ABSTRACT BOOK

INTERNATIONAL WORKSHOP ON AFFECTIVE INTERACTION BETWEEN HUMANS AND MACHINES IN MULTICULTURAL SOCIETY

IWAM 2022

Japan Advanced Institute of Science and Technology (JAIST)

(Hybrid Meeting)

March 30, 2022

JAIST
JAPAN ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY
1990

金沢大学
KANAZAWA UNIVERSITY

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Mahidol University
Wisdom of the Land

Abstract Book

International Workshop on Affective Interaction between Humans and Machines in Multicultural Society (IWAM 2022)

March 30, 2022 (Wed.)

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Introduction

According to the World Health Organization, 4.4 % of the world population or around 300 million people are affected by mental disorders. This statistic has been risen, especially in the lower socioeconomic countries or developing countries. It is important that a reliable mental health tool is made available so that psychological disorders could be early detected. Moreover, the recent COVID-19 pandemic has forced consultation and education to migrate the services into online platforms. Many people have faced communication challenges due to the lack of psychological cues from conversational partners during the interaction, which urges the need for affective computing systems. However, in today's interconnected global world, the understanding of emotional expressions can be diverse in different cultures and nations due to individual exposure to social norms, education, religion, etc. Although there are mutual traits of actions that can be commonly found to decipher emotions, these social messages can be interpreted differently according to the cultural background of audiences. With the consideration of multicultural elements in affective computing, it can elevate the level of autonomy of AI agents delivering users natural and comfortable interactions. Moreover, as security and privacy is one of the key concerns in affective computing as it could be invasive to personal spaces, discouraging people to use the system, it is expected to have a secured affective computing framework that can preserve users' privacy and allows people to comfortably interact with machines without worrying about their information leak to unwanted parties.

The international Workshop on Affective Interaction between Humans and Machines in Multicultural Society (IWAM) is a kick-off workshop gathering researchers from Japan Advanced Institute of Science and Technology (JAIST, Japan), Kanazawa University (KU, Japan), Ho Chi Minh City University of Education (HCMUE, Vietnam), Mahidol University (MU, Thailand) for knowledge exchange and discussion across the research fields, aiming to establish a unified human-machine interaction framework to understand the emotional expressions of people from different cultural backgrounds by the multidisciplinary combination of computer vision, machine learning, psychology, and information security methods.

Prarinya Siritanawan
School of Information Science,
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Organizer of IWAM2022

Welcome Message from Prof. Hiroyuki Iida
Vice President of Japan Advanced Institute of Science and Technology (JAIST), Japan

With much pleasure, on behalf of JAIST all members, I wish to extend warmest welcome all of you to the International Workshop on Affective Interaction between Humans and Machines in Multicultural Society (IWAM2022). Let me take this opportunity to share a few words at this opening session.

First of all, congratulation on such a well-organized workshop. The workshop's home page looks very nice, even though my photo was taken a couple of years ago. We all hope to maintain our young or challenging spirit in doing advanced research in each research field.

At this time, Dr. SIRITANAWAN Prarinya from School of Information Science, JAIST, took his most pleasure to jointly organize this workshop together with his colleagues and research partners from worldwide including Thai and Vietnam. Without such many efforts and nice collaborations, it is impossible to have this kind of wonderful workshop. Thank you, such great efforts.

Let me share an overview of JAIST. JAIST was founded in 1990, 32 years ago as the first university in Japan without undergraduate. The School of Information Science was first created, then followed by the School of Materials Science in 1991, and the School of Knowledge Science in 1996. Since its foundation, some 100 professors and associate professors took their positions as faculty members in JAIST while organizing their own research laboratory in which they conducted research activities with their research associates such as assistant professors, postdoc researchers, and PhD/Master candidates. Totally we have now some 1,200 students in JAIST, including many international students and faculty members. JAIST has aimed to become and maintain the leading research institutes with high-quality and high-impact research outputs including major publications and research-based contributions in industry, government, and society.

However, we have met some limitations to increase further scientific contributions both in the academic and social contexts. Such motivations encouraged us to reform or unify three different schools into one school. Thus, the Graduate School of Advanced Science and Technology was created in 2016, as a result of a reorganization of the School of Knowledge Science, Information Science and Materials Science. This reorganization enables us to have many collaborations in JAIST. Such collaboration outputs are highly expected to have higher impacts and better/more practical contributions to the society while challenging world-wide social problems like Sustainable Development Goals (SDGs). For example, we emphasize on Carbon Neutral issue and therefore take the initiative in this direction as one of leading national universities in Japan.

Moreover, a new Division collaborated between Kanazawa University and JAIST, called Division of Transdisciplinary Sciences was established in 2018. In this collaborative education framework, it is expected to have more research collaborations between two universities in Japan. In my opinion through my own experience in the Netherlands, such collaborative scheme or diversity educational environment is much better to strengthen our students as well as faculty members. We JAIST wish to extend more such collaborations both in research and education. This workshop will be such a great opportunity as a kick-off to start fruitful collaborations. We appreciate all participants and future-participants for the research collaboration community in this research field.

My conclusion today is “Let’s write papers jointly!”. For this purpose, we need to have fruitful and stimulating discussions during this workshop with academic challenging spirit. This is the really first step towards the meaningful collaborations.

Finally, on behalf of JAIST, once again we welcome you all participants and wish you much success on your work in this workshop as well as future collaborations!

Thank you!

