

November 08-09, 2018

The Heritage Hotel  
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“ Fostering Innovative  
Digital Transformation  
Through Emerging  
Technologies ”

International Conference on Information Technology  
and Digital Applications



University of the Cordilleras



Universitas Islam Indonesia

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# ABOUT THE CONFERENCE

## “ **Fostering Innovative Digital Transformation Through Emerging Technologies** ”

The International Conference on Information Technology and Digital Applications (ICITDA) is an international forum for the exchange of ideas, knowledge, and experience on the latest developments in the field of information technology and digital applications among researchers from academia, engineers, and practitioners from industries. The conference is also expected to enable opportunities for collaboration among the participants to advance the theory and practice in the field of information technology.

The ICITDA 2018 is organized by University of the Cordilleras (Baguio, Philippines) and Universitas Islam Indonesia (Yogyakarta, Indonesia).

Papers on original works are solicited on a variety of topics including, but not limited to, the following tracks and topics:

*A. Applications*

1. Digital Forensics and Security
2. Educational Technology
3. Internet of Things
4. Medical Informatics
5. Multimedia

*B. Hard Science and Engineering*

1. Computer Networks and Wireless Communication
2. Computer Vision and Pattern Recognition
3. Intelligent System/Artificial Intelligence

*C. Software Engineering*

1. Data Mining and Analysis
2. Databases and Information Systems
3. Human Computer Interaction
4. Information Theory
5. Software Systems

All accepted papers of ICITDA 2018 will be published in the online proceeding. The online proceeding is a part of conference series of IOP Publication, which will be indexed by Scopus, EI-Compendex, and Inspec.

# SPEAKER PROFILES

Professor at Department of Information Systems and Computer Science, Ateneo de Manila University. Head of the Ateneo Laboratory for the Learning Sciences. Writer of children's books including the recently published Women of Science series of Bookmark.

She is also a member of the Pittsburgh Science of Learning Center. Her areas of specialization are educational technology, intelligent tutoring systems and affective computing. In 2011, she established the Ateneo Laboratory for the Learning Sciences through a grant from the Department of Science and Technology's Engineering Research and Development for Technology program.

She is currently studying students' behavior and affect when using intelligent tutors, educational games, and other learning software.



## **Dr. Ma. Mercedes T. Rodrigo**

Professor at Department of Information Systems and Computer Science  
Ateneo de Manila, Philippines

Dr. Teduh Dirgahayu is a senior lecturer and researcher at Department of Informatics, Universitas Islam Indonesia. He obtained his doctoral degree in Computer Science from University of Twente, The Netherlands.

He received best paper awards in the ACM Symposium of Applied Computing in 2010 and the IEEE International Conference on Cybernetics and Computational Intelligence in 2017. He is now the chair of Centre for Enterprise Information Systems.

His research interests are enterprise engineering, software engineering and service computing. His current research is on a context-aware systems.

## **Dr. Teduh Dirgahayu**

Chair of Centre for Enterprise Information System  
Universitas Islam Indonesia



# HOSTS



## **University of the Cordilleras**

UC was founded in 1946 as Baguio Colleges, amidst the rubbles of the 2nd World War with a vision of establishing the city of Baguio as a center of education in the Northern Philippines. The school was later renamed to Baguio Colleges Foundation in 1966, when the founder, Atty. Benjamin Romero Salvosa, converted the institution into a foundation, donating all of its corporate assets to the new foundation providing an endless cycle of replenishing its resources by plowing back its income to the foundation. To this day, after being conferred the university status as University of the Cordilleras, the institution remains a foundation, with more than 18,000 students every academic term.

UC is among the country's 42 private Autonomous Institutions, a status conferred by the Philippines' Commission on Higher Education (CHED). With IQuAME certification and programs accredited by prominent accrediting bodies, UC has been identified as a CHED Center of Excellence in IT, Criminology, and Teacher Education. UC is also the only HEI in the Cordillera Region to be ISO 9001:2008 Certified. In addition, UC is the only school North of Metro Manila to produce two Bar First Placers. UC is likewise the top Performing Criminology School in the country for more than 20 years. To date, UC is the largest Senior High School in Northern Luzon.



## **Universitas Islam Indonesia**

Universitas Islam Indonesia (UII) is one of the leading private universities in Indonesia. Inspired by the spirit of nationalism and guided by perennial values, UII was founded one month before the proclamation of Indonesian independence in 1945. Located at the northern outskirts of Yogyakarta, the heart of Javanese culture, the main campus, overlooking the stunning beauty of Mount Merapi, is a perfect place to study for almost 27,000 students. Currently, more than 86,000 alumni are serving Indonesia and the world in many fields and many ways.

To ensure that learning in UII is conducted with the highest standard, quality is put firmly in place. As a result, in 2009, the government of Indonesia ranks UII first nationally in Quality Assurance. In 2013, UII achieves 'A' grade for its institutional accreditation by the Indonesian National Accreditation Board and has been re-accredited in 2017 with excellent results. In 2017, UII was awarded by the Ministry of Research, Technology, and Higher Education, as the best private university in Indonesia based on its research and community service performance. UII also received the honor as a three-star institution based on assessment in the QS University Rankings 2019 edition, UII has been included in the Top 500 Asia University. Based on this report, the Academic Reputation and Inbound Exchange Students are the strongest indicators for UII.

Day 01, Nov. 08

## PROGRAMME

8:30 AM - 10:45 PM

8:30 AM - 9:00 AM

REGISTRATION

9:00 AM - 9:30 AM

OPENING PRAYER  
NATIONAL ANTHEM

OPENING REMARKS

**Nancy Flores**

*Executive Vice President, University of the Cordilleras*

OVERVIEW OF THE CONFERENCE

**M. Andri Setiawan**

*Chairman of the Committee*

*ICITDA 2018*

*Universitas Islam Indonesia*

INTRODUCTION OF GUEST SPEAKER

**Mr. Taufiq Hidayat**

*Universitas Islam Indonesia*

### TALK 1: INFORMATION IN LOCATION-BASED SERVICES: FROM PROVIDERS TO CONSUMERS

9:30 AM - 10:30 AM

**Dr. Teduh Dirgahayu**

*Centre for Enterprise Information System*

*Universitas Islam Indonesia*

**PHOTO OPS**

10:30 AM - 10:45 AM

**AM SNACK**

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**SESSION 1: PARALLEL SESSIONS**

10:45 AM - 12:00 PM

10:45 AM - 12:00 PM  
ROOM 1**“A Unique Message Encryption Technique Based on Enhanced BlowFish Algorithm”**

Godfrey L. Dulla | Technological Institute of the Philippines

**“Exploring Constructivism Learning Theory Using Mobile Game”**

Lourdes Padirayon | Cagayan State University, Philippines

**“Improving Tourism Experience in Open Data Environment with Mobile Augmented Reality: Needs and Challenges”**

Ardee Joy Ocampo | Lorma Colleges, Philippines

**“Environmental Acoustic Transformation and Feature Extraction for Machine Hearing”**

Ricardo Jr. Catanghal | University of Antique, Philippines

**“Workspace Layouts for Communication Quality in Scrum Teams”**

Kholid Haryono | Universitas Islam Indonesia

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10:45 AM - 12:00 PM  
ROOM 2**“The Sentiments of Philippines’ Underground Artist and Technology Intervention”**

Randy Joy Magno Ventayen | Pangasinan State University, Philippines

**“Assesment of the Effectiveness of Learning Theories Using Gamified Android App in Teaching C Programming”**

Christopher John Llanda | Abra State Institute of Science and Technology, Philippines

**“The Empirical Study on the Impact of Student-Centered Learning Application to Cognition and Social Learning”**

Desiree I. Cendana | PHINMA-University of Pangasinan, Philippines

**“Students’ Perception on E-Learning: A Basis for the Development of E-Learning Framework in Higher Education Institutions”**

Evangelista Sarte | Ifugao State University, Philippines

**“Classifying Soil Texture Images Using Transfer Learning”**

Excel Philip Guidang | Abra State Institute of Science and Technology, Philippines

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10:45 AM - 12:00 PM  
ROOM 3**“Ensuring Learning Gain Using WebEditor: An Experiential Learning Approach”**

Joventino T. Trinidad Jr. | Abra State Institute of Science and Technology, Philippines

