# ISASE2020

The 6th International Symposium on Affective Science and Engineering

**March 15 (Sun.) – 16 (Mon.), 2020**

**Kogakuin University, Tokyo, Japan**

ISBN:978-4-9905104-7-3

| DAY 1: March 15, 2020<br>Sunday | |
|---|---|
| 09:00-09:50 | Registration |
| 09:50-10:00 | Opening Remarks |
| 10:00-10:40 | Keynote Talk 1: Maki Sakamoto |
| 10:50-11:30 | Keynote Talk 2: Syoji Kobashi |
| 11:30-13:00 | Break |
| 13:00-14:40 | Oral Presentation Sessions 1:1-A, 1-B, 1-C |
| 15:00-16:40 | Oral Presentation Sessions 2: 2-A, 2-B, 2-C |

| DAY 2: March 16, 2020<br>Monday | |
|---|---|
| 09:00-09:30 | Registration |
| 09:30-11:10 | Oral Presentation Sessions 3: 3-A, 3-B |
| 11:30-13:10 | Oral Presentation Sessions 4: 4-A, 4-B |
| | Free day |

**Welcome to ISASE 2020**

## The World is Facing New Challenges
## – Expectations for Affective Engineering and Science –

Hisao Shiizuka
(Chair of ISASE)

It has been six years since ISASE started in 2015. What I feel is that the papers presented at ISASE are increasing in level each time. Therefore, I think that ISASE is showing one "new trends and guidelines" in the field of Affective Engineering and Science.

So, I would like to express our sincere welcome to all those who participated in ISASE2020, the 6th International Symposium on Affective Science and Engineering to be held in Kogakuin University, Shinjuku, Tokyo, Japan. The main objective of this symposium is to bring together academics, engineers, manufacturers, and government officials to present and exchange knowledge, experience, results, and information related to the broad aspects of methodologies employed in affective science and engineering, and also artificial intelligence, cognitive science, etc. Since the affective science engineering is related to many other fields surrounding, it provides a new field and propelling technology that can enable us to bridge gaps between humans and systems. The scope of this symposium covers all fields of advanced technology and science, manufacturing, production as well as design that are related to affective and intelligent fields.

The world is now facing major challenges. In particular, problems that must be solved in an aging society are recognized as essential in each country. Now, I believe that the achievements in the field of “Affective Engineering and Science” will help solve these major social problems. ISASE’s contribution to such a meaning will be at the new stage.

I hope that this conference will be a forum for valuable information exchange for everyone.

## Sunday, 15th March

**ISASE 2020 Special Events (Room A0765)**

**9:50 – 10:00**
**Opening Remarks (Room A0765)**

**10:00 – 10:40**
**Key Note Talk 1 (Room A0765)**
Automatic Estimation of Affective Impressions from a Single Sound-symbolic Word and Word-based Visualization of Perceptual Space

Maki Sakamoto
(The University of Electro-Communications)

**Abstract**
The semantic differential (SD) was mainly developed by the US psychologist Charles E. Osgood in 1950s. Since then, it has been widely applied to capture the affective and cognitive factors of respondents' attributions to selected concepts and objects on a multidimensional level. This method asks respondents to analyze their affective impression and perceptual experiences one by one. On the other hand, Gestalt psychology implies that human understands external stimuli as whole rather than the sum of their parts. Therefore, we proposed a system that can automatically estimate multidimensional ratings of affective impressions of objects from a single sound-symbolic word that has been spontaneously and intuitively expressed by a user. When a user inputs a sound-symbolic word into the system, the system refers to a database of phonemes and their auditory impressions and calculates ratings in terms of fundamental scales of affective and perceptual experiences. In this talk I will outline the advantage of our method in visualizing our affective impressions of objects and our perceptual space.

**10:50 – 11:30**
**Key Note Talk 2 (Room A0765)**
Current Achievements and Future Perspectives for Artificial Intelligence in Medical Engineering

Syoji Kobashi
(University of Hyogo)

**Abstract**
There is no doubt that artificial intelligence (AI) will play the important role of the future medical science. The Ministry of Health, Labor and Welfare (MHLW) in Japan indicates six important areas for AI development in medicine; they are genomic medicine, diagnostic imaging support, diagnostic treatment support, drug development, nursing care, and surgery assistance. And, AI based computer programs for diagnosing diseases have been approved recently by Pharmaceuticals and Medical Devices Agency (PMDA), JAPAN. At first, this talk will survey the current progress of AI development of medicine in not only Japan but also world.

