The 6th International Conference on Computer Science and Computational Intelligence 2021 (ICCSCI 2021)

Innovation and Breakthrough Research of Computer Science and Technology for Industry and Society

School of Computer Science
Bina Nusantara University
2021
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Greetings!

Conference Chair ICCSCI 2021

Honorable Participants/Researchers/Delegates/Professors

Distinguish Guests

Ladies and gentlemen,

On behalf of the Organizing and Steering Committees, it is my great pleasure and privilege to welcome you to the 2021 International Conference on Computer Science and Computational Intelligence (ICCSCI) 2021 held virtually in Indonesia. This conference is the sixth year of ICCSCI, that annually been organized by the School of Computer Science, Bina Nusantara University since 2015. The conference aims to bring together researchers and experts in computer science to share their ideas, experiences, and insights. ICCSCI 2021 would focus on the theme "Innovation and Breakthrough Research of Computer Science and Technology for Industry and Society". This conference is organized under the technical support of the IEEE. Therefore, I would like to extend my sincere appreciation to IEEE Indonesian Section for continuous support and to the honorable keynote speakers for sharing knowledge and research experiences. We would also express sincere gratitude to our national and international Peer-Review team who volunteered and allocated a big chunk of their time to review papers – their contribution is invaluable. I would express my deep gratitude to committees and volunteers, especially from the School of Computer Science. I proudly inform you that even we are still dealing with the covid-19 pandemic ICCSCI 2021 received 203 papers and 85 high-quality papers were accepted and would be presented at this conference. They are from several countries overseas and Indonesia.

More than that we have experts from academia and professionals who will share their knowledge and research experiences related to our theme of the conference. We believe you will enjoy and improve your knowledge and experiences as well. This event is a great opportunity for social networking and there are discussions among us in current and latest Computer Science and Computational Intelligence. Hopefully, researchers, academicians, professionals, and students from various research backgrounds will contribute to the improvement of knowledge and experiences, especially in the area of Intelligent System and Machine Vision, Software Engineering, Information Security and Networks, Big Data and Information Technology, Foundations of Computing and Theoretical Computer Science, Computational Linguistic and Audio Processing, Internet of Thing and Robotics, Multimedia, Game Development and Virtual Reality. Once again, on behalf of the committee, let me extend a warm welcome to you virtually to Indonesia, especially to all foreign participants. I hope that this event will be pleasant and memorable. Thank you and enjoy the conference!

Sincerely Yours,

Dr. Rojali

Conference Chair ICCSCI 2021
WELCOMING REMARKS

General Chair
BINUS Joint International Conference (BJIC) 2021

The 6th International Conference on Computer Science and Computational Intelligence (ICCSCI)
H.E. Prof. Dr. Ir. Harjanto Prabowo, MM., Rector, BINUS University
Vice rectors, Directors, Deans, and Professors,
Distinguished Keynote speaker, guests, ladies, and gentlemen,

Let us praise to God the Almighty for His merciful and blessings as we gather here to attend The 6th International Conference on Computer Science and Computational Intelligence (ICCSCI) 2021 as part of BINUS Joint International Conference (BJIC) 2021, virtually.

This year BJIC consists of 5 international conferences covering many disciplines ranging from sustainability and development, information management, engineering, technology, computer science, business, international relations, social science, and humanities, namely:

1. **International Conference on Biospheric Harmony Advanced Research (ICOBAR)**, chaired by Christian Harito, S.T., Ph.D was held virtually, 24 - 25 June 2021.
2. **International Conference on Information Management and Technology (ICIMTech)**, chaired by Dr. Evaristus Didik Madyatmadja, ST., M.Kom., M.T, was held virtually, 19 – 20 August 2021.
3. **International Conference on Business, International Relations and Diplomacy (ICOBIRD)**, chaired by Ella S. Prihatini, Ph.D.. was held virtually, 5-6 October 2021.
4. **International Conference on Eco Engineering Development (ICEED)**, chaired by Diana Lo, S.TP, M.Sc., Ph.D. was held virtually, 17-18 November 2021.
5. **International Conference on Computer Science and Computational Intelligence (ICCSCI)**, chaired by Dr. Rojali, S.Si., M.Si., is held today, 18-19 November 2021.

The 6th ICCSCI, specifically, aims to bring together researchers, engineers, scientists, and experts to not only share their ideas, but also disseminate their knowledge and research on computer science, computational intelligence, and information technology. ICCSCI is organized by School of Computer Science, Bina Nusantara University and supported by IEEE Indonesia Section. ICCSCI 2021 would focus on innovation and breakthrough research of computer science and technology for industry and society; delivered through the keynote speakers and distinguished lecturers.

Distinguished guests, ladies, and gentlemen,
This conference is also very special, because our keynote speakers are prominent scholars and professionals from France (Prof. Omar Tahri), Malaysia (Prof. Nooritawati), and Indonesia (Prof. Dr. Ir. Agus Buono, M.Si., M.Kom. and Andry Chowanda, Ph.D., MBCS) who contribute to the discussion of new insights about computer science, computational intelligence, and information technology from their perspective as academician, professionals, and expert from different fields. This conference shows the bold commitment of BINUS University as world class university in creating high impact research towards BINUS Vision 2035 and in continuously producing, sharing knowledge, and fostering and empowering the society. Therefore, I do appreciate for their contribution to these conferences.

Last but not least, I would like to appreciate all chairpersons of the 5 conferences and committee members who have been working very hard to make this conference possible. I would also like to thank presenters, participants, our reviewers, and publishers of the paper presented in the conferences as well as sponsor of this event. I hope you enjoy the conference!

Thank you abundantly.

Jakarta, 18 November 2021

Prof. Dr. Tirta N. Mursitama, PhD
General Chair BJIC 2021
Welcome Message
Dean of School of Computer Science
Bina Nusantara University

Dear Prof. Omar Tahri,
Prof. Nooritawati,
Prof. Agus Buono,
Mr. Randi Waranugraha
Ir. Andry Chowanda, S.Kom., MM., Ph.D., MBCS, CCP.

Distinguished Researchers and Colleagues,
Ladies and Gentlemen,

On behalf of the School of Computer Science BINUS University, it is my great pleasure to welcome you to the 6th International Conference on Computer Science and Computational Intelligence (ICCSCI) virtually held on November 18 and November 19, 2021

I am especially honored to welcome our distinguished keynote speakers, Prof. Omar Tahri from University Of Burgundy, France; Prof. Nooritawati from Universiti Teknologi MARA, Malaysia; Prof. Agus Buono from IPB University, Indonesia, Mr. Randi Waranugraha from DANA Indonesia, and Mr. Andry Chowanda, Ph.D. from BINUS University.

ICCSCI is an annual forum for researchers, engineers, and scientist to disseminate their knowledge and research on Computer Science, Computational Intelligence, and Information Technology. For the last six years of hosting ICCSCI, we have the pleasure to the see how this international conference has become an avenue to provide a valuable opportunity for great minds from both academics and industry to showcase their work, share experiences, brainstorm, and cultivate future innovation. This year we are honored to have 85 esteemed academics and researchers joining us virtually from all around the globe.

With great challenge, come great opportunity and creativity. The last two years challenge of the pandemic has provided the urgency for both threat-driven and opportunity-driven innovations to flourish. Contribution of science, technology and innovation is key for facing challenges, and emerging technologies are being developed and deployed at an extraordinary pace. Moving forward, we will live in a new normal where digital technology and transformation is going to persist. Through this conference, we aim to have stimulating discussions, network, and build further collaboration to create future innovations.
I would like to use this opportunity to convey our highest appreciation for BINUS University and IEEE Indonesia Section for supporting ICCSCI 2021. I would also send my deepest gratitude to all the Committees for their hard work and dedication to ensure the success of this conference.

For all participants, I hope you enjoy the conference, and I am certain you will have fruitful and rewarding exchanges in these two days. I also look forward to meeting you again in next year ICCSCI.

Sincerely yours,

Dr. Fredy Purnomo

Dean of School of Computer Science

Bina Nusantara University
WELCOMING REMARKS
Rector BINUS University

Distinguished keynote speakers,
Fellow professors and presenters,
Ladies and gentlemen,

It is a great honor for me to welcome you to the 6th International Conference on Computer Science and Computational Intelligence (ICCSCI) virtually hosted by School of Computer Science, BINUS University. Welcome to BINUS University, a world-class knowledge institution that is included in Top 6 Indonesian university ranked 301-500 in 2020 QS Graduate Employability Rankings. BINUS is also ranked 9th in Top Indonesian University as well as the best private university in Indonesia based on QS World University Ranking 2022. In 2021 QS Subject Area Rankings, BINUS is ranked 451-500 on Computer Science and Information System. Furthermore, in 2022 THE Subject Area Rankings, BINUS is ranked 801+ on Computer Science, 601+ on Social Science, 1001+ on Engineering, and 601+ on Business and Economics. In 2022 QS Global MBA Rankings, BINUS is ranked 201-250 on World Global MBA Rankings and 36 on Regional Asia Global MBA Rankings.

As implementation towards BINUS Vision 2035, high impact research has become instrumental element in fostering and empowering the society in serving and building the nation. We recognize all efforts from faculty member in creating and publishing their research and publication is indispensable in achieving the vision.

This conference is also part of continuing efforts in producing, deliberating, and disseminating knowledge as well as creating research partnerships between faculty members, distinguished scholars, entrepreneurs, industry leaders and experts from many universities, research think-tank, and companies in the world.

Therefore, an international conference that focuses on creating the future by advancement of computer science and computational intelligence with the aim to encourage innovation and research breakthrough for industry and society is essential to make university stay relevant to the needs of the modern societies.

Ladies and gentlemen,

I would like to express my highest appreciation to all invited keynote speakers and invited plenary session speakers and all presenters and participants who will make this conference meaningful. I strongly advice to make use of this conference wisely, not limited to discussing about research but also actively trying to build connections for a new joint research, publication, faculty exchanges and so on.
Finally, I also thank all the chairpersons and committee members of the conference. I wish all of you great conference and make new acquaintances during the conferences virtually.

Thank you very much.

Jakarta, 18 November 2021

Prof. Dr. Ir. Harjanto Prabowo, MM
Rector, BINUS University
WELCOMING REMARKS
IEEE INDONESIA SECTION

Dr.-Ing. Wahyudi Hasbi, SMIEEE  Prof. Ir. Gamantyo Hendrantoro, M.Eng., Ph.D, SMIEEE
Chair, IEEE Indonesia Section  Vice-Chair, IEEE Indonesia Section

Dear Distinguished Guests, Colleagues, researchers, professionals, ladies, and gentlemen.

A prosperous, warm, and spirited greeting.

On behalf of the IEEE Indonesia Section, we would like to extend our warmest welcome to all keynote speakers, presenters, and participants to The 6th International Conference on Computer Science and Computational Intelligence (ICCSCI). I also want to thank all of you who have joined this conference. Due to this year’s pandemic situation, ICCSI 2021 was held as a completely virtual conference. This international conference organized by School of Computer Science, Bina Nusantara University, and technically co-sponsored by IEEE Computer Society Indonesia. The conference aims for researchers, engineers and scientist to disseminate their knowledge and research on Computer Science, Computational Intelligence and Information Technology.

Recent advancements in frontier technologies, such as artificial intelligence, robotics, and biotechnology, have demonstrated significant promise for long-term growth. However, they risk aggravating and establishing new digital gaps between the technological haves and have-nots, expanding disparities. The COVID-19 epidemic has highlighted this divide even further. Technology has been an essential tool in combating the disease's spread, but not everyone has equal access to its benefits. Hence The conference theme is “Innovation and Breakthrough Research of Computer Science and Technology for Industry and Society,” relevant to these rapid changes.

IEEE Indonesia Section has conducted many activities over 33 years in Indonesia. In terms of collaboration, the IEEE Indonesia section has a good and mutual relationship with ICT organizations, Industries, Governments, Universities, and the Community in Indonesia. IEEE Indonesia has established a cooperation agreement with the Directorate General of Higher Education Research & Technology to synchronize and support relevant activities in the Indonesian Ministry of Education & Culture, Research & Technology program.
IEEE Indonesia Section has contributed to more than 60 international conferences annually, and this conference is one of the conferences that IEEE Indonesia Section supported. As the sixth year of ICCSCI, this conference shows its sustainability due to the hard work of the conference organizers, well-organized conference, and high-quality papers. We hope that some high-quality conferences will be continued and strengthened soon to benefit and positively impact human beings, especially Indonesian people.

Finally, we do hope all of you will have an enjoyable and valuable experience during this event. You may share your best knowledge in your area of research and professional activities.

Thank you and stay healthy.

Jakarta, 12 November 2021

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4. Dr. Fredy Purnomo, S.Kom., M.Kom.


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The 6th International Conference on Computer Science and Computational Intelligence (ICCSCI 2021) is annual forum for researchers, engineers and scientist to disseminate their knowledge and research on Computer Science, Computational Intelligence and Information Technology. We are pleased to announce the theme of the ICCSCI 2021 is: ‘Innovation and Breakthrough Research of Computer Science and Technology for Industry and Society’. The conference warmly welcomes prospected authors to submit their research and idea to ICCSCI 2021 and share the valuable experiences with the scientist and scholars around the world.

ICCSCI 2020 received 203 manuscripts from countries, namely Indonesia, Japan, Malaysia, Republic of Korea, Bangladesh, Taiwan, and India. After careful review process of 203 manuscripts, 85 manuscripts were accepted or approximately 42% rate of acceptance. These manuscripts are divided into seven tracks:
1. Intelligent System and Machine Vision
2. Software Engineering, Information Security and Networks
3. Big Data and Information Technology
4. Foundations of Computing and Theoretical Computer Science
5. Computational Linguistic and Audio Processing
6. Internet of Thing and Robotics
7. Multimedia, Game Development and Virtual Reality

We would like to appreciate all participants, keynote speakers, reviewers and committee for the contributions to the conference program and proceeding. We would like to express our gratitude to the reviewers for the valuable review and suggestion, so that we can maintain the quality of this proceeding very well. This conference is held in success collaboration between Program committee and Technical committee. We would like to thank Elsevier for supporting publication of this conference proceeding.