**“Classification of Project Management Tool Reviews Using Machine Learning-Based Sentiments Analysis”**

Rufo Baro | Don Mariano Marcos Memorial State University, Philippines

**“Apiculturists’ Issues and Challenges: A Basis for Invoking IT Model in Beekeeping Industry”**

Stephan Kupsch | DMMMSU - NLUC, Philippines

**“Assessing the Impact of E-Learning System of Higher Education Institution’s Instructors and Students”**

Michael Angelo Burac | International School of Asia and the Pacific, Philippines

**“Investigating Students’ Engagement in a Hybrid Learning Environment”**

Lambert Famorca | Saint Louis University, Philippines

12:00 PM - 1:30 PM

**LUNCH BREAK**

**SESSION 2: PARALLEL SESSIONS**

1:30PM - 5:00 PM

1:30PM - 3:00 PM

ROOM 1

**“Topic Modeling of Weather and Climate Condition on Twitter Using Latent Dirichlet Allocation (LDA)”**

Ahmad Fathan Hidayatullah | Universitas Islam Indonesia

**“Surviving the Disconnections: The Use of Information Systems in Indonesian Public Health Facilities”**

Hari Setiaji | Universitas Islam Indonesia

**“A Study of Public Key ‘e’ in RSA Algorithm”**

Carlo Intila | Technological Institute of the Philippines

**“Optimizing Gift for Handling Database Backups: Findings and Insights From Another 6,000 Hours of Experimentation”**

Jesus Vicente Roig | Asia Pacific College, Philippines

**“Fittest Job First Dynamic Round Robin (JFDRR) Scheduling Algorithm Using Dual Queue and Arrival Time Factor: A Comparison”**

Jezreel Ian Manuel | University of the Cordilleras, Philippines

**“Automatic Music Mood Recognition Using Russell’s Two-Dimensional Valence-Arousal Space From Audio and Lyrical Data as Classified Using SVM and Naive Bayes”**

Kim Rainer Tan | University of San Carlos, Philippines

1:30PM - 3:00 PM  
ROOM 2

**“E-Learning Roadmap for Open Distance Learning in Cordillera Administrative Region”**

Dario H. Galeon | Ifugao State University, Philippines

**“Implementation and Performance Assessment of the Enhanced RC5 (ERC5) Algorithm Based on Additional-then-Append Key Expansion Technique”**

Excel Villanueva | Technological Institute of the Philippines

**“An Analysis on the Insights of the Anti-Vaccine Movement from Social Media Posts Using K-means Clustering Algorithm and VADER Sentiment Analyzer”**

Robert Timothy Yap | University of San Carlos, Philippines

**“Poverty Incidence Identification of Cities and Municipalities Using Convolutional Neural Network as Applied to Satellite Imagery”**

Joshua Louis Dacles Isanan | University of San Carlos, Philippines

**“Computer Simulation Model for Traffic Enforcement Using Unity Engine”**

Daniel R. Ubanan | University of San Carlos, Philippines

**“Usability of KITIKIT: A Mobile-Based App for Implementing Customizable Online Product Ordering”**

Amy Paneda Balcita | DMMSU Open University System, Philippines

1:30PM - 3:00 PM  
ROOM 3

**“Dashboarding the Maternal and Child Health Profiles for Health Supporting System”**

Lizda Iswari | Universitas Islam Indonesia

**“Frequency of Compromised Passwords Used by Students and Staff of Asia Pacific College: An Analysis Using NIST SP 800-63B and Pwned Passwords”**

Josephine de la Cuesta | Asia Pacific College, Philippines

**“Bias Detection in Philippine Political News Articles Using SentiWordNet and Inverse Reinforcement Model”**

Thessa Angelie B. Quijote | University of San Carlos, Philippines

**“IoT Based Model for Monitoring and Controlling Water Distribution”**

Joey G. Natividad | Isabela State University, Philippines

**“Bank Air Kami: Terban Waterscape Information System”**

Ari Sujarwo | Universitas Islam Indonesia

**“A Decision Support System with 3D Visualization for Box Space Optimization Using the Locust-Based Particle Swarm Optimization Algorithm”**

Bojo Luis B. Alcisto | University of San Carlos, Philippines

3:00 PM - 3:15 PM

**PM BREAK**

3:15 PM - 5:00 PM  
ROOM 1

**“Digital Conversion Model for Hand-Filled Forms Using Optical Character Recognition (OCR)”**

Jayvee M. Cabardo | Asia Pacific College, Philippines

**“MAR UX Design Principles for Vocational Training”**

Carlwin Dayagdag | Romblon State University, Philippines

**“Virtual Reality Technology on Health Intervention for Women: A Literature Review”**

Dhomas Hatta Fudholi | Universitas Islam Indonesia

**“Pairing Clients and Psychologists Using Stable Marriage Problem Approach”**

Sheila Nurul Huda | Universitas Islam Indonesia

3:15 PM - 5:00 PM  
ROOM 2

**“Q-DAR: Quick Disaster Aid and Response Model Using Naive Bayes and Bag-of-Words Algorithm”**

Lorena W. Rabago | Asia Pacific College, Philippines

**“A Fuzzy-Based Career Recommender System for Senior High School Student in K to 12 Education”**

Marvee Cheska B. Natividad | Technological Institute of the Philippines

**“Engineering Kids Health Monitoring System in Indonesia”**

Irving Vitra | Universitas Islam Indonesia and Universiti Teknologi Petronas Malaysia

3:15 PM - 5:00 PM  
ROOM 3

**“InTelect: Interactive Telemedicine Communication Technologies Mobile App”**

Veronica D. Aguilar | Mapua University, Philippines

**“Braille3D: Using Haptic and Voice Feedback for Braille Recognition and 3D Printing for the Blind”**

Erick David A. Laurente | Mapua University, Philippines

**“In the Making of Effective Decision Making in Public Health Domain with Business Intelligence Dashboard”**

Mukhammad Andri Setiawan | Universitas Islam Indonesia

Day 02, Nov. 09

## PROGRAMME

8:00 AM - 10:15 AM

8:00 AM - 8:30 AM

REGISTRATION

8:30 AM - 9:15 AM

OPENING PRAYER  
NATIONAL ANTHEM

INTRODUCTION OF GUEST SPEAKER

**Dr. Josephine dela Cruz**

*Program Committee  
ICITDA 2018*

### TALK 2: USE OF EYE TRACKING TO CHARACTERIZE PROGRAMMER DEBUGGING BEHAVIORS

9:15 AM - 10:15 AM

**Dr. Ma. Mercedes T. Rodrigo**

*Ateneo Laboratory for the Learning Sciences  
Ateneo de Manila University*

### SESSION 3: PARALLEL SESSIONS

10:15 AM - 11:15 AM

10:15 AM - 11:15 AM  
ROOM 1

**“Categorizing Mobile User Interface Patterns Using EFA”**

Almed Hamzah | Islamic University of Indonesia

**“Analysis of the Impact of Social Networking Sites Using Web Content Mining and Induction Method”**

Joshua Ty | University of San Carlos, Philippines

**“Modern File Transfer Protocol Using Lossless Compression, Lattice-Based Encryption, and a Data Integrity Hashing Function”**

Marvin S. Lim | University of San Carlos, Philippines

**“Tagalog Text-to-Braille Translator Tactile Story Board with 3D Printing”**

Jelena Maeve J. Baybay | Mapua University, Philippines

10:15 AM - 11:15 AM  
ROOM 2

**“Online Corpus of Spoken Ilokano Language”**

Franklin Apostol | Don Mariano Marcos State University, Philippines

**“Mobile Games Interaction Design for People with Visual Impairment Using Participatory Design Approach”**

Galang Prihadi Mahardhika | Universitas Islam Indonesia

**“Predicting Emotion in Music Through Audio Pattern Analysis”**

Joe Marlon Tang Brotzer | University of San Carlos, Philippines

**“Automatic Wrinkles Detection on Face Image”**

Arrie Kurniawardhani | Universitas Islam Indonesia

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**CLOSING PROGRAM**

11:15 AM - 12:00 PM

**AWARDING OF BEST PAPER**

**CLOSING REMARKS**

CLOSING REMARKS

**Jeffrey S. Ingosan**

*Dean, College of Information Technology  
and Computer Science, University of the Cordilleras*

**DISTRIBUTION OF CERTIFICATES**

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**LUNCH BREAK**

12:00 PM - 1:00 PM

**HISTORICAL TOUR**

1:00 PM - onwards



**BOOK OF  
ABSTRACTS**

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## **“A Unique Message Encryption Technique Based on Enhanced BlowFish Algorithm”**

Godfrey L. Dulla, Bobby D. Gerardo, & Ruji P. Medina  
*Technological Institute of the Philippines, Philippines*

Online transaction especially sending of messages has become easier and simpler to be manipulated. Nonetheless, security is the important aspect to secure its content and raise difficulty to unauthorized attempt. This study aims to secure both plaintext and file message content through encryption technique which is based on enhanced blowfish algorithm. An enhanced Blowfish algorithm is developed to improve its performance by reducing the number of rounds and increase the block length with fixed length during encryption and decryption with added transformation method on selected rounds. The study used Visual Studio application running at x64 operating system.