Next, I will introduce a basic methodology of applying AI to medicine through our achievements on computer-aided diagnosis of rheumatoid arthritis (RA). RA is an autoimmune disorder and results in painful joints. The guideline of RA diagnosis method includes the evaluation of hand X-ray radiograph. The RA progress in X-ray radiograph can be quantified by using modified total sharp score (mTSS), which is defined as the sum of erosion and joint space narrowing (JSN) scores. Due to the time consuming of for image interpretation, many hospitals skips the numeric evaluation of X-ray radiograph. The proposed system first automatically detects finger joints in X-ray radiograph images using support vector machine (SVM), convolutional neural network (CNN), and needless to say image processing techniques. The system belongs to the key area of diagnostic imaging support. The accurate quantification of RA will assist physicians to perform the appropriate treatment, and then will support the evidence based medicine (EBM).

In conclusion, I will summarize the talk, and mention the future perspectives.

**13:00 – 14:40**
**ISASE2020 Oral Presentation Sessions 1 (Room A0712, A0715 and A0765)**

**1-A: Organized Session-Artificial Intelligence for Computer-aided Medical and Healthcare Engineering (Room A0712) 13:00 – 14:40**

1-A-1: Changes in Respiration Pattern Preceding Drowsiness During Driving Ambulatory Respiration Monitoring by Smart Shirts Sensors

*Emi Yuda[1], Yoshida Yoshida[2], Junichiro Hayano[2] (1.Tohoku Univ., 2.Nagoya City Univ.)

**Abstract:** Although many attempts have been made to detect driver's drowsiness by ECG and pulse wave signals, it is not easy to record stable bio-signals while driving. In this study, we examined whether the driver's drowsiness can be detected from the respiration signal that can be acquired relatively easily with wearable clothing sensor. In 7 healthy subjects (five males and two females; age, 45 ± 9 y), respiration, ECG, and acceleration signals were recoded for a total of 2,359 min (137-468 min per subject) of driving with a smart shirt biometric sensor (Hexoskin). Minute-to-minute respiration amplitude and frequency and their variability were analyzed by complex demodulation between 0.05 and 0.45 Hz. The changes in the respiration parameters were analyzed in relation to the Dip & Waves, which are known to be a characteristic ECG R-R interval pattern associated with driver's drowsiness. Neither respiratory amplitude nor frequency showed significant changes with Dip & Wave, but respiratory frequency variability increased progressively from 4 minutes before, peaked at Dip & Waves, and then decreased shortly thereafter. Our observations suggest the possibility that respiration signal obtained by wearable garment sensor may be used to detect driver's drowsiness.

1-A-2: Estimation of Office Worker's Emotions Using Wearable Biometric Sensor

*Junichiro Hayano[1], Tetsuya Tanabiki[3], Shinichiro Iwata[3], Katsumi Abe[3], Emi Yuda[2] (1.Nagoya City University, 2.Tohoku University, 3.NEC Co.)

**Abstract:** We developed a model that estimates the emotions of office workers using information obtained by wearable biometric sensors. In 11 healthy office workers, pulse rate, pulse rate variability (PRV), skin temperature, body motion, and conversation time were continuously monitored between 08:30 and 21:30 on every workday using a bracelet-shape wearable sensor. During the monitoring, subjects recorded four strongly conscious emotions (happy, relaxed, sad, and angry) every 30 min. Based on the Russel's Circumplex emotion model, four emotion types were developed into coordinates consisting of arousal and valence axes. The linear models were developed for estimating the value of each axis using the biometric information. From a total of 911 days of records in the 11 subjects, a total of 9,737 hours of data were obtained. By stepwise regression analyses, the coefficient of variation of high-frequency PRV amplitude and skin temperature were extracted as the best variable combination explaining the valence axis, and the frequency variability of PRV respiratory peak and conversation time were extracted for the arousal axis. The models discriminated between high valence (happy and relaxed) and low valence (angry and sad) states with an AUC of receiver-operating characteristic curve of 0.64 (P = 0.0001) and discriminated between high arousal (happy and angry) and low arousal (relaxed and sad) states with an AUC of 0.61 (P = 0.001). Our findings suggest that information related to two coordinates comprising the Russel's Circumplex model could be obtained by wearable biometric sensors, helping the estimation of emotion type of office workers.