We are looking forward for the next event in computer science and computational intelligence in the future.
Keynote Speakers

Ir. Andry Chowanda, S.Kom., MM., Ph.D., MBCS, CCP - Bina Nusantara University, Indonesia

Andry is a Computer Science senior lecturer at Bina Nusantara University Indonesia. Andry is also the Deputy Dean of the School of Computer Science for Academic and Collaboration. He received his undergraduate degree in computer science at BINUS University Indonesia, his master degree in Business Management at BINUS Business School Indonesia and PhD in Computer Science at The University of Nottingham, UK. He also holds an Engineering profession degree from Universitas Gadjah Mada Indonesia. Andry is a Professional Member of the British Computer Society, IEEE and ACM. He also receives several certifications, such as the AWS and Alibaba cloud certifications. Moreover, He is also a certified educator of AWS, a certified instructor and the university ambassador of NVIDIA Deep Learning Institute. His research is in agent architecture and Machine (and Deep) Learning. His work mainly on how to model an agent that has the capability to sense and perceive the environment and react based on the perceived data, in addition to the ability to build a social relationship with the user over time. In addition, Andry is also interested in the serious game and gamification design. He has received several research grants from the Ministry of Education Indonesia, Microsoft Indonesia and NVIDIA International.

Abstract

Deep Learning for Social Signals Processing

Humans as social creatures always interact and communicate with each other. We use both verbal and non-verbal communication to interact with each other. Research has shown that most of the modalities used during social interaction between people are mostly non-verbal. These signals are conveyed through non-verbal cues by both interlocutors are generally called social signals. The signals can be automatically captured, processed, and appropriately displayed back to the human interlocutors using sensors. Social Signal Processing (SSP) studies signals that are produced during social interactions. The aim is to provide a computer with the ability to sense, understand, and synthesise social signals. SSP has three main domains to be explored. Automatic Behaviour Analysis (or Machine Analysis), Behaviour Modelling, and Behaviour Synthesis. First, we can capture the data from the environment using sensors such as a microphone, camera. Then, the data captured are analysed in the automatic behaviour analysis systems such as emotions recognition, gender recognition, speech recognition, interest and focus detection, etc. We then can model the behaviour based on the laws or concepts from other domains (i.e. psychology, social science, neuroscience, etc.). We try to computationally model how the human brain works in a
specific task as our brain is extremely complex, so it is a cumbersome task for us to model it. Finally, the system can perform the proposed action through its virtual body. It can be a 3D or 2D chars or a physical one such as a robot. The keynote will discuss how to use machine learning or deep learning to solve problems in SSP. Moreover, some case studies also will be presented in the talk.

Keywords : deep learning, social signals processing, automatic behaviour recognition, behaviour modelling, behaviour synthesis

Prof. Omar Tahri - University Of Burgundy, France

Prof. Omar Tahri was born in Fez, Morocco, in 1976. He got his Master in photonics, images and system control from the Louis Pasteur University, Strasbourg, France, in 2000 and received his Ph.D. degree in computer science from the IRISA/INRIA of Rennes (University of Rennes), France, in March 2004. Since September 2020, he is Full Professor and the head of the robot vision research team ImViA-ViBot at the university of Burgundy. Before joining the University of Burgundy, he was associate professor at the National Institute of Applied Sciences Centre Val-de-Loire (France) from 2015 to 2020, and associate researcher at the Institute of Systems and Robotics of Coimbra (Portugal) from 2008 to 2014. He also worked as postdoctoral researcher at the atomic energy commission (CEA France) from 2004 to 2005, and at the National Institute for Research in Digital Science and Technology (INRIA, France) from 2006 to 2007. Since July 2021, he has been visiting Professor of vision and control of the College of Science, University of Lincoln, UK. Prof. Omar Tahri research interests are vision based control and estimation. His main contributions are at the intersection of three fields: robotics, control and computer vision. His research involves several kinds of robotic applications: object manipulation, mobile robotics, medical robotics (micro-robotics and endoscopy). He is the author of more than 15 international journal papers, mainly in the top ranked journal of the field, IEEE Transactions on Robotics with 9 papers.

Abstract

**Vision Guided Robots : Challenges and Applications**

The first commercial industrial manipulator “Unimate” was created by the Unimation Company in 1956 and was first installed in 1961 in a General Motors plant. Nowadays, according to the International Federation of Robotics, around 3 millions operational manipulator robots are under service for different tasks such as welding, painting, and lifting objects. For a long period, robots
have been used in repetitive and hard tasks in well controlled environments. For complex tasks in dynamic environments, robots need to gain intelligence by using external sensors and new algorithms for better perception and task achievement. An intelligent robot is a combination of a robot, sensors and controls and perception algorithms. Vision sensors are among the most used sensors since they are able to provide rich information about the robot environment in one shot, under the form of images. They include a wide range of devices such as cell phone or industrial camera, 3D RGB-D cameras, omnidirectional (fisheye, spherical, catadioptric), infrared, event cameras, but also other medical imaging systems such as ultrasound probes. The information provided by vision sensors can include color/grey level information as 2D images (conventional sensors) or 3D images, 3D points clouds (RGD-D sensors), variation in grey level between consecutive frames (event sensors). The amount of data to be processed can be huge. For humans, vision is an important sensing that allows us to perceive and understand our environment, to make decisions and achieve complex tasks. Human brain is a magic machine able to process huge amounts of visual data and to recover required information about shapes, positions, identity of objects and other humans as well. For several decades, robot vision researchers have been interested in developing computer algorithms to imitate the human brain skills in using visual data. The aim of this talk is to introduce in brief the main technical challenges of the field and also to list the different related applications.

Keywords : Human brain , robot vision, sensor, visual data ,vision sensors

Prof. Nooritawati - Universiti Teknologi MARA, Malaysia

Nooritawati Md Tahir (PhD, CEng, and SMIEEE) is currently the Director of Research Nexus UiTM, (ReNeU) Universiti Teknologi MARA (UiTM) and a professor at the College of Engineering, UiTM, Shah Alam, Selangor, Malaysia. She has received more than RM8M research grants as principal investigator as well as collaborator. Seventeen PhD and six master's students have graduated under her supervision. Her research interest is in image processing, pattern recognition, and computational intelligence focusing on gait recognition where people are recognised based on the human attributes as well as gait analysis related to biomedical, specifically autism and Parkinson's disease. She has authored and co-authored more than 250 publications and has recently published a book on gait analysis. She is also the Chapter Chair for Control System Society, IEEE Malaysia Section.

Abstract

The Future of Gait Analysis and Classification

Gait can be defined as the way we walk. It has been proven that gait is a unique characteristic for every person, which is difficult to imitate. Gait has been studied extensively for recognition
purposes and as a biometric feature in the human recognition system. Gait offers many advantages in recognising humans in low-resolution images, no requirement for closed interaction between the person and equipment, and image acquisition equipment. In biomedical, gait analysis represents the signature gait behaviour where the gait characteristics or features may be used as an early indicator of the abnormal gait. Many studies have been conducted to identify the differences between normal subjects’ gait characteristics and patients under rehabilitation. Gait analysis techniques have been applied as gait monitoring for diagnosis as well. A suitable gait method can be developed for monitoring purposes in clinical gait. The challenges and way forward on gait analysis and classification will be elaborated too.

Keywords: biomedical, biometric feature, gait analysis

Prof. Dr. Ir. Agus Buono, MSi., MKom. – IPB University

Prof. Dr. Ir Agus Buono, MSi, MKom., is an expert in Computational Intelligence and Statistical Pattern Recognition. He has many discoveries such as Vulnerability Index Data Information System (SIDIK) version 1 and 2, cooperation of the Ministry of Environment (KLH), and Centre for Climate Risk and Opportunity Management in Southeast Asia Pacific (CCROM - SEAP) IPB University. He works on research about the Internet of Things system (IoT) for Automatic monitoring and Irrigation for Melon Cultivation, Collaborative Development of Robots Using Computational Intelligence to Search and Rescue Landslide Victims, and many others. He received an award as Head of IPB University's 3rd-ranked Outstanding Study Program in 2014. He has a position in many organizations such as Vice Dean of academic affairs of IPB University Graduate school since 2020, Chairman of Lecturer publication, Association of Computer Science Universities, Indonesian Computer Science Higher Education Association (APTIKOM) in 2018-2021, Assessment of the National Accreditation Board of Higher Education (BAN-PT), Ministry of Education and Culture of the Republic of Indonesia, and IEEE member.

Abstract

Computational Intelligence and Its Application in Agromaritime 4.0

International community and united nation have committed to ending hunger in 2030. Refers to the data, there are around 800 million people worldwide suffer from hunger. And under the scenario of bussiness as usual, around 650 million people in the world will be undemourishfed by 2030 [1]. It is predicted that we need to produce 70 % more food in 2050. Based on current legacy agriculture, the share on GDP from agriculture sector shrunk around 3%. Scarcity of natural resources and climate change are the main source that intensifying the scarcity and hunger
problem. Another aspect that must be considered in food production is sustainability for a better life-effectivity, efficiency and sustainability.

We must move on from the current path food production system to new system of food production system that optimize the use of resources and not give equal treatment in all production areas. New techniques in food production and distribution to consumers must be started, included farming system, animal farm system, animal health system, forestry system, fisheries and ocean management, agroindustry system, and also how to bring the food to consumers. The new food production and distribution system, we called as agromaritime-4.0, will apply IoT, sensors, data & connection, cloud technology, robotics, drone and artificial intelligence, in order to develop the instrumented, integrated, automated, and finally smart agromaritime system. This material is addressed to present the application the computational intelligence as the part of artificial intelligence in the agromaritime 4.0. We will describe the scope of agromaritime 4.0, a survey of computational intelligence algorithm, computational intelligence algorithm in agromaritime 4.0. It is highly expected from this material that scientific research and application research of artificial intelligence will emerge to support effective, efficient and sustainable national food production.

**Keywords**: agromaritime system, artificial intelligence, cloud technology, drone, distribution system, food production, IoT, robotics, smart, sensors
# GENERAL SCHEDULE

The 6th International Conference on Computer Science and Computational Intelligence (ICCSCI) 2021
Jakarta, Indonesia

**Day 1 - Thursday, 18 November 2021**

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<thead>
<tr>
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<td>09.40-09.45</td>
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**Day 2 - Friday, 19 November 2021**

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PARALLEL SESSION SCHEDULE

Day 1: Thursday, 18 November 2021

Parallel Session I

Room I

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<td>6087</td>
<td>Syarifah Diana Permai, Kevin Herdianto, Iwa Sungkawa</td>
<td>Prediction of Health Insurance Claims Using Logistic Regression and XGBoost Methods</td>
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<td>6089</td>
<td>Nuraini Nuraini</td>
<td>Analysis of Decision Support using Elimination and Choice Expressing Reality (ELECTRE) method in determining Best Candidate of Programmer</td>
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<td>5063</td>
<td>Alam Ahmad Hidayat, Bens Pardamean</td>
<td>Count-Data Mixed Models of Topical Tweets: A Case of Indonesia Flood Events</td>
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Room II
### Room III

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<td>Viska Noviantri, Agus Diemas Prayoga, Denny Pratama</td>
<td>Unsteady State Temperature Distribution Inside House Based on Slope Roof</td>
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<td>5979</td>
<td>Ulva Dewiyanti, Viska Noviantri, Reinert Yosua Rumagit</td>
<td>Nonlinear System for Cell Population Growth Simulations in Pulmonary Tuberculosis Infection</td>
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<td>File Encryption Application using Menezes-Vanstone Elliptic Curve Cryptography Based on Python</td>
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<td>Siti Komisyah, Ayuliana Ayuliana, Malda Ratna Ardyanti</td>
<td>Flood-Prone Susceptibility Analysis In Garut Using Fuzzy Inference System Mamdani Method</td>
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<td>Siti Komisyah, Ayuliana Ayuliana, Dara Amira Balqis</td>
<td>Analysis of Decision Support System for Determining Industrial Sub-District Using DEMATEL-MABAC Methods</td>
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<td>5819</td>
<td>Rinda Nariswari, Herena Pudji Hastuti</td>
<td>Support Vector Machine Method For Predicting Non Linear Data</td>
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<td>Jackel Vui Lung Chew, Jumat Sulaiman, Andang Sunarto</td>
<td>Numerical approximation to porous medium equation using a quarter-sweep based finite difference and explicit four-points group</td>
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**Parallel Session II**

**Room V**

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<td>Maria Tamarina Prawati, Cika Putri Ramadhan, Muhammad Fikri Hasani, Muhammad Imam Alqadri, Richard Horas, Willy Chandra</td>
<td>Contextualizing Automated Writing Evaluation: A Case of English for Specific Purposes Writings</td>
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<td>6032</td>
<td>Ida Bagus Kerthyayana Manuaba</td>
<td>A Sentiment Analysis Model for the COVID-19 Vaccine in Indonesia Using Twitter API v2, TextBlob, and Googletrans Python Libraries</td>
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<td>Donghyun Kim, Seokju Oh, Seokju Oh, Jongpil Jeong, Jongpil Jeong</td>
<td>Abnormal Data Classification Based on SSA-AELSTM</td>
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<td>5639</td>
<td>Dinda Thalia Andariesta, Meditya Wasesa</td>
<td>Machine Learning Models to Predict the Engagement Level of Twitter Posts: Indonesian E-commerce Case Study</td>
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**Room VI**
### Track 1: Foundations of Computing and Theoretical Computer Science

**Time:** 13:00-15:00

**Moderator:** Alfi Yusrotis

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<td>Georgius Andrian Halim, Elbert Adiwijanto, Patrice Agustine, Margaretha Ohyver</td>
<td>Estimation of Cost of Living in a Particular City using Multiple Regression Analysis and Correction of Residual Assumptions through Appropriate Methods</td>
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<td>Livia Leonita, Sevien Sevien, Natanael Hauposan Jeby, Margaretha Ohyver</td>
<td>Predicting Cancer Death Rate and Determining the Major Cause Of Cancer using Ridge Regression</td>
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<td>Jurike V Moniaga, Albert Salim, Louis Raymond, Juliandry Juliandry</td>
<td>General Pattern Recognition using Machine Learning in the Cloud</td>
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<td>Azzalina Chaeruni Putri, Teddy Satrio Prakoso, Margaretha Ohyver</td>
<td>MODELING THE EFFECT OF POVERTY RATE, GDPR, MINIMUM WAGE ON MEAN YEARS OF SCHOOLING IN GORONTALO PROVINCE WITH PANEL DATA REGRESSION</td>
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<td>Sofyan Adrianto, Ira Hanifah Nuha Balqis, Catharina Zevania Neysa Soetanto, Achmad Ghifari Ikram Abubakar, Margaretha Ohyver</td>
<td>Cochrane Orcutt Method to Overcome Autocorrelation in Modeling Factors Affecting the Number of Hotel Visitors in Indonesia</td>
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**Id:** 975 6072 4479