## **“The Sentiments of Philippines’ Underground Artist and Technology Intervention”**

Randy Joy Ventayen, Stephan Kupsch, & Thelma Domingo-Palaoag  
*Pangasinan State University and University of the Cordilleras, Philippines*

Listening to music is a significant and essential part of the daily life of many citizens, it is not just a hobby, but it reflects one's personality. In the new age of technology, several ways of playing and producing music became a trend. Thus cultural and underground artist in the Philippines is still left behind. The objective of this study is to determine the current situation of the unsigned artist in the Philippines by means of interviewing unsigned artist, bands, and independent music practitioners. This study uses the descriptive method of study that answered the questions regarding the current situation and sentiment of the unsigned artist. The study also discussed the technological trends could be considered to address problems of the Unsigned artist based on the current situation, and the layout of the proposed portal and lastly the overview of the architectural model that shall be adopted in designing the proposed portal. Based on the result of the study, the Unsigned Artist are in need of a platform for proper distribution of music. In order to satisfy the needs, this paper also discusses the overview of the proposed portal.

## **“Ensuring Learning Gain Using WebEditor: An Experiential Learning Approach”**

Joventino T. Trinidad Jr. & Excel Philip B. Guidang  
*Abra State Institute of Sciences and Technology, Philippines*

Student-centered learning is a wide-ranging teaching approach that involves replacing lectures with dynamic learning, incorporating self-paced learning courses and/or cooperative group situations, ultimately holding the student responsible for his own developments in education. This study aimed to ensure learning gain using WebEditor in light of the experiential learning approach. Specifically, it achieved the following objectives: a) determined the prior knowledge of BSIT students in HTML5 using Notepad and a Web browser, b) determined the individual student gain score or normalized gain and total average gain score after using WebEditor, and 3) determined if there is a significant difference between HTML5 coding skills using Notepad and Web browser and WebEditor. The study is quantitative and descriptive in nature. The study found that the total average gain score of all the

student-participants after using WebEditor is 0.32 or a 32% learning gain. 86% of the student-participants had a positive gain, 7% had a zero gain, and also 7% had a negative gain which is the common case. The study concludes that the entire population on average gained 32 percentage points out of a possible 100 percentage points that they may have gained from pre to post assessment. Experiential learning helped the students fully learn new skills and knowledge using WebEditor. Moreover, all of them agreed that WebEditor is more efficient in displaying the output. Aside from their learning gain from using WebEditor, the performance of the participants in HTML5 coding indeed improved with the introduction of WebEditor in place of using a separate text editor (Notepad) and a Web browser.

### **"Exploring Constructivism Learning Theory Using Mobile Game"**

Lourdes M. Padirayon, Melidiosa V. Pagudpud, & Josephine S. Dela Cruz  
*Cagayan State University, Philippines*

Experience as our way of constructing our understanding of the world we live in is what constructivism theory advocates. In this study, the Decimal FunPro, a mobile game application which is designed to learn number systems was used to explore the occurrence of constructivist learning theory by employing clustering algorithm on the dataset by means of RapidMiner instrument. The performance of the students in using the mobile game shows that during the first tries from the different game categories, students spent more time finishing the activity as compared to the other trials. This means that the students learned from the first trials. A t-test was also conducted to define the significant transformation between the post-test and pre-test. The result showed that there is a significant difference between the posttest as well as the pre-test signifying that students acquired knowledge in number systems when they used the mobile game application. With the evidence stated, it can be concluded that using the Decimal FunPro mobile game application reveals that students can build new knowledge based on prior experience.

### **"Assessment of the Effectiveness of Learning Theories using Gamified Android App in Teaching C Programming "**

Janelyn A. Talingdan & Christopher John R. Llanda  
*Abra State Institute of Sciences & Technology, Philippines*

New knowledge of learners can be easily attained by applying different strategies in the classroom instructions. In the pedagogical domain, learning theories had been enforced and embedded to all instructional materials especially on gamification. Gamification is a concept of game-based approach in the teaching and learning process by offering challenges, tasks, rewards, badges and assessment. An android-based application called C-Rocks had been used in this study which comprises three learning theories: constructivism, behaviourism and instructivism. A pre-test was conducted to the fifty first year IT students who learned C programming in a traditional way of teaching to determine their prior knowledge. After that, the C-rocks was used by the students to facilitate the learning of C programming. A post-test was conducted to determine the post-knowledge gained after using the android app. The students were clustered using the k-means clustering algorithm of educational data mining to good, medium, and poor standard students. It was found out that most students excelled in variable topic while they performed least in the control statement topic. A T-test was also utilized and showed that the result of pre-test and post-test is highly significant with a t-value of 7.236 and a probability of 0.000. With the result established, the C-android app containing three learning theories is an effective Gamified tool in learning C programming as students can achieve greater learning.

## **“Classification of Project Management Tool Reviews Using Machine Learning-Based Sentiment Analysis”**

Rufo A. Baro, Melidiosa V. Pagudpud, Lourdes M. Padirayon, & Raymund E. Dilan  
*Don Mariano Marcos Memorial State University, Philippines*

Managing the daily responsibilities in an organization is a great task for company administrators. Employing a dedicated project management tool is a great aid in all the phases of project management. With a variety of project management tools available in the market, it is a demanding task to look for a tool appropriate to the needs of the organization. It is an observation by scholars and suggests project management tool users tend to read first the reviews and comments of the product before deciding on the tool they are going to implement. This study facilitates sentiment analysis which can help identify effective and efficient project management tool. Microsoft Office Project is one of the most popular and most reviewed tools for more efficient project and portfolio management. The researchers manually extracted data from various websites containing comments and reviews from different users or reviewers. Machine learning-based-approach using RapidMiner was utilized to analyze the collected data from the web reviews. Sentiment analysis from MS Project reviews was applied using supervised learning K-nearest neighbor (KNN). The first level of classification involved classifying statements as “satisfied” and “dissatisfied.” The second level of classification involved clustering sentiments as cost, experience, task, support and interface. Statements classified as satisfied is greater than dissatisfied. The best features to apply when classifying the PM tool reviews dataset are using stop-words, length, stemming and trigram.

## **“Improving Tourism Experience in Open Data Environment with Mobile Augmented Reality: Needs and Challenges”**

Ardee Joy T. Ocampo & Thelma D. Palaoag  
*Lorma Colleges and University of the Cordilleras, Philippines*

Tourism industry plays a significant role in the economic growth of every country. It is one of the fastest growing sectors that provides continuous growth and deepening diversification that leads to socio-economic progress. This study gives an overview of the needs and challenges of incorporating Mobile Augmented Reality in an open data environment to improve tourism experience. The use of open data in tourism and mobile augmented reality was presented to have an overview of its impact on tourism. Mobile Augmented Reality applications are one of the best suitable applications to boost tourism activities. However, there are still existing needs and challenges that need to be addressed, these are a. technical requirement of the application, b. acceptability of users to utilize MAR, c. availability of data specifically on the tourism site.

## **“The Empirical Study on the Impact of Student-Centered Learning Application to Cognition and Social Learning”**

Desiree I. Cendana, Neriza V. Bustillo, Arnel B. Ocay, & Josephine Dela Cruz  
*PHINMA-University of Pangasinan, Philippines*

Cognition is the umbrella term for learning skills-it is the ability to relate and comprehend what was learned. Whereas social learning is the ability of learner to grasp ideas shared by others and from a

community of shared knowledge resources. The main objective of this study was to explore the impact of technology-mediated learning to the cognitive thinking of learners in terms of their ability to understand computer-assisted instructions, adopt new knowledge and apply mental activities and skills to perform reasoning and grasp what is being taught using the Student-Centered Learning Software (SCLS). Also, it aims to understand the impact of technology-mediated learning to social learning in terms of learner's ability to learn and perform activities with peers or in a group-related work. Experimental research was applied and a pre-tested questionnaire was used for data collection from 300 tertiary learners in 2 private universities in the Philippines. Using one-way ANOVA and regression analysis, study has revealed that with lower limit of 95% confidence level, the learner's frequency of use, time spent in taking activity and their level of understanding and comprehension have significant difference to their cognition where  $p=0.000<0.05$ . Whereas using T-test, learner's engagement to peer and group related activities has significant difference of  $pvalue<0.05$  and  $variance=0.20$  to their social learning. Thus, integration of SCLS may positively uphold active learning, increase cognitive thinking, stimulate enthusiasm and social learning. Hence, learner's interactivity to computer mediated technology may lead to a productive learning process.