Best Regards,
Prof. Hiroyuki Iida
Vice President of Japan Advanced Institute of Science and Technology (JAIST), Japan

Welcome Message from Dr. Bui Tran Quynh Ngoc Vice President of Ho Chi Minh City University of Education, Vietnam

This is a great honor for me to give a welcome speech as a representative of Ho Chi Minh City University of Education (HCMUE) to “The International Workshop on Affective Interaction between Humans and Machines in Multicultural Society (IWAM2022)”. For the first word, I'd like to express my heartfelt gratitude for the opportunity to represent our university to take part in this event.

Our university is Ho Chi Minh City University of Education, whose primary mission is to train pre-service teachers, ranging from kindergarten to senior high school. That is the reason why educational science has long been the focal point of our university. Furthermore, we also have a number of groups who specialize in conducting research in varied fields such as physics, chemistry, mathematics, material sciences, data science; and, most recently, artificial intelligence and machine learning.

Due to the collaboration between our IT department and JAIST, Kanazawa University, and Mahidol University Thailand, we are able to organize the first International Workshop in an online format to discuss our shared interests in affective research across a variety of fields such as computer vision, machine learning, psychology, and education. Additionally, this workshop is expected to provide an excellent opportunity for four universities to get to know one another and pave the way for future practical collaborations.

We anticipate that, as a result of this workshop's foundation, comprehensive cooperation projects will be considered in the near future, such as a memorandum of understanding (MoU) between us regarding the exchange of lecturers and students to strengthen the connection in research, collaboration in dual degree programs for undergraduate and graduate study, as well as the adoption of master's and doctoral students from our side through several scholarship programs.

Once again, HCMUE is extremely appreciative of all of you and wishes to express its gratitude for your dedication and hard work. We are confident that this international workshop will be a success and a valuable learning experience. We cordially invite you to pay us a visit and hope everyone is doing well and will soon be free of the Covid-19 pandemic.

We wish the best for all of you.

Thank you.

Best Regards,

Dr. Bui Tran Quynh Ngoc

Vice President of Ho Chi Minh City University of Education

Welcome Message from Assoc. Assoc. Prof. Jackrit Suthakorn Dean of Faculty Engineering, Mahidol University, Thailand

It is my great pleasure to welcome you all from Japan, Vietnam, and Thailand to “The International Workshop on Affective Interaction between Humans and Machines in Multicultural Society (IWAM2022)”, organized by Japanese Advanced Institute of Science and Technology (JAIST), Kanazawa University, Ho Chi Minh City University and Mahidol University.

Apparently, the COVID-19 has brought an unprecedented form of communications to mankind. All physical activities including consultation and education that require face-to-face communication are moved online completely and, inevitably, it comes with a number of challenges from the lack of psychological cues during the conversation. Moreover, considering cultural differences between conversational partners, misunderstanding often arose from such communication. Therefore, the Faculty of Engineering, Mahidol University, together with our partners recognize the issues and consider it is important to find resolutions to achieve successful communication that is aware of emotional aspects and cultural differences regarding virtual communication together.

The international Workshop on Affective Interaction between Humans and Machines in Multicultural Society (IWAM) serves as a kick-off workshop with researchers from JAIST, Kanazawa University, Ho Chi Minh City of Education, and Mahidol University coming together to exchange and discuss knowledge across the research fields. This workshop centers on providing a unified human-machine interaction framework to understand the emotional expressions of people from different cultural backgrounds by the multidisciplinary combination of computer vision, machine learning, psychology, and information security methods.

On behalf of the Faculty of Engineering, Mahidol University, I would like to take this opportunity to express my sincere thanks to the organizers and, specifically, our honorable speakers. All of your hard work and dedication are truly appreciated.

Ultimately, I wish you all a great time and hope that this workshop will be beneficial to all attendees, academics, and society more or less. I am more than grateful to have you all here. Thank you.

Best Regards,
Assoc. Prof Dr. Jackrit Suthakorn
Dean of Faculty Engineering, Mahidol University, Thailand

Program

March 30, 2022		
Thailand and Vietnam Time	Japan Time	Program
08:30-09:00	10:30-11:00	Registration & Reception
9:00-10:00	11:00-12:00	Opening Ceremony
		Welcome Speech #1 Hiroyuki Iida (Vice President) JAIST, Japan
		Welcome Speech #2 Bui Tran Quynh Ngoc (Vice President) and Pham Nguyen Thanh Vinh (Head of International Section) Ho Chi Minh City University of Education, Vietnam
		Welcome Speech #3 Jackrit Suthakorn (Dean of Faculty of Engineering) Mahidol University, Thailand
		Briefing session of workshop and introduction of joint international collaboration Prarinya Siritanawan JAIST, Japan
10:00-10:20	12:00-12:20	Invited Talk #1 Thailand Mental Health Technology and Innovation Center Konlakorn Wongpatikaseree, Mahidol University, Thailand
10:20-10:40	12:20-12:40	Invited Talk #2 Applying deep learning for Hscode classification Hai Tran, Ho Chi Minh City University of Education, Vietnam
10:40-11:40	12:40-13:40	Lunch Break
11:40-12:55	13:40-14:55	Student session (5 students) Presentation time: 10 min. + QA 5 min. Moderator: Teeradaj Racharak, JAIST, Japan
		Compound Facial Expressions Generation with Arithmetical Features Space Win Shwe Sin Khine, JAIST, Japan
		A Learner Engagement Estimation and Support System Using PC Built-in Camera Xianwen Zheng, JAIST, Japan
		Robust feature for Facial Expression Recognition (FER) systems Sukrit Jaidee, Thailand Mental Health Technology and Innovation Center (MH), Mahidol University, Thailand