1-A-3: Synthetic Brain Image Generation for ADHD prediction based on Progressive Growing Generative Adversarial Network

*Saadia Binte Alam[1], Moazzem Hossain[1], Syoji Kobashi[1] (1.University of Hyogo)

**Abstract:** In this paper, we proposed a method to generate synthetic brain images using generative adversarial networks (GANs). In medical image analysis, it remains a difficult and important task to produce realistic medical images that are entirely different from the original ones and also the exchange of clinical image data is a crucial issue for the implementation of diagnostic support systems. Nonetheless, it is difficult for researchers to obtain medical image data because the images contain individual information. Recently proposed GAN models could learn how to distribute training images without seeing actual image data, and generated images can completely anonymized personal information. The produced images can be used as training images for the classification of medical image, promoting medical image analysis viable. Instead of collecting a large amount of MRI data, an approach to image generation has been implemented in our paper. We exploit a progressive growing GAN (PGGAN), a neonatal brain image generation method that can be used for brain MRI classification and ADHD prediction tasks. The PGGAN slowly discovers the features of ADHD in MRI images by adding new layers during the training phase. Our image generation approach shows that it can produce brain MR images avoiding artificial artifacts and have clinical characteristics of the target symptom.

1-A-4: Time Series Human Motion Prediction Using RGB Camera and OpenPose

*Andi Prademon Yunus[1], Nobu C. Shirai[1], Kento Morita[1], Tetsushi Wakabayashi[1] (1.Mie University)

**Abstract: :** The report projects that by 2050, the population aged 60 and above will reach 2.1 billion. This aging society is more likely to suffer from locomotive syndrome. In order to reduce the spread of locomotive syndrome, it is best to increase awareness before the citizens become elderly. We propose the system to predict human motion as the first step to realize the locomotive syndrome estimation. Previous researches were using the Kinect camera which has a depth sensor that the camera used to detect the pose of a human body. However, in this research we are using an RGB camera as a reliable alternative. We set a goal to predict 1 second ahead of the motion which includes simple motions such as hand gesture and walking movement. We used OpenPose to extract the features of a human body pose including 14 points. YOLOv3 is used to crop the main feature in the frames before OpenPose process the frame. Distance and direction which are calculated from the features by comparing two consecutive frames as the input of Recurrent Neural Network Long Short-term Memory (RNN-LSTM) model and Kalman Filter. Mostly, Kalman Filter show better accuracy then RNN-LSTM and based on the human motions, motion such as hand gesture and moving to the right side are easier than more complex motion like hand gesture and moving to the left side. We confirmed the validity of RGB-camera based method in the simple human motion case from the result.

1-A-5: Osteoradionecrosis Region Estimation Using Machine Learning

*Kento Morita[1], Daisuke Takeda[2], Takumi Hasegawa[2], Tetsushi Wakabayashi[1] (1.Department of Information Engineering, Graduate School of Engineering, Mie University, 2.Department of Oral and Maxillofacial Surgery, Graduate School of Medicine, Kobe University)

**Abstract:** Osteoradionecrosis is a disease caused by a bone resorption inhibitor or the radiation therapy to the head and neck cancer. Conservative therapy using antibacterial drug or surgery to remove the necrosis bone have been done in the ORN treatment. Currently, the surgical operation often takes longer time than the pre-operative surgical plan, because it is difficult to recognize the bone necrosis area in the 3D CT image. Therefore, a system to accurately estimates the osteoradionecrosis area in the pre-operative 3D CT image is needed. This paper proposes a method to estimate the osteoradionecrosis area using image texture features and machine learning. Experiments using two osteonecrosis patients CT images showed that the necrosis area was successfully extracted by the F-measure score of 0.729, and we confirmed the necrosis area estimation result through the visual inspection.