### **“Apiculturists’ Issues and Challenges: A Basis for Invoking IT Model in Beekeeping Industry”**

Stephan Kupsch, Thelma Domingo-Palaoag, & Amy P. Balcita

*DMMMSU - NLUC and University of the Cordilleras, Philippines*

The most significant activity of honey bees, as far as advantages to people, is their pollination of natural vegetation. Bees and other pollinators seem to be declining globally. Beekeeping in the Philippines is a thriving industry that perfectly matches the natural landscape of the country. The goal of this study was to define the challenges and issues of Apiculturists in the Philippines where-in an IT approach was formulated to address these issues. Up to now, there is no initiative Information Technology approach in the beekeeping industry in the Philippines. Design thinking has been used as methodology in this study. Several challenges and issues were determined, and it is stated that the main problem to be addressed in order for the bee colonies to have a longer lifespan is its Apiary Location, an IT solution via Drone Technology with a Computer Vision approach was proposed named as Apiary Locator. A proposed framework of the Apiary Locator has been prepared. It is then recommended for the Apiary Locator to be developed as it shall benefit the apiculturists of the Philippines. Also, it will be a basis for developing IT solutions for the Beekeeping industry.

### **"Environmental Acoustic Transformation and Feature Extraction for Machine Hearing"**

Ricardo A. Catanghal Jr, Thelma D. Palaoag, & Carlwin V. Dayagdag

*University of Antique and University of the Cordilleras, Philippines*

This paper explores the transformation of environmental sound waveform and feature set into a parametric type representation to be used in analysis, recognition, and identification for auditory analysis of machine hearing systems. Generally, the focus of the research and study in sound recognition is concentrated on the music and speech domains, on the other hand, there are limited in non-speech

environmental recognition. We analyzed and evaluated the different current feature algorithms and methods explored for the acoustic recognition of environmental sounds, the Mel Filterbank Energies (FBEs) and Gammatone spectral coefficients (GSTC) and for classifying the sound signal the Convolutional Neural Network (CNN) was used. The result shows that GSTC performs well as a feature compared to FBEs, but FBEs tend to perform better when combined with other feature. This shows that a combination of features set is promising in obtaining a higher accuracy compared to a single feature in environmental sound classification, that is helpful in the development of the machine hearing systems.

## **“Students’ perception on e-learning: a basis for the development of e-learning framework in higher education institutions”**

Myle Melody Daniels, Evangeline Sarte, & Josephine Dela Cruz  
*Ifugao State University, Philippines*

As learning styles evolve along with modernizing society, educational technology also expands. A current trend in education brought about by technological advances is the e-learning system where teachers and students can discuss lessons online and exchange learning resources. This study explored on the areas of e-learning and provided a review on current e-learning frameworks from different studies. A recent study of Debattista presented a comprehensive rubric for e-learning and it is adopted by this paper as basis for gathering student expectations, feedback, and problems encountered in e-learning. These rubrics were rated by students according to importance. Statistical findings show a significant difference between ratings of students from public and private institutions. Similarly, there is a significant difference between the ratings of male and female students. The difference might spring from the level of interest of students towards learning as factored in by type of institution and gender. Students’ learning expectations in an e-learning environment were also gathered in this study as a basis for a proposed e-learning framework. All specific standards presented by Debattista were labelled very important by respondents and are therefore adopted into the proposed framework. Along with these rubrics are proposed additional standards that focus on the enrichment of student experience and enhancement of learning. It is still highly recommended that strict and proper implementation of such standards are supervised by concerned administrative departments.

## **“Assessing the Impact of E-Learning System of Higher Education Institutions’ Instructors and Students”**

Michael Angelo Burac, Jane Fernandez, Ma. Melanie Abaza-Cruz, & Josephine Dela Cruz  
*International School of Asia and the Pacific, Philippines*

Through technological and globalization innovation, the traditional mode of instruction in higher education institutions has been transformed through e-learning. It is a new educational trend which created a new medium in the delivery of instruction. The researcher attests by determining the e-learning systems influence on students and instructors is vital to the advance implementation of effective and suitable in e-learning systems. In order to know the perceptions of the students and instructors from higher education, the researcher conducted a survey regarding their current experiences. The main purpose of the study was to investigate the impact of e-learning in higher education. This study shall document the e-learning systems impacts which had on Instructors and Student participant's performance about the level of user satisfaction and productivity, utilization and problems encountered. The study found out that the use of e-learning systems shows a positive influence on student learning.

Most instructors utilized e-learning system as presentation and preparation tool in teaching and learning. Evidently, most instructors positively confirm that e-learning supports teaching and learning effectively implemented.

## **“Workspace Layouts for Communication Quality in Scrum Teams”**

Kholid Haryono & Za Idatin Nikmah

*Universitas Islam Indonesia, Indonesia*

Purpose of study to show the influence of workspace design on the quality of communication, especially on the Scrum team. The motivation is to find out the effect of changes in layout of the workspace on the quality of communication. Communication quality is an important concern about the performance of software development in the Scrum team. Problem: How does the layout change affect the Scrum team's workspace on the quality of communication between members on a team; team members with other teams, and differences in the effect of changing layouts with old layouts. Methodology: Research steps use Participatory Action Research (PAR). This method has four main steps, namely planning; acting; observing; and reflecting. Data retrieval uses survey method by distributing questionnaires, conducting daily observations, and Forum Group Discussion (FGD). Findings: The Development Team Cell (DTC) workspace model is better than the Conference Cell (CC) model. This finding strengthens the previous research conducted by Scott and Pawel Role. Conclusion: There are three conclusions. a) changes in layout can improve the quality of individual communication. b) changes in layout have a positive effect on the quality of communication between team members and outside parties. c) changes in layout have a positive effect on team members' understanding of the work and methods used.

## **“Classifying Soil Texture Images using Transfer Learning”**

Excel Philip B. Guidang

*Abra State Institute of Sciences and Technology, Philippines*

Transfer learning is a machine learning technique which makes use of a pre-trained neural network to classify new objects. This study was conducted to evaluate the performance of Inception-v3 in classifying Soil texture images on different conditions. Specifically it achieved the following objectives 1) Identified the features of Inception-v3 and 2) Classified Soil Texture images using Inception-v3. The study used literature review to identify the features of Inception-v3. The study found that Transfer Learning comprises of two portions: a) feature mining and b) classification. Moreover, Inception-v3 highest prediction rating of a Soil texture image is 98% and 86% as the lowest. The study concludes that Transfer Learning method through the use of Inception-v3 can be used to classify Soil texture images.

## **“Categorizing Mobile User Interface Patterns Using EFA”**

Almed Hamzah

*Islamic University of Indonesia, Indonesia*

A mobile user interface is a specialized form of a user interface as it runs on mobile devices which has some limitations. It must be designed in a simple and engaging appearance. There is a guideline avail-

able that consists of eleven specific patterns of mobile user interface design to achieve this objective. This paper aims to regroup these patterns into smaller groups so that there is a simpler guideline. To do so, the Exploratory Factor Analysis (EFA) approach is being used. The result shows that the eleven patterns could be grouped into four categories. These categories depict the spectrum of mobile user interface design from mandatory to optional. A prototype is built based on this categorization.

## **“Investigating Students’ Engagement in a Hybrid Learning Environment”**

Aida Eliveria, Leoderic Serami, Lambert Famorca, & Joesphine Dela Cruz  
*Saint Louis University, Philippines*

Higher learning institutions (HEIs) are using different learning modalities to encourage better performance from students in accomplishing course requirements. A hybrid learning environment introduces opportunities for educational leaders, teachers and learners in finding alternative approaches to enhance traditional brick and mortar setting. A hybrid learning environment was introduced to a group of information technology (IT) and computer sciences (CS) students through a learning management system. The mixed methods study sought to investigate students’ participation and enthusiasm in a hybrid learning environment. A survey was presented to the students at the end of the semester. The resulting analysis revealed that students prefer online activities but acknowledged that in-class activities help students learn and understand course work. Results further revealed students’ insight of how a successful hybrid learning environment should be handled. The results from this research can provide understanding to help guide future attempts of a hybrid learning environment.