		Thai Speech Emotion Recognition: A New Challenge for Thai Speech Processing Sattaya Singkul, Thailand Mental Health Technology and Innovation Center (MH), Mahidol University, Thailand
		A Model for Detecting Accounting Frauds by using Machine Learning Minh Nguyen Hoang, Ho Chi Minh City University of Education, Vietnam
13:00-13:20	15:00-15:20	Invited Talk #3 Sensitivity of emotional faces and its relation to observer's trait Haruyuki Kojima, Kanazawa University, Japan
13:20-13:40	15:20-15:40	Invited Talk #4 An Adaptive Engagement Support Robot Based on Behavior Update Model and Engagement Estimation Shinobu Hasegawa, JAIST, Japan
13:40-14:00	15:40-16:00	Closing Session
		Discussion and Summary of the Workshop by organizer
		Closing Speech Hung Viet Nguyen Dean of Faculty of Information Technologies Ho Chi Minh City University of Education, Vietnam

Abstract

Thailand Mental Health Technology and Innovation Center

Konlakorn Wongpatikaseree

Mahidol University, Thailand

Thailand Mental Health Technology and Innovation Center integrates psychology and psychiatry with deep technology including artificial intelligence, internet of things, human behavior. We aim to provide prevention, intervention and rehabilitation tools to promote mental health services and improve overall mental health well-being. Currently, several projects have been launching in hospitals and social media. For example, Jubjai chatbot, depression screening tool, has been introduced on Facebook since 2019. Psyjai chatbot, completed mental health chatbot solution, was available from August, 2021. Now, we are testing the performance of AI Psychological Open Platform in 10 hospitals before use in real case in 2022.

Applying deep learning for HSCode classification

Hai Tran

Ho Chi Minh City University of Education, and NTT Institute of International Education (NIIE), Vietnam

AI4SE is a research group that includes individuals from Ho Chi Minh city of Education, NTT Institute of International Education, and information technology industry specialists. We aim to apply artificial intelligence research for real-world application problems. Applying deep learning for Harmonized System Codes (HSCode) classification is one of our IT industry projects. In the field of import and export, finding the HSCode of a product is critical for customs clearance and tax calculation. Instead of relying on customs declaration professionals, this research aims to automate product HSCode classification based on good description. The proposed solution uses deep learning and Natural Language Processing (NLP) techniques to solve this industry problem.

An Adaptive Engagement Support Robot Based on Behavior Update Model and Engagement Estimation

Shinobu Hasegawa

Japan Advanced Institute of Science and Technology (JAIST), Japan

This research aims to develop an adaptive engagement support robot based on a behavior update model and engagement estimation. With the development of robotics, there is a growing expectation that robots can help people learn. This includes learning partner robots that accompany learners and functional robots that help with learning. Almost such robots followed predetermined rules and interacted with the learners based on their emotions or behavior. However, the effective robot's interactions would be different for the different learners.

Thus, our main idea is to propose an interaction network model for learning partner robots to follow individual differences and realize adaptive interactions for facilitating engagement in the learning process. This research consists of the following three steps.

1. Engagement estimation: We adopted V. Huynh's approach, a sub-challenge of the 7th Emotion Recognition in the Wild Challenge (EmotiW 2019). His method involves three basic steps: feature extraction, regression, and model combination. First, the facial features are extracted by a pre-trained model from the input video divided into segments. Then, the engagement intensity is predicted as multiple regression tasks with different LSTM models to capture temporal information. Finally, these models are combined to achieve better performance. In this model, the intensity of engagement is divided into four levels: highly-engaged, engaged, barely-engaged, and disengaged.
2. Interaction network: As a learning partner robot in this research, we employed the communication robot Sota, which has a camera, microphone, speaker, and network functions to interact with the learner with words and actions. To generate Sota's interaction with learners, we build an interaction network of three layers representing Sota's action, words, and speech rate. It is a 3*4 fully connected network where the initial weights are set manually in advance. The weights are translated into a probabilistic form, which determines the content of the robot's interaction.
3. Adaptation model: We propose an adaptation model that compares learners' engagement intensities before and after the interaction to update the interaction network weights so that the robot can change the interaction content through the learner's reaction. It might enable the robot to give the most personalized interaction to different learners.

To verify the effectiveness of the proposed method, we conducted a small experiment at a within subject design with the following three primary objectives.

A) To evaluate the accuracy of the engagement intensity detection model, the subjects were asked to refer to their facial video and score their engagement intensity at 0, 5, 10, 15, 20, 25, and 30 minutes. The data judged by the model were then compared with the data scored by the subject. The results show that out of 280 judgments, the number of correct judgments was 150, with a correct rate of 53.6%.

B) The Sota's interaction was evaluated from the following three perspectives. a) Which condition kept the engagement higher in the with-Sota vs. without-Sota? The results indicated that their engagement intensity was higher in the with-Sota condition. b) Which condition improved the engagement? The results show that the engagement intensity was recovered more often in the with-Sota condition. c) What about the timing and content of Sota interactions? From the questionnaire results, around 40% of Sota's interaction affected the maintenance of learning engagement.
C) To evaluate the effectiveness of the proposed adaptive algorithm was verified by comparing the average of the subject's satisfaction with the content of the first, second, and third periods. From the results, we can conclude that the subject satisfaction increases significantly in the number of interactions at the last third period as the experiment progresses.