**1-B: Affective Information (Room A0715) 13:00 – 14:40**

1-B-1: <*Special Talk*> Olfactory Perception and Kansei—Unravelling Effect of Odor on Psycho-physiological Index Evoked Unconsciously

*Yoshiko Nakao[1], Eri Higuchi[1], Satoshi Kitano[1], Takayuki Kodama[2] (1.NIHON L'OREAL K.K., 2.Kyoto Tachibana University)

**Abstract:** Olfactory information elicits more emotional and evocative memories than other cues, creating different emotional behaviors. Olfactory perception is induced by airborne volatile molecules which reach the olfactory bulb and the olfactory information is further processed in the amygdala, the orbitofrontal cortex and the hippocampus where the olfactory information plays a role in emotion, memory and learning. Here we tried to understand the impact of smell of cosmetic products on emotion and feeling by using neuroscience approach. In many hair salons, a pungent odor is frequently smelt, that is caused mainly by ammonia used in hair coloration. We have investigated the effect of ammonia malodor emitted in the process of hair coloration on the mental state by analyzing neural activity through EEG (Electro-EncephaloGram). The imaging of the neural activity in the a and b wave regions was able to detect differences in 1) emotion (stress level), and 2) feeling (comfort/discomfort) upon exposure to differing levels of ammonia odor. The results suggest that the neuro-science based approach is able to visualize unconscious mental states, which are not able to be clearly evaluated by a subjective way of approach such as questionnaire.

1-B-2: Improvement of BCI operation accuracy by the VR human body motion feedback

*Yuki Shimizu[1] , Hisaya Tanaka[1] (1.Kogakuin University)

**Abstract:** This paper proposes a brain-computer interface virtual reality (BCI-VR) to improve brain-computer interface (BCI) operation accuracy using hand animation feedback by virtual reality. At first, we thought event-related desynchronization/synchronization (ERD/ERS) response is easier to detect in the case of imagining of hand than in the case of imagining of arm since the corresponding area of the motor cortex of the hand is larger than that of the arm. As a result, we assumed that BCI operation accuracy is improved. Thus, we compared the effect of imagining of making fists and of imagining of conventional arm raising. Also, we conducted an experiment to operate the BCI to find BCI accuracy of operation, and a sense of agency (SOA) was obtained using the seven-point Likert scale. The results demonstrated that the imagine of making fists was higher than the conventional imagine of arm raising in both the average of operation accuracy and the SOA. However, the Mann-Whitney's U test depicted no significant difference between the accuracy of the imagining of making fists and of imagining of arm raising. Additionally, it was found that there was a positive correlation between BCI operation accuracy and SOA. Therefore, motor imagery of making fists is considered to be good for improving the accuracy of the BCI operation but it needs to be verified. It was also suggested that the accuracy of BCI operation could be improved if the SOA could be obtained. In the future, we will continue to develop BCI-VR to improve the BCI.

1-B-3: A Study on Evaluation of Healing Level Using Brainwave Stimulated by Tourist Spot Image

*Isao Nakanishi[1], Soushi Uchida[1], Yoshiaki Sindo[1] (1.Tottori University)

**Abstract:** Healing is an emotion that even the person himself is hard to notice. In this paper, healing levels of tourist spots are evaluated using brainwaves stimulated by tourist spot images. Healing level is estimated by a ratio of the sum of spectral elements in α waveband to that in β waveband. From an experiment using eight subjects, it is found that tourist spots in white- and gray-colored images are evaluated as being healed since the visual perception of human beings is greatly influenced by color.

**Abstract:** This paper experimentally clarifies similarities and differences of the impression of sound clips between Japanese and Chinese males, and those between Chinese males and females. Forty sound clips are evaluated through the SD method. It is shown that the factor of brightness commonly appears in the impression factors of Japanese males, Chinese males, and Chinese females, while the other factors do not always appear. The factors of Japanese males may be similar to those of Chinese females.

1-B-4: Cultural and Gender Differences of Impression of Sound Clips

*Teruhisa Hochin[1], Qiyu Yang[1], Hiroki Nomiya[1] (1.Kyoto Institute of Technology)

**Abstract:** This paper experimentally clarifies similarities and differences of the impression of sound clips between Japanese and Chinese males, and those between Chinese males and females. Forty sound clips are evaluated through the SD method. It is shown that the factor of brightness commonly appears in the impression factors of Japanese males, Chinese males, and Chinese females, while the other factors do not always appear. The factors of Japanese males may be similar to those of Chinese females.

1-B-5: The Effects of Tactile Feedback on the Affective Evaluation of Switch Sounds

*Kenji Ozawa[1], Kousuke Yamaji[1], Takeshi Shirasaka[2], Katsuya Saito[2], Hisato Shimomura[2] (1.University of Yamanashi, 2.Alps Alpine Co., Ltd.)