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**Track:** Intelligent System and Machine Vision

**Time:** 13:00-15:00

**Moderator:** Samsul Arifin

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**Track:** Intelligent System and Machine Vision  
**Time:** 13.00-15.00

**Moderator:** Reinert Yosua R

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<td>Sentiments Comparison on Twitter about LGBT in United States of America</td>
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<td>Satoshi Fujimoto, Nobutomo Matsunaga</td>
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## Parallel Session III

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<td>A Review on Determining Customer Satisfaction from Reviews using Sentiment Analysis</td>
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Track: Multimedia, Game Development and Virtual Reality

Time: 09.50-11.50

Moderator: Chrisando Ryan

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<td>JAPANESE LANGUAGE LEARNING GAME “MIRYOKU” USING ANDROID BASED SPEECHRECOGNIZER API</td>
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<td>Yogi Udjaja, Sindhaurtha Liesyatadharma, Samuel Edsel Fernandez, Maria Jeffina</td>
<td>Holoreact: Chemistry Experiment Game with Hologram Based to Enhance Learning on Senior High School Level</td>
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<td>Irfan Rifai, Suryadi Phillip, Hady Pranoto</td>
<td>ReadOn”: Comprehending Challenging Texts at University through Gamification App</td>
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<td>Yeni Nurhasanah, Dimas Pinandoyo, Muhammad Rafi Alamsyah, Ery Prasetyo, Nuzulul Ramadhan Zukri</td>
<td>The Development of Coliform Detection Game As A Part of Android – Based Virtual Food Safety Laboratory to Support Online Learning</td>
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<td>Ishat Raihan Jamil and Mayeesha Humaira</td>
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<td>Boby Siswanto and Yovanka Davincy Setiawan</td>
<td>Smart Plant Watering and Lighting System to Enhance Plant Growth using Internet of Things</td>
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<td>Boby Siswanto and William Hartanto and Elisha Erlina Lukas and Nicolas Don Bosco and Sugiono Kurniawan</td>
<td>Smart Home Monitoring to Improve Valuable Storage Security using IoT-Bluetooth</td>
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<td>Boby Siswanto and Randy Yustar Afif and Alfred Widjaja and Alfonyus Yonatan and Fahmi Efendy and Muhamad Geonurii Rizki Ramadhan</td>
<td>Item verification on smart trolley system using object recognition based on the structural similarity index</td>
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<td>Objective Sleep Quality Measurement based on Fuzzy Logic and Wearable Device</td>
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<td>Jason Andreas Widjaja and Pauw Danny Andersen and Nico Surantha</td>
<td>Cloud-Edge based Heterogeneous Equipment Multi-Task Knowledge Distillation for IIoT</td>
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Parallel Session IV

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**Track**
Multimedia, Game Development and Virtual Reality, Software Engineering, Information Security and Network & Intelligent System and Machine Vision

**Time**
13.00-15.00

**Moderator**
Yogi Udaja
Room VII

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Room VIII

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ABSTRACT LIST

Sentiments Comparison on Twitter about LGBT in United States of America
Axell Mondrian Soesanto\textsuperscript{a}, Aldinata Aldinata\textsuperscript{a}, Vincent Christian Chandra\textsuperscript{a}, Derwin Suhartono\textsuperscript{a}

\textsuperscript{a}Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia. 11530

Abstract
Twitter has become one of the most popular mediums for people to voice their opinions freely on any topic from around the world. Most companies use sentiment analysis from Twitter to see how well their product is. These opinions are categorized into three types which are positive, negative, and neutral sentiments. This paper focuses on Sentiment Analysis of LGBT, which has become a trending and controversial topic for society to talk about. We took these Tweets from fifty states in the United States of America and pre-process them before classifying their sentiment. We test five algorithms to classify the sentiments which are TextBlob PatternAnalyzer, Naive Bayes, Linear Support Vector Machine, Logistic Regression, and XGBoost using both non-preprocessed data and pre-processed data. We found that the Logistic Regression without text-preprocessing gives us the best result with a 70.87\% F1-score. After applying our sentiment classifier to the US tweets that talked about LGBT, we found that most tweets have a neutral sentiment.

Data-Efficient Reinforcement Learning with Data Augmented Episodic Memory
William Rusdyputra\textsuperscript{a}, Andry Chowanda\textsuperscript{a}

\textsuperscript{a}Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia. 11530

Abstract
Since proposed, reinforcement learning has made breakthroughs in cracking the Artificial Intelligence (AI) journey milestones like protein folding, cracking the game of Go, and creating the mechanism to develop a strategy in games like StarCraft and Dota. However, reinforcement learning uses reinforcement learning to gather a lot of virtual data and by trial-and-error to re-configure the parameters to reach optimum capability to solve the environment or challenge. More advanced techniques in reinforcement learning algorithms like Monte Carlo Tree Search combined with deep neural networks helped the current reinforcement learning solve more complex problems. Nevertheless, there are two obstacles in these area: (i) sample efficient learning and (ii) new environment generalization. Sample efficiency concerns the need for extensive data explicitly and to do trial-and-error re-configuration, which means that it is too slow to use for real-world situations and tasks. This work presents a Data-Efficient Reinforcement Learning with augmented data in discrete action environments to prove that can be achieved the state-of-the-art result much faster using data augmentation and episodic memory. Deep Q-Network (DQN) with episodic memory was used and compared to the same model with data augmentation and episodic memory. The model performs augmentation to the observations before being stored to the memory of the agent, causing the agent the perform the same reasoning and action if it encounters similar situations. The result shows that the model with augmentation can outperform the basic model in terms of speed (50\% faster). It can also maintain optimal actions (the base model degrades over time and only reaches the optimum solution after the random action is
disabled). The findings show that the weakness of current models is caused because the model is too precise in observing a situation, means that even if the situation differs by a little bit, the model already considers different action without trying the same action because the situation is similar, this work merely uses the fact and use data augmentation to advise the agent to perform the same action if it encounters a similar situation. It succeeds to perform faster and more optimal.

Real-Time Waste Detection: Comparison between Popular Deep Learning Models
Wesley Lin
Department of Science Morrison Academy Taichung Taichung, Taiwan

Abstract
In the face of the growing global waste pollution crisis and a steep decline in recycling programs, the need to develop a more accurate, efficient, and cost-effective waste management process has become essential. With the rapid advancements in computer vision, object detection through deep learning models can be the perfect solution for this global dilemma. In this study, six well-known computer vision models: YOLOv3, Tiny-YOLOv3, YOLOv4, RetinaNet, Densenet, and SSD were tested and compared to determine the most efficient approach. Models were trained on the TrashX and TrashNet datasets, divided into the seven most common types of solid waste. Based on the findings obtained in this study, YOLOv4 achieved the best mAP result of 45.30%, followed by YOLOv3 with an mAP of 28.83%. Meanwhile, other models thrived in different areas, such as Tiny-YOLOv3 with the highest FPS of 7.54 and the smallest model size of only 34.9 MB. On the other hand, the ResNet-50 model had the shortest training time.

Artificial Intelligence Based Automatic Live Stream Chat Machine Translator
Vincent Joyan Sutandijo, Nunung Nurul Qomariyah
Computer Science Department, Faculty of Computing and Media, Bina Nusantara University, Jakarta, Indonesia

Abstract
In the face of the growing global waste pollution crisis and a steep decline in recycling programs, the need to develop a more accurate, efficient, and cost-effective waste management process has become essential. With the rapid advancements in computer vision, object detection through deep learning models can be the perfect solution for this global dilemma. In this study, six well-known computer vision models: YOLOv3, Tiny-YOLOv3, YOLOv4, RetinaNet, Densenet, and SSD were tested and compared to determine the most efficient approach. Models were trained on the TrashX and TrashNet datasets, divided into the seven most common types of solid waste. Based on the findings obtained in this study, YOLOv4 achieved the best mAP result of 45.30%, followed by YOLOv3 with an mAP of 28.83%. Meanwhile, other models thrived in different areas, such as Tiny-YOLOv3 with the highest FPS of 7.54 and the smallest model size of only 34.9 MB. On the other hand, the ResNet-50 model had the shortest training time.
A Review on Determining Customer Satisfaction from Reviews using Sentiment Analysis
Bayu Kanigoro, Felicia Limanta, Fukjianto Tanjaya, Kezia Aurelia Cendranata, Edy Irwansyah
*Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia. 11530

Abstract
Sentiment Analysis has been part of understanding human behavior and emotion through text in an automated way using algorithms. It is a key factor to scale up understanding people's opinion, which then can be used to several purposes such as increasing service quality and better decision making. In this paper, we have reviewed 34 papers which have proposed various approaches to solve this problem. We found that the state-of-the-art method is using a combination of Particle Swarm Optimization and Naïve Bayes, which achieved 97.5% of accuracy. This shows that Machine Learning is still the go-to approach on Sentiment Analysis.

Automated Essay Scoring Using Machine Learning
Jason Sebastian Kusuma, Kevin Halim, Kevin Halim, Bayu Kanigoro, Edy Irwansyah
*Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia. 11530

Abstract
However, essay grading takes much time, effort, and may be biased. Automated Essay Scoring aims to automate scoring to save time, reduce human effort and reduce biased scoring. However, AES is still not widely used because it lacks transparency, limited language availability, and requires labelled data for the target prompt, which are not always available. The purpose of this study is to review Automated Essay Scoring techniques. This study uses the PRISMA Flow Diagram to do a systematic literature review. Studies published between 2016 until 2021 were identified. From these studies, information relating to the research questions are extracted and processed to answer the research questions. From the papers, datasets, approaches, and models are identified. Models using the same dataset are then compared based on their performance score. The study found that AES has two main approaches, which are feature engineering and deep learning. Recently, more researchers are studying the deep-learning approach. The deep-learning approach uses neural network models such as CNN, LSTM, and BERT. Most studies use ASAP dataset and average QWK as performance metric. The models with highest performance score on ASAP datasets are SBLSTMA (Siamese Bidirectional LSTM Neural Network Architecture) and BERT + handcrafted-features, both with 0.801 average QWK.

Common Brain Activity Features Discretization for Predicting Perceived Speech Quality
Ivan Halim Parmonangan
*Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia. 11530

Abstract
The synthesized speech quality evaluation is one of the important steps to ensure the generated speech audio sounds good to humans. There are two main approaches to perform the evaluation; subjective and objective. Subjective approaches use human as the assessor, which is the most natural approach. However, it is time-consuming and expensive. Hence, it has generally been replaced by the quicker and cheaper objective approaches. Nevertheless, since objective approaches only analyze the audio features,
the predicted quality might not correlated to what humans would perceive. Recent studies shows that brain activity contains some information that can be useful to enhance the prediction performance. This work proposed a method to extract the common features among participants’ brain activity to predict the perceived speech audio quality. The result shows that the proposed approach significantly reduces the prediction error.

**Standard Multi-Layer Perceptron on Positive - Unlabeled Glycosylation Site Dataset**

Bharuno Mahesworo\(^a\), Tjeng Wawan Cenggoro\(^b\), Favorisen Rosyking Lumbanraja\(^d\), Bens Pardamean\(^c\)

\(^a\)Statistics Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia. 11530
\(^b\)Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia. 11530
\(^c\)Bioinformatics and Data Science Research Center, Bina Nusantara University, Indonesia, 11530
\(^d\)Departement of Computer Science, Faculty of Mathematics and Natural Science, University of Lampung, Lampung

Abstract

The implementation of computational approaches for protein glycosylation site prediction is becoming popular since the experimental-validated glycosylation data became more abundant. Some of the data were found to be wrong after the experiment was again carried out with more sophisticated technology. To solve this issue, the latest state-of-the-art model trained the model based on a positive-unlabelled algorithm. The aim of this research is to explore the possibility of an approach applying a simple neural network algorithm and still achieve high classification performance. The model proposed in this research gave competitive results with fewer preprocessing steps. Increasing the accuracy of glycosylation site prediction can complement laboratory-based methods and is very useful for understanding the role of glycosylation.

**Automatic Smart Crawling on Twitter for Weather Information in Indonesia**

Kartika Purwandari\(^a\), Reza Bayu Perdana\(^b\), Join W. C. Sigalingging\(^b\), Reza Rahutomo\(^c\), Bens Pardamean\(^d\)

\(^a\)Bioinformatics and Data Science Research Center, Bina Nusantara University, Indonesia, 11530
\(^b\)Database Center Division of BMKG Meteorological, Climatological, and Geophysical Agency Jakarta, Indonesia
\(^c\)Information Systems Department, School of Information Systems Bina Nusantara University Jakarta, Indonesia
\(^d\)Computer Science Department, BINUS Graduate Program - Master of Computer Science Program, Bina Nusantara University, Jakarta, Indonesia. 11530

Abstract

As a popular resource for analyzing social interactions and text data mining, Twitter utilization is facing an automation problem in collecting Twitter users' geolocation. To surpass this problem, the research proposes Support Vector Machine (SVM) model that can be used to automatically design a smart crawling system on Twitter. Twint, a Python-based Twitter scraping program is utilized to perform data crawling based on keywords related to the weather in Indonesia. Nullgeolocations are filled toward using aliases generated based on Indonesians' behavior of reporting
about Indonesia's location in Twitter tweets. The accuracy of the outcomes of automated smart crawling using the SVM model is 85%.