## **“Topic Modeling of Weather and Climate Condition On Twitter Using Latent Dirichlet Allocation (LDA)”**

Ahmad Fathan Hidayatullah, Silfa Kurnia Aditya, Karimah, & Syifa Tri Gardini  
*Universitas Islam Indonesia, Indonesia*

This study aims to apply topic modeling approach using LDA for Twitter dataset shared by the official Twitter account of BMKG in Java Island. The topic model result can be seen as the representation about what kind of information that posted by BMKG through Twitter. In addition, it can also illustrate the weather, climate, and disaster trends that occurred in Java Island. Based on the topic modeling result, we found five notable topics from BMKG’s Twitter accounts. As for the topics discussed, BMKG’s Twitter accounts disseminate the information about weather Information and weather forecast; latest weather information in Yogyakarta Region; weather forecast and warning in Central Java and West Java; earthquake information; latest articles and calendar cropping information. In this study, we also illustrated the trends about weather and disaster by analyzing the most frequent words from each region in Java.

## **“eLearning Roadmap for Open Distance Learning in Cordillera Administrative Region”**

Dario H. Galeon, Paul G. Jr. Garcia, & Josephine S. Dela Cruz  
*Ifugao State University, Philippines*

The eLearning technology and its integration in higher education's open and distance learning is generally claimed as matured, however actual information gathered on the ground states otherwise. This descriptive research investigated its implementation status in the Cordillera Administrative Region. It explored into the competency of faculty in course content development skills, their engagement and involvement in professional development activities, their integration of ICT in the curriculum and their eLearning culture particularly on their access of eLearning resources. The management support particularly on leadership and planning, support to ICT infrastructure, professional development, eLearning culture, and ICT in the Curriculum were also part of the investigation. Data analysis revealed that generally, faculty are ready to implement eLearning however, management should look into retooling its leadership to support the program in terms of leadership and planning, eLearning culture, and ICT infrastructure support. A roadmap was developed to serve as an implementation plan in addressing the identified issues in eLearning adoption to open and distance education. This roadmap may also service as guide for academic institutions, researchers, administrators and leaderships in implementing similar programs.

## **“Online Corpus of Spoken Ilokano Language”**

Franklin R. Apostol & Alvin Malicdem  
*Mariano Marcos State University, Philippines*

There has been a great effort in the collection of different languages in the past years all over the world, and the development of online corpus outside the country brought new possibilities in the Philippines. However, there is a limited resource for the Ilokano Language. This paper introduces the Corpus of Spoken Ilokano Language, an online repository of spoken Ilokano in the Philippines specifically in region 1. The main component of this study is spoken Ilokano. It has been specifically built for natural language processing. It shows the difference of Ilokano language as spoken by Ilokanos in the region. The database consists of 160 speakers, 40 speakers in each province of the region, each speaking about 74 statements. Spoken Ilokano language was audio recorded and transcribed. A web application has been developed making the dataset available online. The corpus was validated to provide a useful resource of data that can be used for automatic speech recognition models.

## **“Dashboarding the Maternal and Children Health Profiles for Health Supporting System”**

Lizda Iswari, DThomas Hatta Fudholi, & Silfa Kurnia Aditya  
*Universitas Islam Indonesia, Indonesia*

Various types of health data are routinely collected and published as national health profiles. However, these vast amounts of data are not always used effectively since they are presented in raw tabular data sets, fragmented, and are not well-equipped with the statistical data inferences and the trend of changes which are essential to explore some unknown previous information. In this paper, we propose how to manage the national open health data sets as a dashboard application to support the decision

making for maternal and child health-care services in Indonesia. The research was conducted in four steps. First, we described what maternal and child health parameters are involved in relation to the availability of open and accessible data set. Second, we designed the dashboard application based on Kimball's four step dimensional modelling. Third, we implemented the schema modelling as data warehouse by executing ETL (extract, transform and load) and OLAP (On Line Analytical Processing) cubes. Fourth, we analyzed the results with the business intelligence approach. We explored the open data sets in four consecutive years (2014-2017) and determined seven types of business process, i.e. analysis of health profile on neonates, infants, and children, analysis of maternal health profile before, during and after pregnancy period, and analysis of health supporting factors. By applying data warehouse and business intelligence, our proposed system has the ability to integrate and extract a number of tabular and fragmented data sets into an easy and quickly inferred information about the current situation of maternal and children health care services.

### **“Surviving the disconnections: The use of information systems in Indonesian public health facilities”**

Fathul Wahid, R. Teduh Dirgahayu, Almed Hamzah, & Hari Setiaji

*Universitas Islam Indonesia, Indonesia*

The adoption of information systems in public health management in Indonesia aims to manage the data properly in order to improve the effectiveness of the provision of health services. However, based on previous works, it does not live up to expectation. This paper reports an insight coming from the field about the use of various and disconnected information systems in one place without sufficient coordination mechanism among those systems. The systems were developed by the superordinate body and it is compulsory for the public health facilities to adopt and implement the systems. This raises several problems related to the quality of the system itself, human resources capability, ambiguous procedures, various reports with the relatively same data, and unclear incentive mechanism for staffs. We conceptualize the problems of disconnections among three elements: actors, context, and information systems. These lead to different types of disconnections: between government agencies at national level, between information systems, between information systems and the context, between government agencies at national and local level, and between information systems and available staff capacity. This study also points out practical implications, which includes the use of more holistic approach to design and develop information systems, to develop an integrated information infrastructure for public health facilities.

### **“Implementation and Performance Assessment of the Enhanced RC5 (ERC5) Algorithm Based on Addition-then-Append Key Expansion Technique”**

Excel B. Villanueva, Bobby D. Gerardo, & Ruji P. Medina

*Technological Institute of the Philippines, Philippines*

In a business, it is important to note that owners should always make sure that they give a hassle free service to their customers to attract their attention and will eventually, gain their trust and continuous patronage of their service and RFID offers a solution for this concern. Traditional way to collect payment is still in use up to this day. This paper intends to implement the use of the ERC5 algorithm in an

RFID – based payment scheme for the DMMMSU-NLUC Fasfood center as an encryption algorithm for securing sensitive information. Moreover, it also intends to assess the performance of the said algorithm in terms of speed and work efficiency compared to the original algorithm. Result shows that the authors were successful in implementing ERC5 as an encryption algorithm. Result also shows that the ERC5 outperforms the classic RC5 algorithm in both speed and work efficiency category.

### **“Frequency of Compromised Passwords Used by Students and Staff of Asia Pacific College: An Analysis Using NIST SP 800-63B and Pwned Passwords”**

Jesus Vicente Roig, Josephine de la Cuesta, Jose Castillo, Jayvee Cabardo, Edmundo Casiño, Eric Salalima, & Manuel Sebastian Sanchez  
*Asia Pacific College, Philippines*

The National Institute of Standards and Technology (NIST) released new guidelines in June of 2017 that recommended new standards for managing and accepting user passwords. Among the new guidelines is a requirement that verifiers should check if a user's supplied password is compromised – that is, already listed in previous breach corpuses. Using a corpus of 320 million breached passwords, the researchers conducted an experiment to gauge what percentage of the population of their home institution, Asia Pacific College, use compromised passwords. The study found that 16.72% overall – or 1 in 6 people – were using passwords that are part of the 320M breach corpus. This paper also provides a methodology that other institutions and companies can use to conduct the same analysis in order to gather data specific to their population that can guide the improvement of their password policies and related IT security services.

### **“A Study of Public Key ‘e’ in RSA Algorithm”**

Carlo Intila, Bobby Gerardo, & Ruji Medina  
*Technological Institute of the Philippines, Philippines*

RSA Algorithm is public-key cryptography which exposed from factorization attack based on the public key ‘e’ and modulus ‘n’. The study aimed to modify an RSA Algorithm based on generation of different value of public key ‘e’ and show different result based on original equation of RSA Algorithm. A modified RSA Algorithm was developed to generate different value of public key ‘e’ and compared the result based on the output value and speed of execution. The results show that the modification of RSA based on public key ‘e’ provides additional security.

### **“An analysis on the insights of the anti-vaccine movement from social media posts using k-means clustering algorithm and VADER sentiment analyzer”**

Jack Laurence Garay, Robert Timothy Yap, & Mary Jane Sabellano  
*University of San Carlos, Philippines*

This study analyzes the insights and sentiments of the anti-vaccine movements in the social media.