**Abstract:** In a previous study, we examined the effects of listening standpoint on the affective evaluation of switch sounds through a psychoacoustical experiment. Three roles of listeners were set in that experiment: operator, active listener, and passive listener. We considered the difference between active and passive listeners' evaluations to be due to the listeners' attitude or attention to the sounds. On the other hand, the difference between operators' and active listeners' evaluations remains an outstanding question. In order to investigate this question, in this study we conducted an experiment on tactile evaluation of the same 15 switches as in the previous study. The experiment was carried out using the semantic differential (SD) method involving 14 adjective pairs with a 5-point category scale. Twenty-seven subjects, who were the operators in the previous experiment, participated in this experiment. The experimental results were analyzed using factor analysis; we obtained three factors of activity, evaluation, and potency. The three factor scores of the operators' auditory evaluation obtained in the previous study are estimated well by linear regressions with the factor scores of the active listeners' auditory evaluation and the operators' tactile evaluation. The results of regression analysis indicate that that operator's evaluation of switch sounds is based on the auditory evaluation and affected by the evaluation of tactile feedback.

**1-C: Affective Education 1 (Room A0765) 13:00 – 14:40**

1-C-1: Characteristics Extraction from Lifestyle Questionnaire Data in Specific Health Checkup Based on Health State Transition of Metabolic Syndrome

*Norihiko Hashimoto[1], Yoshiaki MIYAUCHI[2], Haruhiko NISHIMURA[1] (1.Graduate School of Applied Informatics, University of Hyogo, 2.Graduate School of Nursing, Nagoya City University)

**Abstract:** In this study, we extracted the Specific Health Checkup (SHC) stratification of Metabolic Syndrome (MS), the quantification of the questionnaire data and lifestyle factors by using of the data in 5,423 males examined the SHC in two consecutive years (2006, 2007) when SHC was initially started. Based on these data we analyzed the differences in lifestyle habits among Bad group (MS to MS), Good group (non-MS to non-MS), Worse group (non-MS to MS), and Improved group (MS to non-MS) for the state movement from 2006 to 2007, and extracted the characteristics of lifestyle factors specifying MS. As a result, we could grasp the lifestyle habits characterized by the difference between non-MS and MS. In addition, the lifestyle factors that affect the transition between MS and non-MS. It is important for Specific Health Guidance (SHG) to recognize the existence of lifestyle factors that characterize MS and non-MS to take preventive countermeasures for MS. In the future, we like to connect our findings to the construction of a health support system that uses big data for SHC by linking to more accurate SHG.

1-C-2: Trial Use of QOL Evaluation Management Application for Cancer Therapy
Multiple Evaluation Methods and Score Analysis Methods
*Guen Yamada[1], Jue Zhang[1], Takuro Sakurai[2] (1.Kansei Information Laboratory, Kogakuin University, 2.National Cancer Center Hospital)
**Abstract:** Recently, medical institutions are now trying different things to evaluate QOL more scientifically. Besides information such as cancer morbidity and mortality, a subjective outcome indicator of QOL and patient satisfaction are used to this end. However, due to the increase in the elderly population, the number of cancer patients is increasing annually. Therefore, to resolve this, it is necessary to have an evaluation that includes test tools that can evaluate an elderly cancer patient's overall condition in addition to C30 commonly used to measure the QOL. Also, in the medical science and treatment fields, the patient's data is analyzed and used for various purposes. this paper aims to assist medical staff by managing and sampling data from multiple evaluation methods and to also provide a data analysis function. By the analysis, to make the causal relationship known and combining elements and incorporating many elements such as the patient's condition to help obtain the score evaluation time and data.

1-C-3: Building a device-free system to prevent fractures in older people with musculoskeletal ambulatory disability symptom complex
*Keiko Fukuroku[1], Yugo Narita[1], Hiroharu Kawanaka[1] (1.Mie University)
**Abstract:** This study aimed to measure the physical ability to cope with daily life and perceptions of older people at high risk of sarcopenia. We surveyed parameters to predict the risk of sarcopenia and factors worsening the condition. We used a pretest among five participants to check the relevance and validation of measures for (1) physical function, (2) physical activity, (3) environmental factors, and (4) subjective daily living activities. We plan to use these as the basis to develop a device-free sensor system to predict the onset and deterioration of sarcopenia in older people. Four participants had reduced muscle mass or left and right imbalances in one or both legs. All participants had consistent levels of vigorous and moderate activity and good sleep status. They also all kept to the protocol and wore the equipment for a whole month without any missing data. We will use the results of this pilot survey to identify changes and influencing factors for sarcopenia among older people.