Ananto Joyoadikusumo\(^a\), Andreas Jahja Sadji\(^a\), Brandon Scott Buana\(^a\), Novita Hanafiah\(^a\)

\(^a\)Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia. 11530

**Abstract**

The devastation of the COVID-19 pandemic, or even similar worldwide disease catastrophes in the future, can undoubtedly be scaled down by the rapid testing of these infections. Even though RT-PCR has been the primary method of diagnosis in the current pandemic, many experts have also proven the credibility of chest radiography analysis and suggested the use of this testing method. In turn, a wide array of studies in 2020 attempted to create state-of-the-art models for COVID-19 diagnosis, utilizing established deep learning architectures like ResNeXt, Xception, etc. Of course, the studies used different pre-trained models, datasets, and had varying results. Therefore, we look to measure the performance of all the popular CNN architectures in classifying COVID-19 infected chest x-ray from healthy chest x-rays and using a single dataset as a benchmark to find the best performing pre-trained models in this task. In turn, future studies related to COVID-19 CXR detection can use the results of this study to select the best suited pre-trained models. The architectures we tested are all augmented with one Global Average Pooling layer (and the 2-unit output layer, of course) and are trained using an exponential learning rate scheduler. We also experimented with different hyperparameters in an attempt to fine-tune the model and get the best possible results. Our experiments show that most of the CNN models have a similar performance in this task, and even simpler architectures were able to achieve similar results as the more complex ones while having faster training time. However, ResNet models (particularly ResNet101) were able to consistently, though marginally, outperform all the other architectures we included in the study.

**ChatLinguist: Web-based Youtube Live Stream Automatic Chat Message Translator**

Jason Christoper Chandra\(^a\), Nunung Nurul Qomariyah\(^a\)

\(^a\)Computer Science Department, Faculty of Computing and Media, Bina Nusantara University, Jakarta, Indonesia

**Abstract**

Live streaming has become a very popular activity that Indonesians with access to the Internet participate in everyday, there are already many live streaming platforms available on the market, such as YouTube and Twitch, however these platforms are not region-locked, which means that viewers are able to watch streamers from other regions of the world. This means that a streamer can reach a wider audience, but it also means that language barriers are more apparent than ever. This issue can be seen when an Indonesian viewer watches a streamer who can only speak in English, as English is not the viewer’s mother tongue, the viewer will not feel as interactive as possible, this is especially true because the viewer is not able to communicate and interact with
other viewers through the live stream chat box, as the chat box is probably utilizing English as the main language. Therefore, the author wanted to create a web application that can help solve this issue by translating YouTube Live chat box messages from English to Indonesian while also being able to translate Indonesian messages inputted by the user into English before sending it into the live stream chat box. This web application implements Django as its main framework and depends on Python libraries and YouTube API calls for its main functionality, while the translation process depends on Artificial Intelligence.

Measuring The Percentage of Brain Concentration Levels Using Bi-LSTM Algorithm
Felix Filipi, Febrian Nugroho, Sidharta Sidharta
Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia. 11530

Abstract
Human concentration plays a crucial role in affecting a person’s activity. And it is very important to keep it present for people who need to do activities that require focus, for example, a surgical operator who needs to operate on a patient. But unfortunately, the measure of the concentration level in a person tends to be less clear. However, there is a way to overcome it by analyzing and observing the electroencephalography (EEG) signal generated by the human brain. The EEG signal will be used as training and testing datasets to automate the measurement of concentration level using the help of a deep learning approach. The model of deep learning will use the Bidirectional Long Short-Term Memory (BiLSTM) algorithm which is successfully able to measure the person's concentration level on a scale of 1 to 100. The model gained 82% as the minimum accuracy when tested on subject a’s dataset and showed 93% of accuracy as the best scenario for testing our model on subject b’s dataset.

A MinMax Item-based Method for Multi-Criteria Recommendation Systems
Noor Ifada, Mochammad Kautsar Sophan, Nur Fitriani Dwi Putri
Informatics Department University of Trunojoyo Madura Bangkalan, Madura, Indonesia

Abstract
Data normalization becomes a common problem in multi-criteria recommendation systems. It occurs due to the diversity of rating ranges amongst criteria and the dissimilarity of the rating behaviors between users. Previous studies have shown the superiority of the Decoupling technique in the user-based multi-criteria recommendation system and the outperformance of the MinMax technique in the multi-criteria decision-making system and data mining. Meanwhile, another study has shown that Decoupling works better in the item-based method than in the user-based. At this point, a question arises on whether MinMax can outperform Decoupling in the item-based multi-criteria recommendation system. This paper proposes a multi-criteria recommendation method that implements the combination of the MinMax normalization technique and the item-based modeling approach, labeled as the MinMax Item-based method (MIB). Using the Yelp Hotel multicriteria rating dataset, we conduct the sensitivity analysis of MIB towards its parameter settings. The best results are then used in the performance benchmarking of MIB towards its counterpart method, DCMItem, which implements the Decoupling normalization technique. The benchmarking results show that MIB outperforms DCMItem, i.e., 2.30% and 2.00% in Precision and NDCG, respectively. Hence, MinMax is proven to outperform Decoupling when implemented in the item-based multi-criteria recommendation system.
Deep Feature-based RGB-D Odometry using SuperPoint and SuperGlue
Satoshi Fujimoto,a Nobutomo Matsunagaa
abGraduate School of Science and Technology Kumamoto University Kumamoto

Abstract
This paper presents a deep feature-based RGB-D odometry system using SuperPoint and SuperGlue. Geometry-based visual odometry systems face challenges, such as tracking failures in difficult scenes and scale ambiguity. As for the scale ambiguity problem, the map need not be initialized because 3D information can be obtained by using the depth cameras installed in smartphones in recent years. By contrast, learning-based visual odometry systems can estimate even particularly difficult scenes compared with ORB, SIFT, and LIFT features. We integrated this into our RGB-D odometry system. Compared with geometry-based and learning-based visual odometry systems, the proposed deep feature-based RGB-D odometry system achieved higher accuracy.

Automatic Essay Exam Scoring System : A Systematic Literature Review
Meilia Nur Indah Susanti,a Arief Ramadhan,a Harco Leslie Hendric Spit Warnarsa
aComputer Science Department, BINUS Graduate Program – Doctor of Computer Science Bina Nusantara University, Jakarta

Abstract
Currently, Indonesia and the whole world are being hit by the Covid-19 pandemic which has an impact on various fields of life. It affects all sectors, including the education sector. The government through the Ministry of Education and Culture makes a policy in education in terms of the learning process. Teaching and learning activities that were initially carried out face to face become distance learning which was carried out at home. In this study, a systematic literature review is conducted on automatic assessment of essay answers. Various previous studies discuss the essay answer scoring system that has been developed using various methods. We synthesize the results to enrich our understanding of the automated essay exam scoring system. The expected result of this research is that it can contribute to further research related to the automated essay exam scoring system, especially in terms of considering methods and dataset forms.

Sentiment Analysis of Restaurant Review Using Support Vector Machine
Leonard Gunawan,a Louis Wihan,a Maria Susan Anggreainya, Gihon Yonathan Lesmana,a Santy,a Sablin Yusufa
aComputer Science Department School of Computer Science Bina Nusantara University Jakarta, Indonesia, 11530

Abstract
Most customers often find themselves in a situation where they have to answer the same question: which restaurant has the best food? To answer this question, we apply the technique of sentiment analysis. The many competitors in the restaurant industry make restaurant owners really value opinions customers regarding the food and services they provide to enhance customer satisfaction. Every word a customer utters has an implied meaning and emotion. This process is important to find out whether customers’ emotions towards our brand are positive, negative, or neutral. This research tries to classifying restaurant customer satisfaction in Jakarta using SVM (Support Vector Machine) and comparing with Naïve Bayes
(NB). The results showed an increase in the accuracy of SVM from 77% to 79%.

Signature Authentication Model using Adaptive Moment Estimation Optimization in Multilayer Backpropagated Artificial Neural Networks
Thomas Galih Satria, Fabian Surya Pramudya, Muhammad Farrel Adinugroho, Syarifa Anatia, Winda Winda, Theresia Diah Kusumaningrum

Abstract
A signature is a unique sign of approval of an individual used for verification and legalization of a written form of information. Given the nature of its importance, a thorough verification procedure is required to validate the authenticity of one’s signature. To aid the manual and laborious procedure of verification, we studied 2000 signature data consists of original and tailor-made signatures, extracted their unique digital properties, analysed, and built an optimized model to produce a verification procedure that can specifically determine whether one’s is authentic or counterfeited. We proposed a methodology using Adaptive Moment Estimation (ADAM) in the Multilayer Backpropagated Artificial Neural Networks methodology (BP-ANN) based on nine important features, namely the ratio, x-axis centroid, y-axis centroid, eccentricity, solidity, x-axis skewness, y-axis skewness, x-axis kurtosis, y-axis kurtosis. The features are extracted and analysed as the model input for the first stage of the research. The model was then iteratively trained to determine the number of effective hidden layers, to classify the signature into a binary class of authentic or counterfeited. 25% of the signatures are used as the training datasets, another 25% are used for the testing datasets, while 50% are used as the final real-world experiment. Utilizing these settings, any form of signature unique to each individual in our datasets can be identified, analysed, and verified with a robust accuracy of 89% by using three hidden layers using our proposed methodology.

Implementation of Computer Vision for Jakarta Weather Image Categorization Using ResNet
Kartika Purwandari, Join W.C. Sigalingging, Alam Ahmad Hidayat, Tjeng Wawan Cenggoro, Bens Pardamean

Abstract
Currently, weather information is very important in supporting community activities. Jakarta as the capital of Indonesia as well as the center of economy and trade has a bustling activities. Therefore, weather information is very much needed so that these activities are not disrupted which results in hampering economic and trade activities. The use of social media as dissemination of
information is very widely used lately. Especially Instagram, where users prefer to take pictures and share the information they experience. The Instagram account that spreads information about the situation in Jakarta and its surroundings is @jktinfo, including the current weather conditions. In this study, the @jktinfo account is used as a data collection. The collected images based on sunny, cloudy, and rainy scenes were augmented using Pytorch albumentation and processed using the residual network method. The ResNet layers used were layers 18, 34, and 50. The results of ResNet-18 with an accuracy of 86.6% provide the best results in classifying outdoor images on weather conditions compared to other models.

**Initial Study of Batik Generation using Variational Autoencoder**
Aditya Firman Ihsan

*School of Computing Telkom University Bandung, Indonesia*

**Abstract**
Variational autoencoder (VAE) is one of the most promising architectures of generative models. In this study, we implemented deep convolutional VAE architecture to reconstruct Batik patterns. Reconstruction results from different batik motifs with some specific criteria are mapped and compared. We also analyzed the effect of batch normalization as one of important features in convolutional network to the model performance. Some properties of learned latent space from the dataset are studied. By these analyses, we provided initial groundwork for future studies of Batik generation using VAE.

**Surrogate Model-based Multi-Objective Optimization in Early Stages of Ship Design**
Nanda Yustina, Ari Saptawijaya

*Faculty of Computer Science, Universitas Indonesia, Depok, Indonesia*

*Center of Maritime Industrial Engineering, Indonesian National Research and Innovation Agency (BRIN), Tangerang Selatan, Indonesia*

**Abstract**
In the early stages of ship design, the decision of the ship’s main dimensions has a significant impact on determining the ship’s performance and the total cost of ownership. This paper focuses on an optimization approach based on surrogate models at the early stages of ship design. The objectives are to minimize both power requirements and building costs yet still satisfying the given constraints. We compare three approaches of surrogate models: Kriging, BPNN-PSO (Backpropagation Neural Network-Particle Swarm Optimizer), and MLP (Multi-Layer Perceptron) in two multiobjective optimization algorithms: MOEA/D (Multi-Objective Evolutionary Algorithm Decomposition) and NSGA-II (NonDominated Sorting Genetic Algorithm II). The experimental results show that BPNN-PSO and MLP have equally lower Mean Absolute Error (MAE) but lower hypervolume compared to Kriging for both optimization algorithms MOEA/D and NSGA-II. On the other hand, Kriging has two times higher hypervolume and the lowest computational time but higher MAE compared to BPNN-PSO and MLP. Moreover, the three surrogate model approaches in automatic optimization can significantly improve ship design solutions and reduce work time in the early design stages.
Twenty Years of E-learning in Health Science: A Bibliometric
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cElectrical Engineering, Faculty of Science and Technology, Raden Rahmat Islamic University, Malang, Indonesia

Abstract
Education about health sciences has historically been limited in the curriculum of health professionals and largely inaccessible to the public. In practice, most of the health science education is still running conventionally. Supposedly with the advancement of technology and the use of the internet everywhere, learning such as e-learning can be important, especially in the health sector. Until this research was conducted, only 514 academic documents about e-learning in health sciences were found for 20 years from 2001 to 2020, obtained in searching on the Scopus database. This study presents a comprehensive overview of studies related to E-learning in the Health Sciences sector. This study uses bibliometric analysis and indexed digital methods to map scientific publications throughout the world. This research employs the Scopus database to gather information, as well as the Scopus online analysis tool and Vosviewer to show the bibliometric network. The method consist with five stages: determining search keywords, initial search results, refinement of search results, initial compilation, and data analysis. Among the most published and indexed articles by Scopus, papers published by researchers in the United States have the highest number of publications (80), followed by United Kingdom (63) and Australia with 45 academic publications. The processed data shows the pattern and trend of increasing the number of international publications in E-learning in Health Sciences field, which Scopus index.

Sentiment Analysis E-Commerce Review
Be Muhammad Doohan Abighaila, Fachrifansyahb, Muhammad Reyhan Firmandaa, Maria Susan Anggreainya, Harviantoa, Gintoroa

aComputer Science Department, Faculty of Computing and Media, Bina Nusantara University, Jakarta, Indonesia

Abstract
Electronic commerce or e-commerce is a business model that allows companies or individuals to buy or sell goods via the internet (online). In e-commerce, it is easy for consumers to give reviews. The number of reviews requires a special method or technique that is able to categorize the review automatically, whether including positive or negative reviews. Sentiment Analysis is a way of identifying and classifying the polarity of a given text at the document, sentence and phrase level. This research tries to classifying e-commerce review with Naïve Bayes Classifier (NBC). The results of this research indicate that the accuracy with NBC 72%, Recall 72% and Precision 78%.
Multivariate Time-Series Deep Learning for Joint Prediction of Temperature and Relative Humidity in a Closed Space
Fergyanto E. Gunawan, Arief S. Budiman, Bens Pardamean, Endang Djuana, Sugirto Romeli, Tjeng Wawan Cenggoro, Kartika Purwandari, Alam A. Hidayat, A. A. N. Perwira Redi, Muhammad Asrol

Abstract
An accurate predictive model of temperature and humidity plays a vital role in many industrial processes that utilize a closed space such as in agriculture and building management. With the exceptional performance of deep learning on time-series data, developing a predictive temperature and humidity model with deep learning is propitious. In this study, we demonstrated that deep learning models with multivariate timeseries data produce remarkable performance for temperature and relative humidity prediction in a closed space. In detail, all deep learning models that we developed in this study achieve almost perfect performance with the $R^2$ value over 0.99.