These results show a certain effectiveness of the proposed method. In the future, we would like to introduce a more robust model to estimate learner’s engagement and follow individual preferences with different cultures and backgrounds.

This work was conducted in collaboration with Mr. Yao Bowei, who has completed his master's degree in March 2022, and was supported by JSPS KAKENHI Grant Number 20H04294 and Photron limited.

Sensitivity of emotional faces and its relation to observer's trait

Haruyuki Kojima

Faculty of Human Sciences, Kanazawa University, Japan

Some people are good at noticing the change of behaviors, attitudes or expressions of the other, such as a partner, a friend, and/or even a person who met for the first time. Whereas, someones are not. There is obviously a difference between people in sensitivity of reading facial and emotional expressions. Especially, people with autism spectrum disorder (ASD) are reported to be less sensitive in accessing the emotional faces than control participants (Kennedy & Adolphs, 2012). However, we wonder if the reported property might be because of the awkward or clumsy tendency of the ASD people. There is another possibility that not necessarily with ASD diagnoses, autistic trait may relate to such a sensitivity.

Thus, it is desirable to examine the sensitivity of people to emotional cues with a more objective method. Among various physical or physiological measures for human behaviors or responses, pupil size is recognized as an index of response to the affective processing (Partala, Surakka, 2003). Therefore, we investigated if pupil size of the observer could be an index for the sensitivity to the human expressions.

Additionally in the second study, we planned to compare the physical values in terms of participants' trait of social behaviors. To assess the traits of healthy young adults, we employed Autism spectrum Quotient (AQ) , Broad Autism Phenotype Questionnaire for Japanese (BAPQ-J) and Daily Life Skills Scale for College students (DLS). Then, we evaluated the relation between the scale points and the pupil size when reacting to emotional faces.

EXPERIMENT 1:

Pictures of emotional faces of six typical emotional categories (Anger, Disgust, Fear, Sad, Surprise, Happy)(ATR, 2006) were presented, one by one, either for short time for 0.3 s or longer time for 5 s. Sentences that express the six emotional situations were prepared. There are two types for texts, short texts that consisted of S+V+C(O), and long texts that consisted of two sentences.

Emotional faces presented only for the short period did not draw any statistical difference in pupil size from the neutral face. However, the longer presentation of emotional faces showed more pupil dilation than neutral face. In the text conditions, there was no statistical difference in pupil size between any context situations and from neutral situation, However, with longer sentence presentations, pupil sizes showed contractions in Anger from Happy and Sad, as well as Disgust from Neutral conditions. Happy, Sad and Neutral conditions showed any difference in pupil size between the long and short text conditions, whereas in Anger, Disgust, Surprise and Fear, longer texts conditions produced contracted pupil than short conditions. These results indicate that pupil size would reflect an internal or psychological state, and that the pupil size change need some time, such as one second or more, to react as the reflection of cognitive process to the information context, regardless it was an image or a verbal information

EXPERIMENT 2:

In Exp.2, sentences were first presented for 2 s and then emotional faces were presented for 3 s. Participants performed a task whether the sentence was consistent with the facial expression.

Pupil size change was examined depending on the facial expressions and evaluated with the traits by questionnaires.

AQ high group was larger pupil size than low group to Sad faces. In terms of BAPQ, participants with high aloofness (reserved and remote, staying away) showed less pupil size than low aloof group to angry faces. In contrast, high Pragmatic Lang group showed greater pupil size than low group to sad faces. When classifying by DLS, participants with sensitivity showed significantly larger pupil size than low group to angry faces. The results indicated that pupil size response differs depending on the participants' trait and also on the emotional context.

DISCUSSIONS

The present study showed that pupil size would reflect the change or move of observer's internal process. These results showed the possibilities that sensitivity to emotional expression and the pupil response of the process would be different among people depending on their traits. It is also important to notify that pupil size difference was significant only to some types of faces with negative emotions, angry and sad. These response properties would relate to the response mechanism.

Further research would be needed to clarify the relationship between the trait of people and the response properties of the pupil size. It would be also interesting to investigate what elements or details of facial emotional expression do people respond and what kind of cognitive process would intermediate these reactions.

Compound Facial Expressions Generation with Arithmetical Features Space

WIN Shwesinkhine

Japan Advanced Institute of Science and Technology (JAIST), Japan

Facial Expressions are the most common visual signal we have seen in our daily lives. Sometimes they convey emotions. For example, when human beings feel happy, they smile, and the facial expression related to smiles appear on their faces. Based on those expressions, we can realize human emotions. Research for facial expressions analysis has been developed in examining human behaviors based on visual signals; however, their focus is on simple human emotions, including happiness sadness. Simple emotions are a part of human emotions and cannot represent the whole human emotions. There is also a possibility that compound emotions have existed as a part of human emotions in a specific scenario. For instance, when we ride the roller-coaster, we feel fear and happiness simultaneously while riding. Like that circumstance, there are possible compound emotions that are required to be explored to get a deeper understanding of human complex emotions. Therefore, we will discuss compound emotions in this work with an analysis-by-synthesis approach considering the expressions features space.