1-C-4: N-back tasks for spatial and verbal working memory using Near-Infrared Spectroscopy
*Kota Kano[1] , Hisaya Tanaka[1] (1.Kogakuin University)
**Abstract:** The purpose of this study is to create new working-memory tests based on the N-back continuous performance task to account for verbal and visual acuity. We created two new N-back tasks: one for verbal working-memory (VWM) and another for spatial working memory (SWM). Like the conventional numeric working-memory (NWM) N-back test, these new types detect the same oxyhemoglobin reactions of the frontal lobe of the human brain. Thus, the responses of oxyhemoglobin during the various workingmemory tasks were measured using near-infrared spectroscopy. By evaluating NWM, VWM, and SWM, the number of trials in which activation was observed and the correct answer rates were compared. Results show that both VWM and SWM measured on par with NWM based on the Wilcoxon's rank–sum test. In the prefrontal cortex, there were no differences in oxyhemoglobin activity found to correspond to the different types of N-tasks. This suggests that there may be a common domain for each type of cognitive function in the subjects.

1-C-5: A Survey about Nap Habits in Workplace
*Cen Zhang[1], Seung Hee Lee[1] (1.University of Tsukuba)
**Abstract:** Sleep problems are becoming more common for many people. Napping during the day is one of the best ways to relieve the accumulation of drowsiness. Some companies have begun to pay attention to employees' health and encourage them to take a nap at noon. However, people have different opinions regarding naps. Many people refuse to take a nap because of the uncomfortable posture and the feeling after waking up. Also, facilities for people to lie down and sleep have not been popularized. The most common napping position is sitting. This study aims to let people nap better in a sitting posture in an office environment to avoid problems like shoulder and neck pain, nausea, and poor blood circulation during napping.

**15:00 – 16:40**
**ISASE2020 Oral Presentation Sessions 2 (Room A0712, A0715 and A0765)**

**2-A: Affective Business & Marketing (Room A0712) 15:00 – 16:40**

2-A-1: Suitable range for ease allowance and appearance of women's shirts
*Yuika Sakata[1], KyoungOk Kim[1], Masayuki Takatera[1] (1.Shinshu University)
**Abstract:** We investigated the suitable range for ease allowance with ready-made women's shirts in two different styles using a sensory test for evaluating appearance. We employed two women's shirts (samples I and II) in different styles (fit and straight). We modified the size of the bust, waist, and hips with a changeable-size dress form; we took pictures from the front of the dress form wearing a shirt. Using those pictures, we conducted a sensory test for evaluating appearance. The study participants made their evaluations using seven terms (wrinkles, fit, silhouette, beauty, fashionable, comfort, and purchase intention) with a five-point scale (–2 to 2). The subjects were 20 Japanese university students in their 20s. The proportion of subjects who scored 1 or more was 40% or greater when using ease allowance in the suitable range. With sample I, the suitable range of ease allowance for the bust was 1–7 cm, for the hips 2–6 cm, and for the waist 13 cm. However, with sample II, the suitable range of ease allowance was about 4 cm for all parts. Thus, the suitable range of ease allowance varied according to the style and part of the shirt. Our results provide a guideline for designing and selecting ease allowance for women's shirts, taking into account both comfort and purchase intention.

2-A-2: Luxury Fashion in Online Platform Service
*Chikako Miura[1], Sakiho Kai[2], Takao Furukawa[2], Kaoru Mori[3] (1.(Former Affiliation)Kyoritsu Women's University, 2.Kyoritsu Women's University, 3.Keio University)
**Abstract:** High quality but low price is a fundamental factor for commodities, however, tangible and intangible added value is the most important factor for luxury products. To pursue added value of luxury fashion brands and products, this paper shed light online platform service dealing with a large amount of products, and aims to reveal the actual situation of the luxury fashion market. The importance of online platform service as a data source is discussed in terms of network externality required for modern services. This paper proposes sales amount analysis and analyzed 308,154 luxury fashion items. The results show availability of category extension in luxury brands to raise sales. Integrity of high sales amount products is also discussed on brand equity fascinating consumers.