Stock Price Prediction Model Using Deep Learning Optimization Based on Technical Analysis Indicators
Theodorus Devrison, Timothy Julian, Varian Anora, Kristien Margi Suryaningrum

Abstract
Stock prices are difficult to predict as they do not have a fixed pattern. Seeing this problem, the authors conducted experiments to predict stock prices for the next 7 market days by using one of Deep Learning architecture, Multilayer Perceptron combined with the proposed day shifting method. Raw data for this experiment was obtained from https://finance.yahoo.com. The results of the experiments showed that the model could predict stock prices with $R^2$ metrics of 0.995. The authors also observed the usefulness of the model and proposed Mean Error to Mean Price Ratio (MEMPR) to enhance the insight given by the model.

Japanese Language Learning Game “Miryoku” Using Android Based Speechrecognizer API
Yogi Udjaja, Rio Wibawa, Adhiwira Lokacarya, Felix Kurniawan

Abstract
The goal of this research is to produce a game that uses speech recognition technology that can be used to learn basic Japanese and to find out whether there is an increase in basic Japanese skills for beginner students who use game media for learning. The research method used includes the
pre-test and the final test in the form of a quiz, where there are questions addressed to players to
determine the improvement achieved after playing the game “Miryoku” for 5 days. The Android
based SpeechRecognizer API will be implemented as the core of the algorithm. Data collection
was carried out using the distribution of a survey form to 31 participants with minimal skills about
Japanese and or who wish to learn Japanese. The result obtained was an increase in the average
score obtained by the participants from 64.77 out of 100 on the initial test to a score of 87.77 out
of 100 on the final test. It can be concluded that game media is in demand and effective for
learning Japanese as seen from the improvement.

Empowering Military in Tactical and Warfare Area with Virtual Reality Technology: A
Systematic Literature Review
Lonard Steven\textsuperscript{a}, Jason Kenneth Hauw\textsuperscript{a}, Muhammad Billy Keane\textsuperscript{a}, Alexander Agung Santoso Gunawan\textsuperscript{a}
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Abstract
Virtual reality technology's rapid development draws real-world advantages for multiple sectors
around the world. That includes the military forces that are the first adopters of the technology,
with numerous beneficial medical and practical usage. However, the technology's research
contribution in this field, mainly the practical ones is currently low. It is caused by limited data
and interest thru both researchers and military institutions. To discovering if that problem truly
happens, the authors are conducting a practical military virtual reality systematic literature study,
especially concerning tactical and combat acts. Using the PRISMA framework, in addition to the
searching and inclusion-exclusion technique, the authors found twenty-five relevant quantitative
and qualitative research outputs that discussed these extensively. The majority of those, fifteen in
amount, would be conversing about combat and weapon training simulators. An unexpected thing
to see is that they are starting to apply other computer science and applied science technologies.
Robotics, big data, haptics, body area networks, and signal processing are known to be them.
Almost all quantitative research activities in this area are considered successful, with eight of ten
papers showing it. Solutions to improve research qualities in this matter are generally composed of
two things. They are implementing combat and weapon training in the military system and
encouraging both novel and profound new research in this area. military forces can make use of
analyzed products as a support platform to support personnel to improve and maintain their
personal development and skills.

The Impact of Competitive FPS Video Games on Human's Decision-Making Skills
Juan Oscarido\textsuperscript{a}, Zulfikar Airlangga Siswanto\textsuperscript{a}, Devin Akwila Maleke\textsuperscript{a}, Alexander A S
Gunawan\textsuperscript{a}
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Abstract
The problem we face today is that many people think that playing games only has a negative impact on a
person's brain and behavior. but the fact is that playing games has a positive impact in many ways. The
aim of this document is to prove whether video games can really influence human behavior on their decision-making skills. We will test 22 respondents directly who are teenagers and adults around 17-25 years old, and we will score them after they have finished playing games with the genre that we decided. The results proved that competitive First-person shooter (FPS) games increase human ability to make decisions quickly and correctly. Many of our participants agree that after playing competitive FPS games, they feel a positive impact on their cognitive skills. Our participants said that they can quickly compare the impact of the decisions they make and choose exactly which is the best course of action.

Casual Game Design to Introduce Jamu
Thomas Galih Satria\textsuperscript{a}, Reyna Rosalia Priyanto\textsuperscript{a}, Zephania Isadora\textsuperscript{a}, Yasmin Quita Azzahra\textsuperscript{a}, Francisco Maruli Panggabean\textsuperscript{a}
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Abstract
Jamu is an Indonesian traditional herbal medicine that has been practiced for many centuries in Indonesian community to maintain good health and as medication. Modern and conventional medicine is becoming increasingly important in Indonesia, Jamu tends to be ditched and resulting Indonesian in urban area has a few amounts of knowledges of the benefits of Jamu. The aim is to using games as a medium for Indonesian learning process as games could increase interest in focused topic. In this research, we developed a game application and technology to increase user knowledges in the benefits of Jamu herbal medicine. Application is tested and evaluated with a sample of users to increase user knowledge and interest in herbal medicine. The post-test results shows that 70% of users shows increased interest in herbal medicine and 85% show increased knowledge of the benefits of herbal medicine.

Multimedia Application based on Virtual Reality to Introduce College Majors in Universities
Damar Harip Paramartha\textsuperscript{a}, M.Afdhal Arief Malik\textsuperscript{a}, Selvi Dian Pertiwi\textsuperscript{a}, Reinert Yosua Rumagit\textsuperscript{a}
\textsuperscript{a}Computer Science Department School of Computer Science Bina Nusantara University Jakarta, Indonesia, 11530

Abstract
The purpose of this research is to develop Virtual Reality-based multimedia applications that can provide new experiences and knowledge of universities. Right now, lots of prospective students are choosing the wrong major and this can cause bad influences on those prospective students. The development process method used in this application is the GDLC method, or it can also be called the Game Development Life Cycle. The GDLC process starts from initiation, pre-production, testing, beta, and lastly release. The application has been tested by several respondents. The results of the survey concluded that 74.5% respondents agreed that this application can motivate students to choose the majors they are interested in. The survey also shows that 80.6% respondents agreed that the application developed can convince students to choose the majors they are interested in. The results of the testimonials shows that 77.1% respondents felt that this application is easy to understand.
Implementation E-Concierge in Hotel
Alexander Agung Santoso Gunawan

Abstract
Hotels are the places that people choose to carry out activities such as recreation, business, and others. Guests expect to get good service, get comfort while staying at the hotel. During this pandemic, the hotel has started to enforce strict health protocols by reducing the number of employees working, by reducing the number of workers expected to minimize transmission in the hotel environment. With the reduction in hotel employees, it creates a shortage of labor in serving hotel guests who arrive. For this purpose, we created a chatbot, called as e-concierge, that can provide information about the hotel to the guests. The chatbot is also expected to help push the hotel industry forward by combining technology. The chatbot is developed using the AI-based Dialogflow application that can answer questions asked by staying guests. Dialogflow uses json to be able to reply to messages with the design we want and uses node.js. Based on our evaluation, the chatbot can employ the purpose as e-concierge which can replace customer service in the hotel.

Level of User Satisfaction with the Current YouTube Recommendation System
Erdvin Erdvin, Farhan Muhammad Ardiansyah, Hendika Solim, Alexander Agung Santoso Gunawan

Abstract
YouTube is a very large video platform that users use for an equally large variety of reasons. YouTube uses a recommendation system to help each user pick videos that suits their requirements. However, filtering these videos is not an easy task, and the recommendation system may make mistakes. This paper discusses what problems the recommendation system has and how dire these problems are through a survey in order to understand the advantages and disadvantages of the current recommendation system. Out of 59 participants, 46 of them find the recommendation system is acceptable, good or excellent, but still points out several problems. Between the 24 creators participating in the survey, the recommendation system is still acceptable, but inclined much more towards being poor. We concluded that there is a lack of clarity on how the recommendation system works. This characteristic disliked mainly by creators because they are unable to direct their works to the prospective viewers.

“Read on”: Comprehending Challenging Texts at University through Gamification App
Irfan Rifai, Suryadi Phillip, Hady Pranoto

Abstract
Despite the common public misperception of gaming as wasteful activity, studies found that it contributes to students’ knowledge generation, soft skill improvement and other technical skills. This article explores the benefits of integrating gaming elements in non-game setting (gamification) with reading in the form of an application. The application was aimed to support
generation \( Z \) university students, who have been generally exposed to gadgets and gaming, with the ability in comprehending challenging texts. In addition to Second Language Acquisition theory, we considered factors like university students as users, texts’ complexity offered at the university level, and gamification features that might influence our design. The study resulted in a prototype of a gaming activity that we call “ReadOn”. An interview and an experiment to a small group of participants was done to explore the newly built prototype. The experiment with users displayed the result of collaboration and competition that underlined the essence of the application. The data of students’ experience in using the prototype was used as feedback for future development of the platform.

**Improving the Performance of Speech-Gesture Multimodal Interface in non-Ideal Environments**

Fiolisya Faustine Ambadar\(^a\), Jude Joseph Lamug Martinez\(^a\)

\(^a\)Computer Science Department, Faculty of Computing and Media, Bina Nusantara University, Jakarta, Indonesia, 10270

**Abstract**

Multimodal interfaces have enhanced human-computer interaction by enabling users to interact with computers using a combination of multiple input modes, providing increased accessibility to a wider range of users in various situations. The multimodal system’s ability to process multiple input modes allows it to rely on one input modal given that the second modal is unable to function due to exposure to extreme environments. This study will analyse a speech-gesture multimodal interface framework and the prototype that was initially developed by Sindy Dewanti and have been improved upon by Regita Isada. To further improve the framework and prototype’s performance, this study will evaluate and resolve the issues encountered in the previous study regarding the configuration of each modal’s confidence levels, environment detection, weight calculation, and how the unification process selects a final semantic. Upon implementing the changes, the prototype was tested under three environmental conditions: normal, moderate, and extreme in both unimodal and multimodal mode. The test results show that the prototype was able to deliver the expected results with improved accuracy in multimodal mode as compared to the previous study. Nonetheless, the way that the modals perform, and the unification process can still be further improved.

**UI/UX Design Prototype for Mobile Community-based Course**

Yanfi\(^a\)

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**Abstract**

Until now, there is neither research nor application, both mobile and website specifically designed to facilitate courses in the community, a non-profit organization. This paper discusses how to design a prototype for mobile community-based, especially in the Personal Evangelism course at Catholic Church of Mary Mother of Carmel in Jakarta, to give a solution to manage communication and course activities between members. This study uses the Task-centered User Interface design method which allows the interface to be designed and evaluated according to the user's work. In explaining the methodology, there are four phases including users’ identification, requirements, design solution, and walkthrough evaluations. The evaluation is done in natural
settings involving users and using the USE Questionnaire for the evaluation tool. The result obtained from the testing of the prototype with Usefulness (UF) aspect results is 82.88%, Ease of Use (EU) aspect results is 83.91%, Ease of Learning (EL) aspect results is 84.70%, Satisfaction (SA) aspect results is 81.21%, and the result of all usability aspects are 83.11% where Usefulness (UF), Ease of Use (EU), Ease of Learning (EL) respectively affected Satisfaction (SA). The finding of this study as a recommendation for the organization about the prototype is useful and worthy to develop.

**Experiential Game Learning Design Framework: Mechanical Content of Serious Game**

Yogi Udajaya\textsuperscript{a}, Dimas Ramdhan\textsuperscript{a}, Agnes Kurniati\textsuperscript{a}

\textsuperscript{a}Computer Science Department School of Computer Science Bina Nusantara University Jakarta, Indonesia, 11530

**Abstract**

Indonesian society is plural, many cultures spread throughout Indonesia. If not preserved, over time the culture will be lost eroded by time. In the era of globalization, the exchange of information very quickly, but the traditional culture began to fade, one of them is gamelan. The main factors that cause this are the lack of gamelan makers or craftsmen, the high price of gamelan, and foreign culture entering Indonesia. This causes many people who do not know about gamelan and have no interest in knowing it. Therefore, a system was created to increase public interest in learning gamelan. This study describes the development method and learning framework for serious game content to obtain one option to preserve traditional culture, especially gamelan, and increase public interest in learning gamelan.

**Augmented Reality Navigation Application to Promote Tourism to Local State Attraction “Lawang Sewu”**

Peter Pranata Saputra\textsuperscript{a}, Hady Pranoto\textsuperscript{a}, Melki Sadekh Mansuan\textsuperscript{a}, Yanfi Yanfi\textsuperscript{a}, Herru Darmadi\textsuperscript{a}

\textsuperscript{a}Computer Science Department School of Computer Science Bina Nusantara University Jakarta, Indonesia, 11530

**Abstract**

The writing of this paper and the creation of this application is a means to improve and add on facilities on the local state-run attraction. This subject matter was picked in conjunction with the decline of tourism in the said historical site due to a pandemic that rankles Indonesia’s tourism industry and drives it to the ground. Augmented Reality as a method of deliverance was picked due to its popularity and freshness in the tourism market. The research method was conducted starting with analysis, development, implementation, then evaluation. Analysis was done using sourcing available to the public and a questioner. Implementation was done using Unity, Vuforia, and Maya. And with the positive responses of 66.6% of the sample market finding enjoyment in the use of this application in their exploration during User Acceptance testing with the existing prototype. This shows that the resulting use of this application improves user enjoyment in experiencing the state attraction.