The data, comprising of tweets and excerpts, are pre-processed to omit noise and irrelevant data. They are clustered using the k-means clustering algorithm. Each word belonging to a cluster is processed by VADER sentiment analyzer. Prevalent sentiments per cluster label the mood associated in the cluster. The results suggest insights about vaccines such as: side effects, post-shot injuries, ineffectiveness, damage from ingredients, unvaccinated elite, reinforcement of the right to not vaccinate, toxic ingredients, big pharmaceuticals' profit maximization, links to autism, and health issues after getting vaccine shots. To evaluate k-means results, the silhouette score is determined to indicate how far a point is to other nearby clusters. The resulting average silhouette score of all points is 0.013540022 which indicates that the points are close to the decision boundaries.

## **“Bias Detection in Philippine Political News Articles Using SentiWordNet and Inverse Reinforcement Model”**

Thessa Quijote, Allena Zamoras, & Angie Ceniza  
*University of San Carlos, Philippines*

Not all information posted on the internet is deemed ‘trustworthy.’ Some articles, especially those related to politics, seem to display traces of bias, whether they be for or against the Philippine administration. This research aims to determine if a news article—and by extension, a news outlet—is biased based on its sentiments and use of lexica. Data were harvested from chosen websites and news outlets provided by Alexa. These data underwent pre-processing and were scored based on their sentiments with the use of SentiWordNet. The resulting scores were then fed into the Inverse Reinforcement Model, which determined whether an article is biased or not. With the use of Inquirer, Philstar, Manila Bulletin, The Manila Times, and Journal Online news articles, the system was able to detect bias with an accuracy rating of 0.89, precision of 1, recall of 0.60 and F-Measure of 0.75.

## **“Optimizing Git for Handling Database Backups: Findings and Insights From Another 6,000 Hours of Experimentation”**

JV Roig  
*Asia Pacific College, Philippines*

This is the second in a series of papers detailing results from on-going investigations of using Git - a distributed source control system - as a database backup and disaster recovery tool. The first paper, published early 2017 after 2,000 hours of data processing and simulations, warns that the default configuration of Git is unsuitable for database backups, but also shares configuration tweaks that make it safe and more space-efficient than zipped .sql archives - as low as only 1% of the storage space needed by .sql archives. This second paper focuses on optimization, looking specifically to identify which configuration tweaks and factors affect the reliability, scalability and efficiency of a Git-based database backup and disaster recovery system. Critical insights regarding the reliability and scalability of a Git-based database backup system were found after 6,000 hours of experimentation, centered around the problem of configuring Git to be able to handle .sql files measured in gigabytes.

## **“Analysis of the Impact of Social Networking Sites using Web Content Mining and Induction Method”**

Renz Carlyle Bernados, Joshua Ty, & Angie Ceniza  
*University of San Carlos, Philippines*

With the prevailing presence of social media, we cannot deny the fact that it influences the life of people. Usually teenagers tend to use this technology either to socialize or entertain themselves. In this paper, we have presented a framework to perform a qualitative analysis of social media networking sites using their social media reviews. The researchers gathered 503 links from Facebook, Twitter, Instagram and other related articles using web content mining. And, induction method was used to restrict and classify the harvested data. Researchers makes use of Word2Vec model that would find the similarity of one word to another. The experimental results show 81.39% precision, 67% accuracy, 70.93% recall and 75.58% F-Measure.

## **“Poverty Incidence Identification of Cities and Municipalities Using Convolutional Neural Network as Applied to Satellite Imagery”**

Jericho E. Mesina, Joshua Louis D. Isanan, & Christian Maderazo  
*University of San Carlos, Philippines*

Poverty remains to be a hindrance to national growth for many developing countries. This presents a problem in a country's resource management and urban planning of its people. Furthermore, there is a big gap when it comes to data collection and monitoring in developing countries such that the government fails to prioritize this area of responsibility. The authors aim to bridge this gap by classifying wealth through the use of satellite images and emerging technology, particularly Convolutional Neural Networks. The researchers' goal is to test whether AlexNet, a Convolutional Neural Network Architecture, can identify the poverty levels of municipalities in the Philippines, by estimating their poverty incidences, based on satellite images. With this research, it can measure a broader set of society growth indicators. Indicators such as the material of people's houses, the size of their houses, their living conditions, access to roads and also how highly urbanized an area is, are considered important factors to indicate poverty. The results shows an accuracy of 0.84 and average precision-recall of 0.86 and 0.84, respectively. This study will give deeper insight to the government as to which areas to improve on in certain sectors given that a poverty incidence is high in a certain municipality.

## **“IoT Based Model for Monitoring and Controlling Water Distribution”**

Joey G. Natividad & Thelma D. Palaoag  
*Isabela State University and University of the Cordilleras, Philippines*

These days, because of increment in relocation from a provincial territory to urban ranges, the population in urban areas is obviously expanding quickly together with the requirement for comfortable living. With increase in population, urban areas have expanded, water becomes one of the major problems in a city particularly water distribution, interfered with water supply, water protection, water utilization and furthermore the water quality. To overcome water supply related problems proper monitor-

ing and controlling system must be implemented. The developed system consist of different IoT devices like water pressure sensor, ultrasonic sensor, solid state relay switch, motorized electric water valve, Raspberry PI, GSM module and Arduino UNO micro-controller. This paper focused on the monitoring and controlling of water distribution using IOT based model. It aims to design and develop a low cost reliable and efficient technique to improve water distribution in the community. A prototype was developed to simulate the operation of a water distribution. Also, a web application was created as a front-end system for monitoring the status of the different pumping stations as well as controlling. Also, fuzzy logic algorithm was integrated into the developed prototype system to be more scientific in making decision. As a result, the experiment was successful and passed all the conditions set for monitoring and controlling water distribution using IoT based model

### **“Fittest Job First Dynamic Round Robin (FJFDRR) Scheduling Algorithm using Dual Queue and Arrival Time Factor: A Comparison”**

Jezreel Ian C. Manuel & Dionisio R. Tandingan Jr.  
*University of the Cordilleras, Philippines*

The Fittest Job First Dynamic Round Robin (FJFDRR) was introduced as a CPU scheduling algorithm whose performance evaluation reduces the number of context switches (CS), average waiting time (AWT), and average turnaround time (ATAT) of processes in a single CPU environment. In this paper, we explored improvements on the FJFDRR by including the process arrival time as an algorithmic factor implemented using a dual queue. We then compared the performance of the proposed algorithm called enhanced Fittest Job First Dynamic Round Robin (eFJFDRR) as with the FJFDRR algorithm together with the other CPU scheduling algorithms. Trial results showed that eFJFDRR scheduling algorithm performed better in reducing average waiting time, average turnaround time, and average response time in some cases. It was also found to balance the number of context switches of the processor during execution.

### **“Computer Simulation Model for Traffic Enforcement Using Unity Engine”**

Kasey G. Cuyos, Daniel R. Ubanan, & Angie M. Ceniza  
*University of San Carlos, Philippines*

In this paper, we have presented a graphical representation of road traffic. The intersection rules can be manipulated to the configurations set by the user. In the real world, traffic congestion is inevitable. In fact, the Philippines is considered to have the 3rd worst traffic in Southeast Asia. This research aims to provide a system to help lessen the rate at which traffic congestion occurs. With the help of this simulation model, authorities may simulate situations that may aid in their decisions in order to improve traffic flow.

## **“Bank Air Kami: Terban Waterscape Information System”**

B Syahputra, A Sujarwo, & I Maharika  
*Universitas Islam Indonesia, Indonesia*

As an informal urban-rural mixture area in the middle of Yogyakarta, Terban holds a special living facility: water. Dividing the downtown with a popular river sourcing from Mt. Merapi volcano, Terban waterscape has nine springs watering the society in a traditional way. This paper offers a new approach for the Terban waterscape to show water quality data for researcher and tsociety through information system, and to increase the benefits of natural resources among people. The approach was conducted by designing and deploying a set of sensors to collect data which were then managed by information system for further processing by researchers and locals.

## **“Automatic music mood recognition using Russell’s two-dimensional valence-arousal space from audio and lyrical data as classified using SVM and Naïve Bayes”**

Kim Rainer Tan, Matthias Laurence Villarino, & Christian Maderazo  
*University of San Carlos, Philippines*

Automatic music mood recognition is still a new field of research that is gaining attention in the last decade. This study created a system that predicts which of the four quadrants of the valence-arousal space the song belongs to. The system used support-vector machine (SVM) for audio features while Naïve Bayes was used for lyrical features. audio classification achieved a high accuracy for arousal while lyrics classification achieved a high accuracy for valence.