2-A-3: Qualitative Evaluation Method for Inner Branding of B2B "Small and Medium-Size Enterprises" using Face Chart.
*Takahiro Nishihara[1], Masahiro Kiyosumi[1], Hisao Shiizuka[2] (1.Kyushu University, 2.SKEL Shiizuka Kansei Engineering Laboratory Co. Ltd.)
**Abstract:** It has become possible to quantitatively express where to improve the evaluation view point of inner bundling. However, qualitative expressions as well as quantitative evaluations are required for the evaluation of inner branding. A more effective evaluation that balances these two is especially required for inner branding. In this paper, we propose a qualitative evaluation method of B2B SME inner branding using face chart.

2-A-4: Basic Model for Memory Retention of Advertising Content in Outdoor Advertising

*Masaaki Koyama[1], Yuki Takahashi[1], Hisao Shizuka[2] (1.AIWA Advertisement Co., Ltd., 2.SKEL Shiizuka Kansei Engineering Laboratory)

**Abstract:** The production of signboard advertisements with high advertising effectiveness has been achieved with some craftsmanship. The authors have consistently studied advertising effects on signboards in order to optimize the advertising effects of signboard advertisements. In this paper, we focused on modeling the memory retention structure among the advertising effects. This shows that it is possible to design billboard advertisements according to each purpose. Our final goal is to develop a model that can be used in practice.

2-A-5: Extraction of Problem Solving Patterns on Business Meeting

*Yuri Hamada[1], Tomomi Gojo[1], Hiroko Shoji[1] (1.Chuo University)

**Abstract:** The authors observed and analyzed the problem solving processes of a business meeting. Specifically, we analyzed conversations at a meeting between the headquarters of an apparel company and employees at the site. In this paper, the types of problem solving are classified into small problem solving and large problem solving. Small problem solving involves sharing, communicating and confirming information. Small problem solving are also classified into three patterns. Pattern 1 is the case where the problem is solved immediately in the dialogue. Pattern 2 has the prospect of solution, but the solution is carried over to the next time. Pattern 3 is a case where the subject is moved to another agenda without being resolved. Large problem solving requires discussion. As a result of analysis and discussion, it was suggested that headquarters employees' awareness and changes in viewpoints by grasping the situation at the site had a great effect on problem solving. In the meetings, not only were discussions on the agenda set in advance, but also new problems were discovered from the conversation. This showed the importance of the face-to-face problem solving process.

**2-B: Emotional Design (Room A0715) 15:00-16:40**

2-B-1: Visualization of sounds from multiple musical instruments

*Shoichi Miyamae[1], Noriko Hashida[1] (1.Shibaura Institute of Technology)

**Abstract:** Human beings recognize external world through multiple sensory functions. In recent years, it is getting obvious that sensory functions are not independent but affect each other. Also, this phenomenon is called cross-modality. In this paper, I focused on cross-modality of auditory and visual sensation and investigated relationship between sound from a musical instrument and shape which is reminded from sound. Firstly, I prepared 10 sounds from 10 different instruments (Piano, Organ, Guitar, Violin, Cello, Harp, Trumpet, Clarinet, Flute, Saxophone) and investigated trends of the shape felt from sound by making subjects draw sketches. From this investigation I found some trends from sketches and made 25 planer shape samples. Secondary, I conducted a survey by using 25 samples which I described. As a result, I found similar trends from samples which are chosen for some instruments. Especially, Harp, Trumpet and Flute had obvious and really similar trends to previous trends from sketches. From these results, I made 40 three-dimensional shape samples and conducted same survey as planer shape samples. Finally, I found harp, trumpet and flute had obvious and similar trends through all the surveys.

2-B-2: Emotional Map : Building a Data Tool for Geolocation-related Product Design

*Pengcheng Wan[1], Seung Hee Lee[1] (1.University of Tsukuba)

**Abstract:** This article introduces a solution of design simulation system based on data processing. It is to observe and analyze user behavior by reflecting a large number of user behavior data trajectories on city maps. We believe that under the technical background of big data and cloud technology, it is possible to build a tool that can help designers to predict user behavior to a certain extent. This article describes the design of the simulation system divided into five stages: data collection, local database establishment, cloud database establishment, user model simulation, and user model-based behavior prediction. We also introduce the experimental design for the first stage: data collection. This research proposes an experimental method of using sensor-based wearable data collecting devices to simulate the scenario with users of smart wearable devices and using the method of diary studies to create user profiles. The study believes that user's emotion data, such as subjective feelings, which is difficult to measure directly through physical sensors, also plays an important role in the simulation analysis of the design process. This study collated the multi-dimensional information categories needed for user analysis of geolocation-based designs, including geographic data, biological data, and emotional data. In the experiment, a mechanism for collecting emotional data through user's subjective selection was also introduced.