**The Development of Coliform Detection Game As A Part of Android – Based Virtual Food Safety Laboratory to Support Online Learning**

Yeni Nurhasanah, Dimas Pinandoyo, Muhammad Rafi Alamsyah, Ery Prasetyo, Nuzulul Ramadhan Zukri

**Abstract**

The Implementing of online learning during the pandemic offers opportunities and challenges,
especially for educators. Creativity is needed to ensure that online learning is effective and efficient so that learning outcomes can be achieved properly. Having the appropriate learning media is certainly very helpful in overcoming those issues. However, in some areas of competencies, for example in food safety practical work, there are still few learning media available. Food safety is a material that must be mastered not only by food packaging technology students but also culinary students and catering, public health, and food technology. This research aims to produce a coliform detection game that is part of a virtual food safety laboratory application. This game application is expected to support the learning process about food safety. This research using the ADDIE model approach (Analysis, Design, Development, Implementation, and Evaluation) and implements the stages of the game development life cycle. The coliform detection game application was validated by 2 material experts and 2 design and media experts. Application trials were carried out in small groups of 5 people. Field trials were conducted on 25 students in the 3rd semester of the Art culinary studies program at the Creative Media State Polytechnic. From these trials, the average pre-test score was 2.88. Meanwhile, the average post-test score was 9.28. The data shows an increase in student knowledge so that it can be concluded the coliform detection game application supports online learning.

**Holoreact: Chemistry Experiment Game with Hologram Based to Enhance Learning on Senior High School Level**

Yogi Udjaja\(^a\), Sindhuartha Liesyatadharm\(^a\), Samuel Edsel Fernandez\(^a\), Maria Jeffina\(^a\)

\(^a\)Computer Science Department School of Computer Science Bina Nusantara University Jakarta, Indonesia, 11530

**Abstract**

Survey conducted to 104 students from 14 schools through online questionnaires found that students considered chemistry as a hard subject. This is also supported by the declining score result from chemistry’s National Examination, specifically in analytic chemistry section for the past three years. Based on survey, students were found to be interested in learning chemistry through experiment hologram-based game because it is more immersive and easier to observe. Hence a chemistry experiment hologram-based game is made using ELEKTRA method, which aims to teach high-school chemistry concepts for analytic chemistry. The test result from students showed an increase of understanding for 47\% - 62\% in both pre and post experiment quiz score. Based on expert’s interview result, the game’s content has been compatible with current high school curriculum.

**AHMERS: Active Health Monitoring and Emergency Response System**

Ishat Raihan Jamil and Mayeesha Humaira

**Abstract**

AHMERS, active health monitoring and emergency response system, is a mobile application-based system that wirelessly connects to a smartwatch to constantly monitor the human body and respond to sudden changes in vital data, in case of emergency. This app monitors heartbeat rate, blood oxygen saturation, body temperature, and compares them with pre-set normal values. If the data deviates or the user presses one of the emergency switches, the app immediately asks the person if he/she is ok. If the person fails to respond within a few seconds to the “Are you ok?” message, the app continues to send out distress signals to pre-set phone numbers and server along with the person’s altitude, latitude and longitude, and current location on the map so that help can be sent quickly. It can determine whether a person is suffering from a health-related problem such as heart failure, Corona virus infection, hypothermia, etc.
Smart Plant Watering and Lighting System to Enhance Plant Growth using Internet of Things
Boby Siswanto, Yovanka Davincy Setiawan, William Hartanto, Elsha Erlina Lukas, Nicolas Don Bosco, Sugiono Kurniawan
Computer Science Department School of Computer Science Bina Nusantara University Jakarta, Indonesia, 11530

Abstract
Technology can be applied in all fields; one of the implementations is technology in agriculture. The application of this technology can automate plant maintenance management systems to facilitate plant care and cultivation. Plant cultivation using the Green House method of automation management system technology for plant maintenance and cultivation will utilize humidity, temperature, and lighting. This study aims to propose an intelligent plant system to help us cultivate plants or plants more quickly and efficiently in their care, and then this research has a goal or result to support increasing plant growth. The data obtained by the connected sensors are collected and processed on Arduino to provide recommendations on the plant maintenance process at the Greenhouse. The characteristics obtained from the sensor indicate that it will increase plant growth.

Smart Home Monitoring to Improve Valuable Storage Security using IoT- Bluetooth
Boby Siswanto, Randy Yustar Afif, Alfred Widjaja, Alfonsius Yonatan, Fahmi Efendy and Muhamad Geonurri Rizki Ramadhan
Computer Science Department School of Computer Science Bina Nusantara University Jakarta, Indonesia, 11530

Abstract
Home security is one of the most essential and simple things that must be considered so that everyone has a safe and comfortable home. Traditional home security usually only applies surveillance cameras in monitoring security. The price of security cameras is generally relatively high, and many cannot be integrated with the user's device to be monitored in real-time. To maintain and monitor security, the Internet of Things (IoT) system using sensors installed in the house. In this study, the detection sensors used were PIR sensors as well as Ultrasonic sensors. Both sensors will be used as triggers to notify users and triggers for a servo to lock down valuable storage. Precautions, when intruders enter the house, this system will increase the security level for the house owner.

Item Verification on Smart Trolley System Using Object Recognition Based on the Structural Similarity Index
Alexander Agung Santoso Gunawan
Computer Science Department School of Computer Science Bina Nusantara University Jakarta, Indonesia, 11530

Abstract
The main problem of supermarket customers is the shopping payments have a considerable amount of time. This happens because the verification step is usually done manually. The customer must take their items out of the trolley, hand them over to the cashier, and then the
cashier would scan the barcode stuck on each item. In this paper, we would like design and
develop automatic payment system to speed up the verification step. The automatic payment is
part of our smart trolley system. Our goal is to develop an automatic moving trolley with smart
payment devices to solve the problem. First, we develop web-based payment apps where the
customer can scan the items using barcode reader during shopping moment. Next, when finish the
shopping, the customers can check and confirm the items in the shopping trolley, and they will go
to the exit room. In this exit room, the customers verify each item one by one in front of the
camera and finalize the purchase. For item verification, we used object recognition based on deep
learning and similarity measurement using structural similarity index (SSIM). The structural
similarity index is used for comparing the detected item to images of which are stored in the
supermarket’s database. We find that the method used in this paper works as intended and shows
that item verification using the SSIM is a better alternative compared to traditional methods.

Objective Sleep Quality Measurement based on Fuzzy Logic and Wearable Device
Jason Andreas Widjaja*, Pauw Danny Andersen*, Nico Surantha*
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Nusantara University, Jakarta, Indonesia 11530

Abstract
Sleep is a natural resting state in humans and many other species. Sleep quality is a vital, often
neglected, component of sleep in general. Sleep quality is important because it enables the body to
repair and be fit and ready for another day. The only way to properly measure sleep quality was
subjective assessment. Nowadays, there is a ubiquitous device that can measure sleep cycle called
actigraphy device. This paper proposes a method using Fuzzy Logic utilizing actigraphy device to
measure and classify the level of sleep quality. The fuzzy logic system was developed through
several steps: (i) Identifying the parameter which affect the sleep quality, (ii) Determining the
fuzzy set for each input variable, (iii) Constructing the fuzzy rules. Five individuals were invited
for the experiment, they were also required to complete the PSQI subjective sleep.

Cloud-Edge based Heterogeneous Equipment Multi-Task Knowledge Distillation for IIoT
Seokju Oh*, Donghyun Kim*, Jongpil Jeong*
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Suwon, Gyeonggi-do, 16419, Republic of Korea

Abstract
Along with the 4th industrial revolution, smart factories are receiving great attention. In particular,
the speed of data generation in the industry is increasing very rapidly, and real-time data is
becoming more important. Industrial Internet of Things (IIOT), which connects, controls and
communicates with heterogeneous devices, is becoming more and more important. Also, in order
to ensure fairness and quality of IIoT with limited network resources, the network connection of
IIoT needs to be done more intelligently. Many studies are being conducted to efficiently use the
resources imposed on IIoT devices. This paper proposes an edge-based distributed multitask
knowledge distillation algorithm for heterogeneous devices. It also shows a multi-edge
collaboration network with ensemble learning
Securing Text File Using Combination of Vigenere and One – Time Pad Cipher Algorithm
Muhammad Andika Putraa, Louis Marcellino Liwea, Felix Rustana, Kristien Margia, Suryaningruma
aComputer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia 11530

Abstract
The development of the digital era is marked by the massive increment of social media life. Cybercrime is one thing that must be considered as technology evolves aimed to protect and prevent misused data by unauthorized parties. The application of cryptographic techniques is one of the solutions to overcome the impediment. There are various types of encryption techniques such as Vigenere Cipher, One – Time Pad Cipher, Hill Cipher, etc. Vigenere cipher is considered to be the simplest substitution cipher and One – Time Pad is known as an encryption technique that cannot be cracked. Due the lack of Vigenere cipher security that only relies on having the unknown length of the key and the encrypted result itself in words, so it is vulnerable to incoming attacks and easily predictable. To overcome it, in this research the Vigenere is combined with One – Time Pad cipher which allows the encrypted result in XOR result. Then the MD5 algorithm is used to get the hash value from the encrypted message to verify its integrity furthermore. The results show that the algorithms can be implemented properly so that the data security can be increased.

ChirpMap: Python based Discord Bot for Tweet Data Visualization using Geographical Information System
Albert Adiwena Selliagia, Lionel Limiartoa, Mishael Hentawan Suwandi, Muhammad Fikri Hasani
aComputer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia 11530

Abstract
Lately the internet usage is having an increase because of Covid-19 pandemic. Twitter itself has been used in many studies because the data contained in Twitter is very diverse and large in number and is updated every day. This data abundance gives an inspiration to develop a python-based discord bot that help to visualize tweet data. In here the system was implemented into discord bot with python backend API as thebrain, called ChirpMap. This discord bot generated a heatmap based on user keyword input and each tweet language. The heatmap showed tweet population on each country based on user query into the discord bot. Even if ChirpMap successfully generate tweet count and heatmap for each country based on the query input, the bot itself still need to be updated into understand more natural language from user and able to identify the location from tweet itself.
Feasibility Study for Implementation Biometrics for Online Transaction
Jurike V Moniaga\textsuperscript{a}, Claudia Ananthio\textsuperscript{a}, Dimas Widia Bakti\textsuperscript{a}, Tatyana Andhini\textsuperscript{a}
\textsuperscript{a}Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia 11530

Abstract
In the era of digital technology it’s a major problem for company to improve their security, especially in online retailers. Hacker can hack through the networks and steal sensitive information about the customer in online retailing. In Indonesia, online retailing companies still haven’t been using biometrics as the security of online payment. In this paper, we are going to discuss how biometrics can improve security and efficiency in online transactions.

Privacy Protection Strategies on Social Media
Maria Susan Anggreain\textsuperscript{a}
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Abstract
Privacy breach has been a well-known and widespread issue all-around social media platform. Some of them are Facebook, WhatsApp, Twitter, Instagram, etc. There are lots of methods to breach someone's privacy such as giving out bait link that turns out to be an IP Grabber. Giving fake giveaway sites to grab their login information. Privacy breaches are also affected by user's gender as well, Due to their various way of using the social media platform. For example, females are usually posted more picture of themselves more than males, and with that people can Dox their current location which can lead to kidnapping. This paper aims to teach people how to properly use social media to protect their privacy.

Count-Data Mixed Models of Topical Tweets: A Case of Indonesia Flood Events
Alam Ahmad Hidayat\textsuperscript{a}, Bens Pardamean\textsuperscript{a,b}
\textsuperscript{a}Bioinformatics and Data Science Research Center, Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia 11480
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Abstract
A topic level variability in modeling twitter data can potentially generate more comprehensive conclusions about the public perception during critical times for improving natural disaster mitigation and surveillance efforts. We employ generalized linear mixed models to demonstrate the variability in Indonesian topic- specific tweet count data during the flood events in February 2021 using the glmmTMB library in R. The data are assumed to be generated from two different exponential distributions: Poisson and Negative Binomial. We implement random effects by allowing random intercepts and random slopes to vary across topic randomly in the two first models. Furthermore, the dispersion and zero-inflation problems are also addressed in the final model. Using Akaike Information Criteria scoring, we obtain that a Negative binomial-based model with random zero-inflation intercepts is favored by the data. The chosen model formulation and the estimated parameters may be useful to forecast topic-specific trends in Indonesian flood-related Twitter data.
**Numerical Approximation to Porous Medium Equation Using a Quarter-sweep Based Finite Difference and Explicit Four-points Group**

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**Abstract**

A numerical approximation to a one-dimensional nonlinear porous medium equation using a quarter-sweep based finite difference method is studied in this paper. The quarter-sweep computation approach showed the ability to reduce complexity in a computation of the solution of a sparse and large linear system. Thus, the quarter-sweep process is used in formulating an efficient finite difference scheme for the porous medium equation. Newton method is applied to solve the generated nonlinear system, and an explicit four-points group method is implemented for internal computing for the solution. The paper presents several problems of the porous medium equation to show the efficacy of the proposed finite difference approximation with the explicit four-points group method. The efficiency of the proposed numerical method is measured using the maximum number of iterations and the computer elapsed time, while the accuracy of the method is illustrated based on the maximum absolute errors produced by the grid points. A comparative analysis is made against a half-sweep finite difference with a Newton explicit group method and a standard quarter-sweep finite difference approximation.

**Software Size Measurement of Smart Digital Tourism Project based on Use Case Point**

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**Abstract**

The tourism industry has become a strategic sector to leverage regional economic income in recent years. Since the end of 2019, this industry has faced a hard challenge of COVID-19 pandemic impact. However, the tourism industry was predicted to rebound and will continue in growing as in previous periods. This industry needs transformation from the traditional approach to digitalization regarding the improvement of services for stakeholders. A smart digital tourism should be prepared regarding the capability to integrate stakeholders in providing smart services. Development of this smart solution should be conducted through measurable software process development such as measurable software design. This research aims to provide the measurable of software design through uses case point method in dealing with project schedule and budget. The result of this study presented 112.27 project size based on Use Case Points, 2,133.13 hours for project duration effort, 28,530,613.8 in Indonesia currency (IDR) for the cost of software development. The results will help the next stage of software development management regarding further measurable project planning and decision making.
Support Vector Machine Method For Predicting Non Linear Data
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Abstract
This research aims to determine performance measures score of classification model on nonlinear data. The data used in this paper is e-commerce X seller, namely accuracy, precision, sensitivity, and specificity. The method used to make the classification model in this research is the Support Vector Machine (SVM) method by comparing several kernel function, namely linear kernel, polynomial kernel, and Radial Basis Function (RBF) kernel. The best model is determined by comparing the performance measures scores of each model formed. The results showed that in this case, SVM model with linear kernel is the best classification model because it has the highest performance measures scores. This model is used to predict seller status on e-commerce X.