A Learner Engagement Estimation and Support System Using PC Built-in Camera

ZHENG Xianwen

Japan Advanced Institute of Science and Technology (JAIST), Japan

During the last decades, rapid advances in technology made online learning were well established in higher education. Furthermore, control of COVID-19 made face-to-face teaching impossible and forced schools to shift to an online teaching model. Nevertheless, the theoretical course content and less practice make the learners who take online courses seem unable to concentrate on the courses and, therefore, cannot maintain high learning efficiency. Besides, the lack of connection and in online learning made instructors hard to grasp the learner's situation and whether the course content is suitable for the current level of learners. Thus, estimating learners' engagement and giving corresponding technology support to both instructors and learners. However, there is limited research for learners' engagement support systems [1,2,3] and no research combining affective engagement detection and behavioral engagement intervention. Therefore, the purpose of this research aims to analyze learners' engagement using recorded time-series expressions and body features to develop learners' engagement support system for facilitating online learning and education quality.

From an online education point, we defined engagement in three facets. Affective engagement refers to the students being attracted to the course or task and enjoying it. Behavioral engagement refers to student's participation in the classroom, and extra-curricular activities also relate to asking questions and contributing to class discussion. Cognitive engagement depends on affective and behavioral engagement and is directly related to learning goals. We introduce the research content from these three aspects.

1. Affective engagement estimation: Improving the performance of engagement estimation and analysis from the following steps. a) A new dataset was collected and labeled with an engagement level label for each video. The collected new dataset will be merged with the public engagement research dataset. b) Due to the eye features having a more substantial influence than others, we updated eye/eyebrow features for sequence deep learning models. c) To improve the pre-trained deep learning models, we rearrange the structure of LSTM/QRNN models.

2. Behavioral engagement intervention: Designing engagement feedback loops to support online learning from the following perspectives. a) Engagement intervention model will be proposed. We will survey engagement intervention models and gather terms of learning activities that effectively maintain engagement. b) An engagement support system will be developed. The system integrates the affective engagement estimation deep learning model and the proper learning activity intervention model.

3. Engagement assessment framework: Each engagement element depends on the others. In other words, Engagement assessment framework for each element is the basis for research. a) Affective engagement: Applying the proposed engagement analysis system to evaluate intervention effectiveness. b) Behavioral engagement: Analyzing and visualizing learning process with intervention and learning activity histories, including dropout rate. c) Cognitive engagement: Analyzing information from conducting an exam, questionnaires, and self-reports about motivation, performance, and learned skills.

In the affective engagement estimation part, we proposed the optimization structure network achieved the engagement estimation correct rate of 68.5% sequence deep learning models. The achieved correct rate is 10% higher than the baseline in the DAiSEE dataset. Moreover, to solve the insufficient data issue, we proposed transfer learning which pre-trained a deep learning model on DAISEE dataset and transferred the trained model to a new composing time-series dataset. The experiment result is 63.7% and 2% higher than the baseline in the new time-series dataset.

From this result, we found that eye information, like eye gaze, wink, and eye movement, is essential than before for our experiment in this stage. The body action and movement improved the performance of sequence deep learning models and brought some partially redundant information that interference/harmful estimation. We need to standardize time-series body features and refine the designed features to improve our proposed optimization structure models' accuracy. In the future work, we will design and evaluate behavioral engagement intervention and address the impact of individual and cultural differences.

This work was supported by JSPS KAKENHI Grant Number 20H04294 and Photron limited.

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Robust feature for Facial Expression Recognition (FER) systems

Sukrit Jaidee

Thailand Mental Health Technology and Innovation Center (MH), Mahidol University, Thailand

The AI-Avatar system is a system that helps psychologists assess a participant's emotions. The system's method of predicting emotions takes into account a number of factors, including action units, facial keypoints, body movement, eye movement, and voice, each of which employs machine learning to extract key features. The action unit is used as part of the feature because the movements of the facial muscles correspond to the emotions expressed. We have applied a machine learning model to detect action units, which will allow us to determine the emotional expressions of the participants. Facial expression analysis is one of the few techniques available to assess emotions in real time. Movement of the upper body in a forward or backward inclination was another feature that corresponded to the emotions expressed by the participants. Movement of the upper body in a forward or backward inclination was a feature that corresponded to the emotions expressed by the participants. To determine upper body movement, we use pose estimation models in a different method. Rolling eyes is another feature that indicates the emotions expressed by the participants, so we detected eye rolling to help assess the participants' moods. Rolling eyes is another feature that corresponds to the emotions expressed by the participants, so we detect eye rolling to help assess the participants' moods. The AI-Avatar system also applied an acoustic model to help predict the participants' moods. All of the aforementioned feature inputs are then used to predict the participants' moods for the most accurate results.

Thai Speech Emotion Recognition: A New Challenge for Thai Speech Processing

Sattaya Singkul

Thailand Mental Health Technology and Innovation Center (MH), Mahidol University, Thailand

Nowadays, emotion analysis has been an active research area in human-computer interactions which depend on language understanding. For Thai, language understanding has been many challenges from cultural language that is shortened words, ambiguous words, slangs, sarcastic meaning, and homophones. Besides, Thai is a low-resource language that has low dataset size and research when compare with high-resource language. For Thai emotion analysis, Thai speech emotion recognition (SER) is same challenges as previously mentioned. Additionally, Thai speech emotions are individually speech person style and have a variety of contexts. All of which cause Thai to be difficult to handle especially in SER tasks. Therefore, in this study, we would like to present the Thai SER challenge with solving solutions using deep learning approach. The study outlines are described in three sections including language analysis, SER feature analysis, and SER model to improved Thai SER performance.