## **“Mobile Games Interaction Design for People with Visual Impairment Using Participatory Design Approach”**

Galang Prihadi Mahardhika, Arrie Kurniawardhani, & Debby Yolhanda  
*Universitas Islam Indonesia, Indonesia*

Mobile games are one of the technologies that can change the way people express and interact with their environment. In certain development, mobile games can also be used as medium to support the learning process. One of the main elements of mobile games is accessibility. Accessibility can be illustrated by the ease of interaction in the mobile games itself. There are not many mobile games developed for players with special needs, such as people with visual impairment. This research was conducted to develop alternative interaction design on mobile device that can be used by people with visual impairment. The development of alternative design was conducted by using participatory design approach. The participatory design approach is considered to be able to create interaction design which is appropriate with the participants wish. This study involved 10 visual impairment people as participants in the participatory design process. The final result showed that the alternative design produced were in accordance with participant’s desire.

## **“Usability of KITIKIT: A Mobile-based App for Implementing Customizable Online Product Ordering”**

Amy Paneda Balcita, Randy Roy Ventayen Magno Ventayen, & Thelma Domingo Palaoag  
*DMMMSU Open University System adn University of the Cordilleras, Philippines*

Pugo, branded as the woodcarving capital of La Union, is well known for woodcarving products. The town has skilful tribes who practice woodcarving. One of these tribes was the Ifugaos, and when they learned that the art of woodcarving could make money for them, a wave of Ifugaos migrated along the Marcos Highway to showcase their hand-carved wood products. The widespread of woodcarving business was due to the availability of the raw materials, tools used and durability of the product. Home decors, furniture and other sculptural forms made out of wood are some of the products that are now distributed in the market. This research was then conceptualized for the benefit of the woodcarving industry stakeholders. The researchers proposed the KITIKIT, a mobile app to ease the searching for hand-carved wood products. Usability testing using USE questionnaire had been conducted to find the level of usability of the KITIKIT. The results show that the proposed application is acceptable to users in terms of usefulness, ease of use and satisfaction.

## **“A decision support system with 3D visualization for box space optimization using the locust-based particle swarm optimization algorithm”**

Carlo L. Janea, Bojo Luis B. Alcisto, & Christian V. Maderazo  
*University of San Carlos, Philippines*

The non-stop increase in world population has resulted to an increase of the demand of space for human habitability. Space allocation is a problem mostly dealt with those with limited to scarce resources, and those who cannot afford or are not willing to spend for an alternative or an additional space as a solution. The objective, then, is to aid people in maximizing their current available space without having to sacrifice cost, time, and effort. This study has developed a decision support system that provides the optimum arrangement between a set of objects, selected by the user from sample models from the ShapeNet dataset presented by the system through 3D Visualization, to maximize the space of the given box. The developed system obtained the optimal arrangement, which maximized 60% to 91% space of the given box, of the set of objects by utilizing the locust-based Particle Swarm Optimization algorithm.

## **“Digital Conversion Model for Hand-Filled Forms Using Optical Character Recognition (OCR)”**

Lorena Rabago, Jayvee Cabardo, Jade Ericson Adriano, Katelyn Anne Calma,  
Nicole Angelyn Lopez, & Justin Parado  
*Asia Pacific College, Philippines*

The process of manual data entry used by several industries garners a high error rate. This is because the manual process relies too heavily on a human’s capability to interpret handwritten forms. To reduce the high error rate of data entry, the researchers explored the different processes that comprise optical character recognition (OCR) and used it on a novel digital conversion model for

hand-filled forms. The OCR process is made up of four major phases. The techniques for each stage are as follows: Sauvola binarization for image pre-processing; blob analysis for character segmentation; pre-trained Convolutional Neural Networks: GoogLeNet, AlexNet, and VGG16 for feature extraction, and Support Vector Machines (SVM), K-Nearest Neighbor (KNN), and Naïve Bayes for classification. The novel combination of Convolutional Neural Networks for feature extraction coupled with SVM for character classification showed promising results, going up to 98.62% in accuracy and 65.31% in F-Score.

## **“Modern File Transfer Protocol Using Lossless Compression, Lattice-Based Encryption, and a Data Integrity Hashing Function”**

Vince Jerald A. Villamora, Marvin S. Lim, & Archival J. Sebial

With the recent advances in technology, the creation and access to voluminous amounts of data has become more and more common. From consumer computers and smartphones to big data, the transfer of data entailed a longer download and upload time as the size gets bigger, thus taking a significant amount of time for data to reach its destination. Moreover, data can be corrupted as it is being transferred over the network and most file transfer protocols do not have a file integrity check. Lastly, most file transfer protocols employ the RSA cryptosystem which can be broken through the use of a quantum algorithm known as Shor’s algorithm. The proponents have implemented a file transfer protocol that integrates file hashing, compression, and a quantum-resilient cryptosystem. The results show that the proposed file transfer protocol is faster than plain FTP and even faster against FTP over TLS.

## **“Q-DAR: Quick Disaster Aid and Response Model Using Naïve Bayes and Bag-of-Words Algorithm”**

Reham Snow Camama, Julius Claveria, Ma. Fevy Espinas, Jayvee Cabardo, & Lorena Rabago  
*Asia Pacific College, Philippines*

A real-time approach in decision-making for disaster management here in the Philippines is important, given that the country is vulnerable to disasters. Many studies show that data from social media can be of good use especially in times of disaster. This research aims to develop a model that will serve as a decision support tool for the government to respond during disasters with the use of Twitter hashtags that are based from the DRRM disaster phases; Disaster Response, Disaster Preparedness, Disaster Rehabilitation and Recovery, and Disaster Mitigation. The result of the study provides an overview of the critical level of the disaster phases with the use of Naïve Bayes and Bag-of-Words algorithm. The process of this study has four phases; the Training phase includes the labeling of the hashtags and list of Bag-of-Words, the next phase is Data Collection where Twitter data automatically updates and can be extracted every hour. The third phase is Data Pre-processing; where the tweets go through tokenization and normalization. Lastly, the dataset goes through Q-DAR with two sub-processes: The Disaster Phase Analysis using Bag-of-Words and Critical Level Analysis using Naïve Bayes in WEKA.

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## **“Predicting Emotion in Music through Audio Pattern Analysis”**

Joe Brotzer, Ethan Mosqueda, & Ken Gorro  
*University of San Carlos, Philippines*

Music plays a big part in the development of humanity and has inspired so many people to do great things. Which is why a study was conducted focusing on music and its relation to human emotions. It tackles on how an emotional response is generated from an audio pattern through the use of a model constructed by the researchers. The work done is aimed to generate ratings of the emotion conveyed in a song represented as valence and arousal. Audio feature extraction and Artificial Neural Networks played big parts in the development of the research in creating the regression model and predicting the human emotion being emphasized in an audio pattern. The findings of the research will be used to give meaning to audio patterns and how their structure and composition leads to different emotional states of man.

## **“InTelect: Interactive Telemedicine Communication Technologies Mobile App”**

Mary Jane C. Samonte, Veronica D. Aguilar, Airah Katrina M. Marino, & Ramerson M. Tolentino  
*Mapua University, Philippines*

In over 90 million of the population in the Philippines, for every 10 people, 8 of them reported never having a medical check-up in their lives. Reasons for this are the ongoing economic issues of the country such as poverty, poor infrastructure, and heavy traffic. This paper focuses on developing a system for both medical doctors and patients whose ability and affordability to access healthcare in terms of medical consultations are very limited to almost none. The developed system, a mobile application, provided an environment for the remote communication of doctors and patients utilizing the mobile communication tools for the Information and Communications Technology (ICT) through the concept of telemedicine and the use of Global Positioning System (GPS). Through this research, medical consultations between doctors and patients are made more accessible since both users are able to communicate over long distances, making it possible to look for a doctor especially in the rural areas. The mobile communication tools and the GPS are used to allow patients to search for a specific kind of doctor and consult with them. Patients can also utilize the GPS alone to locate and get directions of the nearest healthcare facilities from their locations. On the other hand, doctors are able to accommodate patients remotely giving them the benefit for comfort and an additional source of income.