Applying Javelin Prototyping for Micro, Small, and Medium Enterprises Handicrafts and Wood
Reinert Yosua Rumagit\textsuperscript{a}, Yogi Udaja\textsuperscript{a}, Irma Kartika Wairooy\textsuperscript{a}, Firza Bagus Razdiansyah\textsuperscript{a}, Wibowo HadiPrasetyo\textsuperscript{a}
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Abstract
Software application development has become a current trend, where almost all transaction processes are supported by applications. Likewise, what the owners of UMKM Handicrafts and Wood Crafts want to apply. With the difficulty of carrying out promotions and buying and selling transactions so far, it is hoped that the application will become easier. However, the application development model also needs to be considered, there are many models that can be applied such as the Prototyping model. The conventional prototyping model has drawbacks, namely delays can occur because they have to wait for the user to approve the entire prototyping that has been completed, and if the prototyping is not approved, it will be discarded. By initiating a new prototyping model where prototyping will be divided into modules and evaluation is carried out per module, it can overcome the problems in conventional prototyping. This research focuses on developing a new prototyping model called Javelin Prototyping, with the Javelin Prototyping method it is hoped that the existing prototype problems can be resolved. This is evidenced by the process of creating websites for micro, small and medium enterprises (MSMEs) for handicrafts and wood.

Unsteady State Temperature Distribution Inside House Based on Slope Roof
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Abstract
House is a place for reside in, that must be designed as comfortable as possible. It seems interesting
to analyze the temperature distribution inside, as a part of this comfortability. Temperature distribution may cause by a roof geometry as the first part of house that heat gain from the sun directly. This study investigates the geometry of roof by its slope to find efficient roof slope for residential building. Unsteady state heat equation is applied to rich this purpose, then solved numerically by finite difference that modified by quadratic ghost point method. Temperature distribution simulation are presented for some different slope of roof and compare it. At the end, this study show the temperature distribution inside house as time raises and which roof that give the most comfortable temperature distribution.

**Nonlinear System for Cell Population Growth Simulations in Pulmonary Tuberculosis Infection**

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**Abstract**

Pulmonary tuberculosis caused by Mycobacterium tuberculosis (MtB) which attacks the body's immune cells. A better understanding of the interactions of MtB, macrophages, and T cells will help control tuberculosis. This interaction is represented by a non-linear system of differential equations and solved numerically by the 4th order Runge-Kutta method for the system. Python-based desktop application is developed to simulate numerical solutions and display simulation results quantitatively and visually. The simulation results indicate compliance with the prior studies. The analysis of the simulation results showed differences in the distribution of cell populations based on the parameters used. The equilibrium point can indicate infection-free state and latent or active infection based on the number of bacteria.

**Analysis of Decision Support System for Determining Industrial Sub-District Using DEMATEL-MABAC Methods**

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**Abstract**

This paper aims to create a decision support system (DSS) application for determining industrial locations in Serang Regency, with mathematical calculations using the DSS (Decision Support System) hybrid method namely Decision-Making Trial and Evaluation Laboratory (DEMATEL) and Multi-Attributive Border Approximation Area Comparison (MABAC). The DEMATEL method is used to obtain the criteria weights of each criterion and the MABAC method is used to rank the determination the best industrial sub-districts. The data used are primary data, namely interviewing interviewees to calculate the weight of the criteria and secondary data, namely the official website data of Central Bureau of Statistics. Then, the process and results of the DEMATEL-MABAC calculation method are implemented with a python-based desktop
application. The results of this method indicate that the location of Cikeusal District in Serang Regency is the right location to be used as an industrial location with the criteria and alternative function values of 0.193.

File Encryption Application using Menezes-Vanstone Elliptic Curve Cryptography Based on Python
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Abstract
The development of information technology has given various impacts on humans. The conveniences provided result in information being sent freely. This can be exploited by unauthorized parties to retrieve and use the information without the owner’s permission. In this study, the authors use the Menezes-Vanstone Elliptic Curve Cryptography algorithm with modification to perform data security for text, image, audio, and video. In this paper, we implement Menezes-Vanstone Elliptic Curve Cryptography in a program for encryption and decryption file text, image, audio, and video. We also give the performance of our program and other methods for comparison. The result shows that the encrypted file size is smaller than other methods. However, our program needs improvement in terms of encryption and decryption time as it is slower than other methods.

Flood-Prone Susceptibility Analysis In Garut Using Fuzzy Inference System Mamdani Method
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Abstract
Flood is a natural disaster that often occurs in The District of Garut. At the present moment, in order to anticipate flood, the National Disaster Management Agency (BNPB) has been conducting a monitoring agenda based on landscape condition throughout the Watershed River (DAS). Moreover, in order to mapping this particular natural disaster, there is a program that has been designed for further analysis. Furthermore, this program has been succeed to summarize the susceptibility level towards flood. Additionally, this method divided some areas in Garut into three classifications, such as safe, prone, and flood. Also, in order to give further explanation, this research will be using Fuzzy Inference System Mamdani as a calculation process. Therefore, there are some factors that could influence the calculation process, for instance, intensity rainfall level, watershelf area level, land slope level, altitude level, population density and risk level. In conclusion, the result of the study has a suitability level of 92.30% with the reality in the field.
Biplot Analysis: A Study of The Change of Customer Behavior on E-Commerce
Rinda Nariswari\textsuperscript{a}, Naufal Hafiz\textsuperscript{a}, Teddy Satrio Prakoso\textsuperscript{a}
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Abstract
COVID-19 pandemic affected many aspects in global life, the one of aspect is e-commerce. The COVID-19 pandemic changes the general society into having a more consumptive behavior. This research is conducted to identify whether there is a difference in mean/average sales between the period before the COVID-19 pandemic and during the COVID-19 pandemic. This paper used T-Test Paired Samples to analyze the difference of behavior’s customer of some e-commerce in Indonesia. Biplot analysis is also used to give visualization of the behavior’s change caused by the COVID-19 pandemic. Six variables are used in this paper and purposive sampling is selected to get a sample size. We use 63 respondents are eligible to fulfill the questionnaire. The T-Test paired samples resulted that there is a difference in mean sales for the service or online products, food and beverages, electronics, and cosmetics and skincare. Those aspects are an evidence that COVID-19 pandemic could change the customer behavior in E-Commerce. We also illustrate the change of customer behavior through biplot.

Cochrane Orcutt Method to Overcome Autocorrelation in Modeling Factors Affecting the Number of Hotel Visitors in Indonesia
Sofyan Adrianto\textsuperscript{a}, Ira Hanifah Nuha Balqis\textsuperscript{a}, Catharina Zevania Neysa Soetanto\textsuperscript{a}, Achmad Ghifari Ikram Abubakar\textsuperscript{a}, Margaretha Ohyver\textsuperscript{a}
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Abstract
Hotel service is the one factor impact for economy in Indonesia, especially in areas tourist attraction. Many factors for tourist to visit the hotel, one of them is the total of rooms hotel. These factors need to be considered for property businesses, in case they want to build a new hotels in Indonesia. The purpose of this research for analyze effect of total rooms hotel with the total of hotel visitors (domestic and foreign) in Indonesia. We test the autocorrelation with Durbin Watson test for this research. The concluded the regression model has error with not normally distributed, the variance is not constant, and there is autocorrelation. For overcoming autocorrelation, this research uses the Cochrane-Orcutt method. The Cochrane-Orcutt method is repeated calculate the convergent value of p\textsuperscript{\wedge}. Then the regression model was recalculated with Durbin Watson test, and concluded the method has an error with normally distributed, the variance is constant, and there is no autocorrelation. The conclusion of this research is Cochrane-Orcutt method it can used to overcome for autocorrelation.
Handling Overdispersion in Poisson Regression Using Negative Binomial Regression for Poverty Case in West Java

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Abstract

Poverty is one of government’s problems in West Java Province that should be suppressed even abolished considering its violates human rights to live in prosperity. In September 2019, number of Poor People reaches 3.38 million people (6.82 percent). Thus, the results of this paper expected could help government in overcome poverty problem in West Java Province by finding the best regression method and model to predict number of poor people and find the most influential predictor that affects the number of poor people in West Java Province. We used secondary datas in 2019 from BPS Jawa Barat with four predictor: Province Minimum Wage (UMP), Human Development Index (IPM), Open Unemployment Rate (TPT), and Number of House Hold (RumahTangga) and one respon variable: Number of Poor People in West Java. The conclusion of this paper are: overdispersion could be overcome and modelled better using Negative Binomial, and the significant variables (which means have impact for response variable) in this case are only two predictor: Human Development Index (IPM) and Number of House Hold (RumahTangga). Human Development Index (IPM) is the most impactable predictor that government should build up to decrease Number of Poor People, while Number of House Hold (RumahTangga) does not have a really big impact but if it get depress would decrease Number of Poor People in West Java.

Determining Factors that Affect Student Performance Using Various Machine Learning Method

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Abstract

Students face problems that might hinder their academic pursuit toward success, problems ranging from trivial matters such as class condition, feeling of the student to severe matters such as family breakdown, economic reasons, and many more. This is a major problem because students shape the future of a nation – which will affect many things in the future. Teachers are looking for an effective way to find what might generally be the best solution for solving certain problems, as each student may face different problems, solving one at a time is not possible with the number of students each year. In this paper, we will try to find factors that might hinder or improve student performance using Pearson correlation between each feature toward the student G3 result. Based on the result, past failure will negatively impact student grades with -0.360415 correlation, and then Mother’s Education will positively impact student grades with 0.217147. After finding out which factor affects student grade, we try to predict student grade using ML models to prove whether that factor actually affects student grade. Our MLP 12-Neuron model performs the best with RMSE value of 4.32, followed by Random Forest with RMSE value of 4.52, and finally Decision Tree with RMSE value of 5.69.
MODELING THE EFFECT OF POVERTY RATE, GDRP, MINIMUM WAGE ON MEAN YEARS OF SCHOOLING IN GORONTALO PROVINCE WITH PANEL DATA REGRESSION

Azzalia Chaeruni Putri, Teddy Satrio Prakoso, Margarethya Ohyver

Abstract
This Study aims to analyze poverty rate, Gross Domestic Regional Product (GDRP), Minimum Wage on mean years of schooling in Gorontalo Province. The data taken from Central Bureau of Statistics (BPS), which consist of six cities/districs from 2010-2019. The method that used in this research is Panel Data Regression with the software used is Rstudio and Eviews. The results of this study can be concluded that GDRP and minimum wage affect to the mean years of schooling in Gorontalo Province. Also, this study has limitations in terms of the amount of data in each time period which affect the dependence variable and there are also some data that cause failures in some assumptions.

Prediction of Health Insurance Claims Using Logistic Regression and XGBoost Methods

Syarifah Diana Permai, Kevin Herdianto, Iwa Sungkawa

Abstract
One of the crimes that occur in the financial sector is fraud in the transactions. In Health insurance fraud can occur in Health insurance claims. In this paper, health insurance claims are analyzed to detect fraud. If the claims suspected of fraud then that claims would be rejected. The method used in this paper is Logistic Regression and Extreme Gradient Boosting (XGBoost) methods. Logistic Regression is a classic method in statistics that performs very well in classification, while XGBoost is the latest method in Machine Learning which is an improvement in classification. Based on the result of Logistic regression, there are 9 independent variables that effect fraud in health insurance claims. Based on the results of logistic regression model and XGBoost model, it showed that the XGBoost method is better than Logistic Regression. Because the accuracy, precision and recall of XGBoost are greater than logistic regression.

Analysis of Decision Support using Elimination and Choice Expressing Reality (ELECTRE) method in determining Best Candidate of Programmer

Nuraini Nuraini

Abstract
This research was conducted based on a case study at PT SIER in Indonesia. Programmer team at PT SIER had a very important role in supporting the company's operations. Due to the increasing number of requests for application development from various departments to the Programmer team, the company intended to add one Programmer to Programmer team so that the Programmer team could carry out their tasks faster. Therefore, the company opened a vacancy for one Programmer. There were several applicants who could be candidate for Programmer position
because they met the requirements. The company faced difficulties in determining the best candidate. To help this company in determining the best candidate for Programmer position, this research offered the use of Elimination and Choice Expressing Reality method or ELECTRE method as a decision support. ELECTRE method was chosen to be used in this research because this method was one of the multi-criteria decision making methods that could select best choice based on certain factors or criteria. The result showed that ELECTRE Method could help in determining the best candidate for Programmer position by incorporating factors or criteria of the candidate.

**Estimation of Cost of Living in a Particular City using Multiple Regression Analysis and Correction of Residual Assumptions through Appropriate Methods**

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**Abstract**

From year to year, the poor economic conditions and lack of employment opportunities in villages are the main push factors for the rural population moves to the urban areas. Indonesia is home to more than 260 million people and is one of the world’s most rapidly urbanizing countries. Between 1980 and 2010, Indonesia’s urban population grew about fourfold, from 32.8 to 118.3 million. But when the rural population move to the urban area, they did not know about the cost of living in the urban area that is so much different from the rural area. Also, many rural populations get underpaid, and their wages is not enough to cover their cost of livings. This study aims to develop a regression model that is able to predict the cost of living of an area by using the Groceries Index and Restaurant Index with good accuracy. The developed regression model fulfills the residual assumption of heteroscedasticity by using the Weighted Least Squares method, which is selected after comparison with other regression equation by measuring its residual standard error value. The estimated Cost of Living Index could then be used accordingly to help determine the cost of living in a particular city (relative to New York City) or as factor in other calculations, such as calculating the minimum wage of a particular area.