A Model for Detecting Accounting Frauds by using Machine Learning

Minh Nguyen Hoang

Faculty of Information Technology, Ho Chi Minh City University of Education, Ho Chi Minh City, Vietnam

This topic aims to show a machine learning model that enables to predict signs of financial statement frauds by combining the domain knowledge of machine learning and accounting. Inputs of this model is a published dataset of financial statements, and outputs involve the conclusions whether the predicted financial statements indicate the signs of financial statement frauds or not. Currently, XGBoost is recognized as one of the most popular classification methods with fast performance, flexibility, and scalability. However, its default properties are not suitable for fraudulent detecting of imbalanced datasets. To overcome this drawback, this research introduces a new machine learning model based on XGBoost technique, called f(raud)-XGBoost. The proposed model not only inherits XGBoost advantages but also enables it to detect financial statement frauds. We apply the Area Under the Receiver Operating Characteristics Curve and NDCG@k to perform the evaluation process. The experimental results show that the new model performs slightly better than three existing models including logistic regression model that is based on financial ratios, Support-vector-machine model, and RUSBoost model.

Biography

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Research Interest	Intelligent System, Deep Technology in Psychology, Healthcare System

Education

- D.Eng in Information Science, Japan Advanced Institute of Science and Technology (2013)
- M.Eng in Information and Communication Technology for Embedded Systems, TAIST-Tokyo Tech Program, Sirindhorn International Institute of Technology, Thammasat University (2010)
- B.Sci in Computer Science, Thammasat University (2008)

Work Experience

A data science researcher with 3-year research experience within cross-functional teams as follows:

- 2016 – Present: Lecturer at Faculty of Engineering, Mahidol University
- 2018 – Present: Visiting Faculty at Mahidol University International College (MUIC)
- 2018 – 2019: Visiting Faculty at Sirindhorn International Institute of Technology, Thammasat University
- 2014 – 2016: Postdoctoral Researcher at Japan Advanced Institute of Science and Technology
- 2010 – 2014: Researcher at Japan Advanced Institute of Science and Technology
- 2010 – 2010: Visiting Faculty at Computer Science Department, Thammasat University

Short Biography

Konlakorn Wongpatikaseree received his B.Sc. from Thammasat University in 2008. During 2008–2010, he received a scholarship to pursue a Master degree from the Thailand Advanced Institute of Science and Technology and Tokyo Institute of Technology. He received his Ph.D. in information science from Japan Advance Institute of Science and Technology. Now he is a lecturer at Department of Computer Engineering, Faculty of Engineering, Mahidol University, Thailand. His research interests are in Intelligent System, Deep Technology in Psychology, Healthcare System

Name	Hai Tran
Position	Researcher
Affiliation	Ho Chi Minh City of Education (HCMUE), and NTT Institute of International Education (NIIE), Vietnam
Email	haits@hcmue.edu.vn
Research Interest	Computer vision and apply AI in IT industry projects

Education

- PhD. of Computer Science - The University of Information Technology, VNU-HCM, 2018.
- Master of Computing Science - The University of Natural Science, VNU-HCM, 2007.
- Bachelor of Mathematics and Computer Science, HCM University of Natural Science,VNU-HCM, Vietnam, 2003.

Work Experience

2008-present: HCMUE and NIIE AILab Reseacher;

- Condinator AILab resource with partners (internal NFT EduGame project, HBS – Data Analysis project, Dustycast - HSCode classification system, Yoot – Fresher and Internship Service provider, AIPower – SmartFire; Kyanon Digital – Advosights, Bottle Cap recognition)

Projects:

- SmartFire (AILab and AIPower company). Using Keras, Tensorflow, ImageAI, OpenCV, and Yolo to build the fire detection model for fire alarm system via cameras. Analysis the accuracy and set the adaptive threshold, and integrate the AI service into the smart fire system.
- Advosights (AiLab and Kyanon Digital). Using python with MongoDB to analysis and measure the influence factor of KOL in order to boost your brand advocacy program with data-driven insight.
- Bottle Cap Recognition (AiLab and Kyanon Digital). Developing bottle cap recognition using OpenCV, Keras and Tensorflow with python, Flask and AWS SageMaker. Using Postman to automatically verify AI services.

Short Biography

As a lecturer, I got experience in sharing knowledge, researching the new technology and contributing to the community with more than 20 publication (https://scholar.google.com/citations?user=kHZvlTkAAAAJ&hl=en&oi=ao).

As an IT Consultant in integrating AI features to software development process based on Agile-Scrum with TFS/JIRA, I got experience in large and sophisticated systems like social network analytics, B2B system, healthcare system and Enterprise Resource Planning (ERP) system, and smart home security system.