## **“Tagalog Text-to-Braille Translator Tactile Story Board with 3D Printing”**

Luis Alfonso D. Arbes, Jelena Maeve J. Baybay, Jose Enrique E. Turingan, & Mary Jane C. Samonte  
*Mapua University, Philippines*

New technologies create new challenges, especially for those who cannot read, count, and write. It has been reported that out of 161 million blind people or visually impaired people in the world, 90% of them live in developing communities. However, only 3% are capable to read, write, or count. The Philippines is estimated to have half a million blind Filipinos. National Library's Division for the Blind contained 922 Braille titles, 880 cassette titles, and 462 large print titles. A report concluded that Braille reading materials are lacking in schools and despite the condition of blind Filipinos, many still

want to read. This study is focused on developing an assistive system for visually impaired children under kindergarten. The developed system enhanced the existing reading materials that is used by visually impaired students by providing a 3D visual representation of children's book. Significant story lines of a book were translated to Braille text to tactile board then made into a 3D printed product as a learning material presented to visually impaired students in class. The developed system was tested and used by the target users to their full learning potential.

### **“MAR UX Design Principles for Vocational Training ”**

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*Romblon State University and University of the Cordilleras, Philippines*

Current scientific research on MAR UX design does not address all facets of user experience in a holistic manner. It only covers usability, value, and desirability of the fundamental elements of UX. No known current published research considers the adoptability design principles of UX in MAR. To address this need, this Paper proposed UX design principles for MAR vocational training application and apply it to the design and development of AR4Juan. AR4Juan is an android based MAR vocational skills training application for Senior High School students specializing in Computer System Servicing National Competency (CSS NC) 2. CSS NC2 is under Technical Vocational Livelihood (TVL) track of the K12 education program in the Philippines. The researchers used MAR UX design principles research process to formulate the proposed UX Design principles. The study found out that other literature's design principles only focus on usefulness, usability, and desirability of UX elements and does not consider the adoptability element. Adoptability principles are essential in ensuring the application's natural users usage increase. Thus, drives business success. AR4Juan is still in its prototype stage and needs to be evaluated in every key UX element to determine the degree of its usefulness, ease of use, user enjoyment and engagement and ease of access. Other researchers could adopt the proposed UX designed principles and improve it iteratively after every evaluation of the MAR application.

### **“A fuzzy-based career recommender system for senior high school student in k to 12 education”**

Marvee Cheska B. Natividad, Bobby D. Gerardo, & Ruji P. Medina

*Technological Institute of the Philippines, Philippines*

In this paper, a proposed career recommender system was presented which aim to help not only the guidance counselor but most especially the senior high school students to guide them in considering numerous factors associated to their decision on what career they will pursue. In dealing with choosing the student attributes from numerous factors, a feature selection technique is appropriate to use to remove irrelevant features that affect the performance of the proposed fuzzy-based system. In this paper, different filter methods are used to select the best attributes then these attributes are used as crisp inputs. The result of the experiment shows reasonable result for making decisions. It is concluded that the proposed career recommender system for the students is very timely and will be one of the significant research work in the new era of education system in the Philippines.

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## **“Automatic Wrinkles Detection on Face Image”**

Izzati Muhimmah, Fadhillah Abriyani, & Arrie Kurniawardhani

*Universitas Islam Indonesia, Indonesia*

Image processing techniques are beneficial for reconstructing and processing an image in resulting different images. One of its benefits is it can be used for detecting wrinkles on a face. Line characteristic of wrinkles can be detected also with the support of the features that had been provided. The purpose of this research is to design a system that could detect the exact location of the line of wrinkles which occur from one face image. Generally, the step that required for this research is the HSV colour image segmentation step and K-Means Clustering for dividing skin object and non-skin object. The second step is phase image improvement step with Laplacian of Gaussian filter to sharpening line of wrinkles on image face, and the last step is feature extraction which used for taking wrinkles. After all the steps had been done, each of the wrinkle's areas are detected with Canny filter and eliminated based on Area characteristic. From research experiment, the result validation data of system based on an expert are 40.6% for sensitivity, 96.9% for specificity, and 94.2% for accuracy, with the performance of the system 5,247 seconds.

## **“Braille3D: Using Haptic and Voice Feedback for Braille Recognition and 3D Printing for the Blind”**

Mary Jane Samonte, Erick David Laurente, Karlo Marco Magno, & Catherine Perez

*Mapua University, Philippines*

In today's state of technology, people can see the innovations that have evolved throughout time. One of those is assistive technology which exists to help impaired people from doing their daily activities. This technological advancement is made to help people accomplish tasks they could not perform before. Assistive innovations today reside on computers and people, not only the disabled, have become dependent on them as they make life more efficient and convenient. Accessibility has always been a challenge for people with disability. Researchers and inventors resolved this problem by integrating solutions and innovations into society which benefited the disabled community to let them experience a more convenient life, easing their burdens that hinders them from living an enjoyable life. Assistive technology was one of the solutions that innovators eventually came up with. Prosthesis was invented to be an extension to legs, arms, and other body parts for people who lost a limb, wheelchair for those people who were paralyzed or have difficulties in walking. Other assistive technologies were made to accommodate current technology such as accessible keyboards, text-to-speech software, and speech recognition software. With that said, the motivation of this is study is to contribute to the society by helping people with visual impairment to have more access to technology and to give them a better learning environment in which the person can learn the Braille system.

## **“Virtual Reality Technology on Health Intervention for Women: A Literature Review”**

Rahadian Kurniawan, Dthomas Hatta Fudholi, Dimas Panji Eka Jalaputra, & Restu Rakhmawati

*Universitas Islam Indonesia, Indonesia*

Virtual Reality (VR) technology application has become more affordable, immersive and portable. This is also happening in the health intervention domain. While the usage of the VR applications is still

dominated by man, we conduct a literature review study to see the state-of-the-art in the application for recent VR technologies for women's health intervention. This study is done since women are more susceptible to some disease than men, feel pain more easily, more susceptible to autoimmune diseases, and experience anxiety and phobia more easily. It will help future studies to lookup the big impact of VR health intervention for women. The result of the literature review shows that there are three types of VR technology are used in the application (non-immersive, semi-immersive, and full-immersive), there are four category of health interventions done through VR (prevention, diagnosis, treatment, diagnosis-treatment), and the domain of the disorder are focused mostly to psychological and physical aspect.

### **“Engineering Kids Health Monitoring System in Indonesia”**

Irving Paputungan & Hari Setiaji

*Universitas Islam Indonesia and Universiti Teknologi Petronas Malaysia, Indonesia & Malaysia*

There is a healthcare program in Indonesia called Pos Pelayanan Terpadu (Posyandu). Services such as nutritional counselling, immunization service, health education and birth preparedness are conducted in the program. All the information collected form such program is still in paper-based document, called Kartu Menuju Sehat (KMS). A development of an electronic KMS (e-KMS) is proposed. This paper presents several related works on e-KMS for Indonesia. This paper derives requirements towards the most workable features for e-KMS based on the literatures.

### **“In the Making of Effective Decision Making in Public Health Domain with Business Intelligence Dashboard”**

Mukhammad Andri Setiawan

*Universitas Islam Indonesia, Indonesia*

The easy access towards public health information system is one of the most important aspects in improving general health public. Today, people have more privilege to travel than a few decades ago as flight cost is getting cheaper and the economic situation for many people are better. However, this also brought some consequences that disease also easily move from one place to another. Hence, for many countries, it is necessary for many public health institutions to be able to check current health information system in more accurate and can answer problems that often happened. One of the approaches that have been used to improve the readability of public health information is through Business Intelligence (BI). BI allows health administration to get a good quality of information that can help them to decide. BI has its role as a decision support system that is based on collected facts. However, there are still lots of challenges in implementing BI for public health information system that needs to be addressed. In Indonesia, public health data are collected, but then some studies have suggested that data that have been collected just sitting idle in the repository, and have not been used effectively to help health administration managing the public health. We proposed a system that can help health administration to decide what needs to be done to improve the public health. This information is able to help health administration to show problems and allows them to assign priority to improve the overall public health condition.

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## **“Pairing Clients And Psychologists Using Stable Marriage Problem Approach”**

Sheila Nurul Huda

*Universitas Islam Indonesia, Indonesia*

Health is an important thing in human life, it includes not only physical health, but also mental health. Choosing the right psychologist will help individuals with mental problem to overcome the problem. Choosing a psychologist is important, because the psychologist's personality will influence the process of psychotherapy. This research paper will describe our approach in building a Decision Support System model that will compute the pairing of clients and psychologists. In this study, Weighted Sum Model is adopted to calculate the preference value of each individual, both psychologists and clients. Then based on this preference value, the client-psychologist pairing will be calculated using the Stable Marriage Problem approach. The Gale-Shapley Algorithm is used in this system to solve the Stable Marriage Problem and has been able to produce a stable matching between one set of Clients and one set of Psychologists, and there is no blocking pair from the results of this algorithm.

# WORKING COMMITTEE

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