**Predicting Cancer Death Rate and Determining the Major Cause Of Cancer using Ridge Regression**

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**Abstract**

Cancer has been the leading cause that bring about death all over the world. Diverse researches on the malady had taken place. One of those is the data analysis and prediction project we found uploaded by Steven Burnett four years ago on Data World. He predicted the outcome of Cancer Mortality Rates with 31 predictors using the Ordinary Least-Square Regression Model. Our research carried out here is to amend the weakness in the treatment of the model Steven Burnett built, where most of the variables show a high correlation. In our research we made use of Ridge Regression to encounter the predictors high correlation disadvantage. At the end of our findings,
we succeeded in improving certain statistics related to the correlation problem.

**Contextualizing Automated Writing Evaluation: A Case of English for Specific Purposes**

**Writings**

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**Abstract**

With the developments of technology, writing evaluation and feedback are supported by Natural Language Processing (NLP) and Latent Semantic Analysis (LSA). The immersion of NLP and LSA in Writing contributes to the development of Automatic Writing Evaluation (AWE), a system that compares a text to a large database of the writing of the same genre and supports an evaluation process that is independent of the human rater. The potential of T.E.R.A.’s reach in evaluation became one of the bases of this research. This research intends to compare the evaluation process of human raters to T.E.R.A. and find out; a) the figuration of assessment criteria used in the evaluation process, and b) which elements rates are higher, the same, or lower. The result of this study shall be a point of departure to establish AWE which is suitable to the context of English as a Foreign Language being taught as a compulsory course at Bina Nusantara University.

**A Sentiment Analysis Model for the COVID-19 Vaccine in Indonesia Using Twitter API v2, TextBlob, and Googletrans Python Libraries**

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**Abstract**

COVID-19 was declared a world pandemic in early-mid 2020. After about a year, several vaccines for this virus have been found and become alternative solutions to reduce the spread of the COVID-19 pandemic and build up herd immunity in society. Since early 2021, Indonesia has been one of the countries that participate in using vaccines for the public to fight the COVID-19 pandemic. However, there are a lot of positive and negative responses from Indonesian society related to these COVID-19 vaccines. Implementing a sentiment analysis model for a specific topic like a “vaccine” from social media could help us to see and understand the responses from society in Indonesia towards the vaccine program that is being conducted by the Indonesian government. Understanding society’s response towards vaccines is expected to be able to support the Indonesian government, for example in formulating the distribution strategy of vaccines in the future. This paper discusses about how to develop a sentiment analysis model, by implementing several existing technologies such as Twitter API, TextBlob, and Googletrans. Besides, this paper also shows a sample of data visualization of the sentiment analysis model into a meaningful infographics format. The utilization of these existing technologies could show how a sentiment analysis model could be developed conveniently, for example in using cases to analyze Indonesian society’s responses towards the COVID-19 vaccine program.
Abnormal Data Classification Based on SSA-AELSTM
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Abstract
Smart factories and big data are important factors in the 4th industrial revolution. Smart factories aim at automation and integration, but the most important part is the use of data. Although many studies are underway on the maintenance and quality management of big data-based production equipment, facility data collected for industrial data analysis has more normal data than abnormal data. In addition, a lot of energy is consumed in the data preprocessing process to analyze the collected data. Therefore, to maintain production equipment and manage quality, data classification technology that is easy for data analysis by classifying abnormal data only with normal data is needed. In this paper, we propose the classification of outliers in target data of univariate cycle data collected from production facilities through SSA-AELSTM. SSA-AELSTM is a hybrid technique that combines SSA techniques that are effective in reducing noise in time series data and LSTM automatic encoder that showed excellent performance in time series outlier detection.

Machine Learning Models to Predict the Engagement Level of Twitter Posts: Indonesian E-commerce Case Study
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Abstract
The increasing use of social media allows companies to engage consumers directly through social media content. Due to the increasing interaction dimensions on social media platforms and real-world data problems, more complex decision models are needed. In response, this study presents machine learning models (i.e., multinomial logistic regression, decision tree, k-nearest neighbor, and random forest) to predict the engagement level of Twitter posts of three prominent e-commerce platforms in Indonesia, namely Bukalapak, Blibli, and Tokopedia. From those accounts, we analyzed a total of 12,786 unique tweets with 11,870,254 favorites and 2,735,886 retweets over seven months period, i.e., February 1 – August 31, 2021. We incorporate three constructs consisting of a total of seven variables in developing the prediction models, including interactivity (i.e., link, hashtag), vividness (i.e., image, short video, long video), and temporal factors (i.e., day of post, last post time). In developing the prediction models, we incorporate three constructs with seven features, including interactivity (i.e., link, hashtag), vividness (i.e., image, short video, long video), and temporal factors (i.e., day of post, last post time). Post frequency, interactive posting elements, and static visual elements played an important role as dominant predictors of the engagement of the Twitter post. Our study shows that the random forest model provides the best prediction performance (i.e., precision, recall, and F1 score) than the singular classifier models such as multinomial logistic regression, decision tree, and k-nearest neighbor models.
Systematic Literature Review on Statistics and Machine Learning Predictive Models for Rice Phenotypes
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Abstract
Predicting the best-quality of rice phenotypes is the priority among agricultural researchers to fulfill worldwide food security. Trend development of predictive models from statistics to machine learning is the subject of this review. Gathered from the Google Scholar database, 17 appropriate papers (2016-2021) related to the rice phenotypes prediction were selected through title and abstract content filtering. The outputs show that Support Vector Machine, Multi-layer Perceptron, and regression are the most used models, while yield level is the priority prediction point besides tiller, panicle, and 1000-grain weight of rice. However, finding the accurate predictor is invariably challenging due to distinct rice varieties in the world and high confounding factors. Thus, developing an advanced deep learning model that accommodates these needs are worth considering further.

Extracting Information from Vehicle Registration Plate using OCR Tesseract
Kendricko Adrio\textsuperscript{a}, Kevin Tanuwijaya\textsuperscript{a}, Agung Yuwono Sugiyono\textsuperscript{a}, Kristien Margi Suryaningrum\textsuperscript{a}
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Abstract
Growing number of vehicles is not harmony with the capacity that roads can hold, which makes traffic congestion is easy to find. To limit number of vehicles on the roads, government in some city like Jakarta, Mexico, Bogota, Paris created an odd-even vehicles regulation. Since number of police officers is limited and due to the great number of surveillance camera on the street, this research paper proposed an Automatic Number Plate Recognition (ANPR) system which will focus on categorize a car based on its license plate number. ANPR systems is an image processing and a character recognition system that used to recognize a car’s license plate using Optical Character Recognition (OCR). The inputted license plate is automatically localized, segmented and recognized using the OCR algorithm provided in the Tesserract library. The experiment shows 83.3\% accuracy due to the difference license plate format, background, fonts, and deformation.

Aldrian Kwantawijaya, Daniel Stephanus Najoan, Tamimmanar Tamimmanar, Tjeng Wawan Cenggoro

Computer Science Department, School of Computer Science, Bina Nusantara University, Jakarta, Indonesia. 11530

Abstract

The performance of SISR models is currently growing at a rapid pace since the adoption of Convolutional Neural Networks (CNN) in the domain. Despite that, the understanding of the underlying factors of this rapid growth is still low. In this study, we proposed a study design to measure the impact of the inductive bias in CNN on its training performance, which is one of the factors of the excellent performance of CNN in SISR. With this study design, we observed that not all CNN has a supportive inductive bias to the training performance. This result can provide guidance to future research in choosing a suitable CNN architecture for optimal SISR performance.

Machine Learning Approaches in Detecting Autism Spectrum Disorder

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Abstract

Early detection of Autism Spectrum Disorder (ASD) needs to be increased to prevent further adverse impacts. Thus, the classification between ASD and Typically Development (TD) individuals is an intriguing task. This review study has collected 26 related papers to answer four research questions, i.e., what are the most used data inputs, brain atlases, and machine learning models for ASD classification, as also to discover the significant parts of the brain correlated with the ASD. It was eventually found that functional connectivity matrix, Support Vector Machine, and CC200 are the most frequently used data input, model, and brain atlas, respectively. Researchers also concluded that the posterior temporal fusiform cortex, intracalcarine cortex, cuneal cortex, subcallosal cortex, occipital pole, and lateral occipital cortex are the brain regions highly correlated with ASD.

Face Mask Detection for COVID-19 Prevention using Computer Vision

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Abstract

During the height of the Coronavirus Disease (COVID-19) pandemic, prevention by obeying health protocol is a key to fight this pandemic, one of the ways is by using a face mask. In this paper, we conduct a research to make a face mask detection using Computer Vision. This face mask detection will detect people who use mask or not using mask by using Convolutional Neural Networks.
Network (CNN) Algorithm, using three models, namely MobileNetV2, ResNet50V2, and VGG16, which are trained as many as 20 epochs for each model. The result showed MobileNetV2 and Resnet50V2 have better performance in terms of accuracy and loss value than VGG16.

**Image Pre-Processing Effect on OCR’s Performance for Image Conversion to Braille Unicode**

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**Abstract**

The cases of visual impairment have been growing in number, especially in Indonesia. To add to that, according to Population Census Data, the majority of disabilities in Indonesia is visual impairment. A large portion of this disability is blindness among many other things. With that in mind, we are attempting to help them by translation literatures, which basically means turning text in images into the braille Unicode. This braille translation will then be printed in a braille embosser, which is a tool that can print braille pages for the visually impaired to read. In this paper, we discuss the pre-processing effects on converting an image with text into the braille Unicode. The pre-processing methods we use here are done before applying the OCR, and the effects are recorded in this paper. Furthermore, the results of unprocessed images are compared with the pre-processed one in order to know how effective it is applying pre-processing on an image.

**A Systematic Literature Review of Machine Learning Application in COVID-19 Medical Image Classification**

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**Abstract**

Detecting COVID-19 as early as possible and quickly is one way to stop the spread of COVID-19. Machine learning development can help to diagnose COVID-19 more quickly and accurately. This report aims to find out how far research has progressed and what lessons can be learned for future research in this sector. By filtering titles, abstracts, and content in the Google Scholar database, this literature review was able to find 19 related papers to answer two research questions, i.e. what medical images are commonly used for COVID-19 classification and what are the methods for COVID-19 classification. According to the findings, chest X-rays were the most commonly used data to categorize COVID-19 and transfer learning techniques were the method used in this study. Researchers also concluded that lung segmentation and use of multimodal data could improve performance.
Design of Intelligent Decision Support System for Supply Chain Sustainability Assessment
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Abstract
An intelligent decision support system (IDSS) is necessary to assist decision-makers in improving the performance and transforming the sugarcane agroindustry into a fair and sustainable supply chain. This study aims to develop an IDSS to assess and improve supply chain sustainability. A sugarcane agroindustry supply chain was proposed as a case study. The IDSS was designed using the system development life cycle (SDLC) with the waterfall approach and developed using an object-oriented programming technique. This research succeeded in developing an IDSS prototype with a database, model base, and knowledge-based management system configuration. A fuzzy inference system and an adaptive fuzzy inference system algorithm were applied to assess the supply chain sustainability performance. The verification and validation results showed that the IDSS prototype could be implemented in the real world by paying attention to the model assumptions.

Implementation of Handwriting Recognition and Answer Evaluation with Recurrent Neural Network
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Abstract
To this day, examinations are still used by many teachers as a tool to evaluate their students’ knowledge. However, evaluating the answer to the exam can take a very long time since the teacher needs to understand every answer submitted by their students one by one. In addition, various types of handwriting can cause errors in grading the answer and cause the grade to become inaccurate. This paper proposes a web-based application to recognize students’ handwriting and implementing a Recurrent Neural Network in helping teachers evaluating their students’ answers. The goal of this research is to provide a web-based application that can take students’ answers as input and producing the accuracy percentage as the output.
Long Short Term Memory-based Models for Sleep Quality Prediction from Wearable Device Time Series Data
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Abstract
Several studies suggest that sleep quality is considered to be associated with physical activities. Moreover, deep sleep time can be used to determine the sleep quality of an individual. In this work, we aim to find the association between physical activities and deep sleep time by modeling the time series data such as heart rate and a number of steps captured from a commercial wearable device. Our previous study demonstrates that deep learning-based time series modeling is well suited for our problem since the temporal patterns in the two physical parameters need to be captured to obtain more accurate results. We first preprocess our series data to have a time-step size of 10 minutes. To improve our previous effort in this modeling, we compare four different variants of Long Short Term Memory (LSTM)-based models, ranging from single input to dual input models. Our result shows that the simple stacked LSTM model performs better for our data because the remaining models suffer from overfitting due to a larger number of the trained parameters.

Mobile Based Brand and Car Type Detection Using Convolutional Neural Network
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Abstract
The car parking area has been monitored with CCTV, there are still cases of car theft. Thieves take advantage of system weakness that cannot detect the brand and type of car that enters the parking area, with a car that leaves the parking area using the same ticket. This study aims to build a system that detects the brand and type of car. The method used in this research is Convolutional Neural Network. This study uses the EfficientNet, MobileNet, MobileNetV2 architecture, which was chosen because of the minimal use of resources. In this study, image data for training was obtained from an online used car marketplace. This study uses 20 variants of car brands and models and each one has 100 photos. Then the data is processed and produces a model. The model is implemented in a mobile application for the prototype. The result of this research is a comparing EfficientNet, MobileNetV1, and MobileNetV2. The test accuracy result of EfficientNet is 74%, MobileNetV1 is 74%, and MobileNetV2 is 66%. After fine-tuning the EfficientNet, the accuracy rises to 80%.
Transfer Learning Strategy from Image to Owl Sound for Classification
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Abstract
Accurately predicting an owl species based on its sound can be helpful for owl conservation. To build an accurate model for owl sound classification, deep learning is currently the most preferred algorithm, due to its excellent performance for modeling audio data. However, deep learning is generally underperformed for a small dataset, which is the case for recognizing scops owl sound. To overcome the issue, we proposed a transfer learning strategy, which is common for computer vision tasks, that can alleviate overfitting in a deep learning model for the owl sound classification. In our approach, we propose a neural network architecture consisting of the backbone of a EfficientNet model pre-trained on the massive ImageNet database. The model takes the sound input that has been converted as two image representations: Spectrogram and Mel Frequency Cepstral Coefficients. Our strategy enables the use of a relatively small size of pre-trained image classification model, which is widely available, for transfer learning in owl sound classification. Deploying the lightweight model in an automatic sound classifier provides a fast and accurate tool for various owl conservation purposes.