Name	Shinobu Hasegawa
Position	Professor
Affiliation	Japan Advanced Institute of Science and Technology (JAIST)
Email	hasegawa@jaist.ac.jp
Research Interest	Learning Technology, Educational Technology, AI in Education, DX in Education

Education

March 1998, B.S. in Systems Engineering, Osaka University
March 2000, M.S. in Systems Science, Osaka University
March 2002, Ph.D. in Systems Science, Osaka University

Work Experience

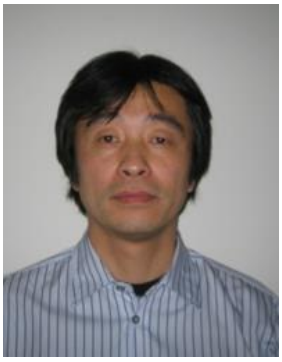
2002-2004, Assistant Professor, Center for Information Science, JAIST
2004-2012, Associate Professor, Research Center for Distance Learning, JAIST
2012-2015, Associate Professor, Center for Graduate Education Initiative, JAIST
2015-2021, Associate Professor, Research Center for Advanced Computing Infrastructure, JAIST
2021-Present, Professor, Center for Innovative Distance Education and Research, JAIST

Short Biography

The primary goal of my research is to facilitate "Human Learning and Computer-mediated Interaction" in a distributed environment. My research field is mainly learning technology but interdisciplinary fields with educational technology, artificial intelligence (AI) in education, and digital transformation (DX) in education. Currently, I am interested in the following research projects.

- Engagement detection/facilitation in online learning: Today's topic.
- Support for research activities: to cultivate research skills of graduate students through scaffolding of their daily research activities.
- Support for cognitive skill learning/self-directed learning: to develop a learning support environment to improve cognitive skills like decision making or how to learn in self-directed/regulated learning as more generic skill.
- Learning support with gamification/edutainment: to keep motivation and focus on embedded cognitive skill training.
- Implementation of distance learning system: to develop a design support system based on "Design Pattern" methodology in order to implement a distance learning system systematically and sustainably.

Name	Haruyuki KOJIMA
Position	Professor
Affiliation	Kanazawa University, Faculty of Human Sciences
Email	hkojima@staff.kanazawa-u.ac.jp
Research Interest	Vision, Perception, Cognition, Brain and Neural Mechanism



Education

1989/3	B.A. Behavioral Science, Hokkaido University, Japan
1991/3	M.A. Behavioral Science, Hokkaido University, Japan
1996/3	Ph.D in Behavioral Science, Hokkaido University, Japan

Work Experience

1996/4 - 1998/5	Department of Psychology, Vanderbilt University
1998/4 – 2000/11	Department of Psychology, Ritsumeikan University
1999/2 – 2000/11	Department of Psychology and Center for Neural Science, New York University
1999/7- 2000/3	School of Economics, Shiga University, Hikone
1999/10 – 2000/11	School of Optometry and Vision Science Program, University of California, Berkeley
2000/12- present	School of Letters, Kanazawa University
2000/12- present	Graduate School of Human and Socio-environmental studies, Kanazawa University

Short Biography

Haruyuki Kojima started learning psychology in a program of Behavioral Sciences in School of Letters, Hokkaido University, 1985, where the department had just launched the department. After obtained Ph.D from Hokkaido University, he spent his post-doc in Vanderbilt University (R. Blake Lab.), Ritsumeikan University, New York University (M. Landy Lab.), and University of California, Berkeley. (M. Banks Lab.).

He was appointed to Associate Professor of Psychology in Faculty of Letters, Kanazawa University, in 2000. He is now Professor of Psychology and Cognitive Sciences in Institute of Human & Social Sciences, and also concurrent professor of Grad. School of Transdisciplinary Science as well as of Research Center for Child Mental Development, Kanazawa University.

Associations: Japanese Psychological Association (representative), Japanese Psychonomic Society (Director), Vision Society of Japan (organizer), Japanese Cognitive Science Society, Japanese Cognitive Neuroscience Society.

Name	Xianwen Zheng
Position	Ph.D. student
Affiliation	Japan Advanced Institute of Science and Technology
Email	zhengxianwen@jaist.ac.jp
Research Interest	Learning Technology, Online Learning, Distance Learning, Engagement Estimation, Online Affection Analysis

Education

07. 2010, Bachelor (Japanese), Dalian University of Foreign Languages
03. 2021, Master (Information Science), Japan Advanced Institute of Science and Technology
04. 2021 - present, Ph.D. student, Japan Advanced Institute of Science and Technology.

Short Biography

My name is Zheng Xianwen from China. As an international student, I received the M.Sc. degree from the Japan Advanced Institute of Science and Technology, and I am currently pursuing the Ph.D. degree.

The research in the M.Sc. degree focused on estimating learners' engagement in the online learning environment from external information with a built-in PC camera. From this research, I was intensely aware that the fusion of the information science field and the learning/education technology field is the key to improving the quality of online education. Thus, in Ph.D. degree research, we aim to develop a learners' engagement support system for facilitating online learning education quality.

Online learning, distance learning, engagement estimation, and online affection analysis are my research keywords and research interest. I am committed to upgrading the traditional education model with the artificial intelligence method.

Name	Win Shwe Sin Khine
Position	PhD Student
Affiliation	School of Information Science, Japan Advanced Institute of Science and Technology
Email	winshwesinkhine@jaist.ac.jp
Research Interest	Human Emotions; Facial Expression Analysis; Deep Learning;

Education

2020-Present: Ph.D. candidate, School of Information Science, Japan Advanced Institute of Science and Technology.
2018-2020: Master's degree Program, School of Information Science, Japan Advanced Institute of Science and Technology.
2012-2017: Bachelor's degree Program, Computer Science Department, University of Information Technology, Myanmar.

Short Biography

Win Shwe Sin Khine is a Ph.D. candidate at the Computer Imaging Laboratory from the Japan Advanced Institute of Science and Technology (JAIST). She received an M.Sc. in Information Science from JAIST in 2020 and B.Sc. in Computer Science from the University of Information Technology (UIT), Myanmar, in 2017. She is currently working on the research project for human complex emotions from facial expressions signals by analysis-by-synthesis approach to understanding the human deep emotions.

Name	Sukrit Jaidee
Position	Researcher
Affiliation	Thailand Mental Health Technology and Innovation Center (MH)
Email	Sukritjaidee@gmail.com
Research Interest	

Education

Kasetsart University, Electrical Engineering (B.Eng.), 2014
- Thesis: Degradation of underground cable insulation due to water treeing

Chulalongkorn University, Electrical Engineering (M.Eng.), 2019
- Research: Un/Semi/Supervised learning, Reinforcement Learning (RL), IoT, and Optimization Techniques
- Thesis: Regional Solar Power Forecasting Using Deep Neural Network and Hyperparameter Tuning

Work Experience

2014 Half-Year: Siam Compressor Industry, Mitsubishi Electric Corp. (MELCO group)
- Position: Research and Development (R&D) Engineering

2014-2015: Isuzu motors co. (Thailand) ltd
- Position: Electrical Engineer

2015-2017: SCG Cement-Building Materials
- Position: Electrical Engineer

2017-present: Electricity Generating Authority of Thailand (EGAT)
- Position: Business integration

2020-present: Innospec (Thailand) Co.,LTD,
- Position: Technology Evaluation

Short Biography

I have been working in image recognition since the end of the Super AI Engineer Season 1 project, where I was a part of the Optimizer team. Then, I was in MU's AI-Care Nonverbal group during the preparation for my Ph.D. I have worked in many parts of the Facial Expression Recognition (FER) systems, such as robust features, action unit detection, emotion recognition, pose estimation, Iris Landmark detection, and facial landmark detection. I also participated in the HealthCam startup as part of the National Innovation Agency (public organization), where I worked in action recognition and stroke disease detection using deep learning. Currently, I am part of the AI-Care Nonverbal group at Mahidol University, where I continue my work in facial expression recognition. I am also part of the EGAT Proventure team, where I apply machine learning techniques and image recognition to provide technologies for business. Lastly, I am also part of the EGAT Data management Group working on Business Insights and Analytics.

Name	Sattaya Singkul
Position	Researcher
Affiliation	Thailand Mental Health Technology and Innovation Center
Email	sattaya.sin@speechance-tech.com
Research Interest	Speech Processing Natural Language Processing, Language Understanding,

Education

Master of Science (M.Sc.) in Information Technology at King Mongkut's Institute of Technology Ladkrabang (KMITL)
Bachelor of Science (B.Sc.) in Information Technology at King Mongkut's Institute of Technology Ladkrabang (KMITL)

Work Experience

A data science researcher with 3-year research experience within cross-functional teams as follows:
2021 – Present (Self-employee): Co-Founder/Chief Technology Officer (CTO) at SpeeChance Technology
2021 – Present (Contract): Researcher (Collaborator and Engineer) at Thailand Mental Health Technology and Innovation Center, Mahidol University.
2019 – Present (Contract): Research Assistant at King Mongkut's Institute of Technology Ladkrabang (KMITL).
2020 – 2021 (Full-time): Laboratory Research Assistant at Thailand's National Electronics and Computer Technology Center (NECTEC).
2020 – 2021 (Contract): Data Scientist and Research Collaborator (KMITL-SCB Joint Program) at Siam Commercial Bank (SCB).
2018 – 2018 (Outsource): Data Research Analyst at Wisesight (Thailand) Co., Ltd
2017 – 2017 (Outsource): Business Data Analyst at Village Farm Co., Ltd.

Short Biography

Sattaya Singkul received the B.Sc. in information technology from King Mongkut's Institute of Technology Ladkrabang (KMITL) in 2019. During 2019-2021, he received a scholarship to pursue a master's degree in innovator's promising with honor and currently pursuing the M.Sc. in information technology from KMITL. Now he is a researcher in speech and text understanding laboratory at Thailand's National Electronics and Computer Technology Center (NECTEC). Besides, he is co-researcher within cross-functional teams such as Siam Commercial Banking (SCB), Kasikorn Business Technology Group (KBTG), Thailand Mental Health Technology and Innovation Center in Mahidol University, KMITL, and Artificial Intelligence Association of Thailand (AiAT) to expanding in Thailand and globally. His research interests are in speech processing, music processing, language understanding, intelligent systems, and healthcare systems.

Name	Minh Nguyen Hoang
Position	Master student
Affiliation	Faculty of Information Technology, Ho Chi Minh City University of Education, Ho Chi Minh City, Vietnam
Email	Minhnh.khmt302@pg.hcmue.edu.vn
Research Interest	Machine Learning, Data Science.

Education

2019 – 2022: Master of Computer Science at Ho Chi Minh city University of Education, Vietnam
2014 – 2018: Bachelor of Software Development at Ho Chi Minh University of Education, Vietnam.

Short Biography

Minh Nguyen Hoang is a Computer Science Master student at Ho Chi Minh University of Education, Viet Nam. He enjoys using his skills to contribute the exciting technological advances. His research interests mainly focus on Machine Learning, Deep Learning, and Data Science. He is currently working on project about machine learning model to detect accounting fraud. In the future, he aims to improve his knowledge by researching more fields, e.g detecting human emotion using Machine Learning. Besides, he also plans to pursue Ph.D degree in Computer Science field.

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