2-B-3: Design of Health State Transition Model Based on the Specific Health Checkup Using Binary Expression

*Yoshiaki Miyauchi[1], Norihiko Hashimoto[2], Haruhiko Nishimura[2] (1.Nagoya City University, 2.University of Hyogo)

**Abstract:** In Japan, the Specific Health Checkup program, focusing on metabolic syndrome and aiming to prevent lifestyle-related diseases, has been conducted since April 2008. We constructed state transition models of medical examination data from a sample of 3,949 subjects in Japan who received health examinations for two consecutive years. Each of the four inspection factors (body type, blood sugar, lipids, and blood pressure) was expressed as a binary variable using reference values in the Specific Health Checkup, yielding 16 health condition states, i.e., (0000) through (1111). First, we calculated state transition probabilities for each of the following three age groups: 40–49 years, 50–59 years, and 60–65 years (256 transitions × 4 age ranges). Next, we constructed a health state transition model using two cubic lattices with eight vertices for each of the age groups and performed model comparisons. In the state transition model for the age group 40–49 years, we found a tendency to improve to good condition when a factor, other than body type, exceeded the reference range. In addition, the transition of metabolic syndrome required that the three factors other than body type moved into the reference range in advance. The health state transition model can easily demonstrate the health state of the examinee visually, as well as the direction of the state transition. We believe our health state transition model provide guidance for efficient and effective health maintenance and improvement for each age group.

2-B-4: Take-Over Request in Highly Automated Driving: A Survey on Driving Experience and Emergency Operation Accuracy

*Han Zhang[1], Ji Wang[1], Seunghee Lee[1] (1.University of Tsukuba)

**Abstract:** An essential question in highly automated is how to aid drivers to make safe transitions between manual and automated control. We surveyed 1122 people about the driving experience and public opinions of a highly automated vehicle. Determined whether driving state and frequency would provide a significant difference in the accuracy of TOR, investigated the effects of different secondary tasks in driving on driver's takeover control performance in HAV. The survey showed that there is no correlation between the state of driving and the probability of making mistakes in an emergency. Besides, we need to take into account the instant communication between the driver and the system because the leading cause of stress in driving is anxiety about traffic accidents and concerns about insufficient traffic information.

2-B-5: Building a Smartphone Push Notification Management System

*Kazuma YOSHIIZUMI[1], Jue ZHANG[1] (1.Kogakuin University)

**Abstract:** The number of mobile applications that utilize push notifications is extremely high, and smartphone users who use multiple applications receive large amounts of push notifications each day. The amount of notifications that users see all at once is high, and not only could this be a nuisance, it creates the possibility of users missing important notifications. You can restrict unnecessary notifications by changing the notification settings, but changing the settings takes time. The purpose of this research is to improve user experience by saving the time required for these settings through the automatic classification of push notifications and the assessment of the importance thereof. We have assessed the importance of standard notifications, and implemented a notification simulator with an assessment database into iOS.

2-B-6: “Tell Tell” - Effects of Personality of Kansei Agents

*Ryo WATANABE[1], Shigeki OKAWA[1] (1.Chiba Institute of Technology)

**Abstract:** The purpose of this study is to propose an emotion generation model that consists of pseudo-personality and pseudo-moods. Agents implementing this model have various personalities for each user. In order to verify its usefulness, we implemented the model on an agent called “Tell Tell” and performed an experimental performance evaluation using a web application. In addition, we tried to performed an experiment to identify the nurtured agents. From the experimental results of performance evaluations, it was found that the agent of the proposed method had a positive difference in impression between "enthusiasm–lose interest" and "human-like– mechanical". However, in the items of getting tired and fun, there was a significant decrease in subjects with many interactions. From the experimental results of the nurtured agents, it showed that the proposed agent had a higher discrimination rate than the agent with personality only. Therefore, we analyzed the interaction of each subject, the agent of the user who was able to discriminate had little change in personality, and the user who couldn't discriminate had changed personality many times. In the future, it is necessary to improve the impression of getting tired and increase the discrimination rate by implementing an algorithm that changes the facial expression depending on the intensity even for the same personality.

**2-C: Affective Education 2 (Room A0765) 15:00-16:40**

2-C-1: Understanding the burden in communication through a short-term education program with practical experiences-Focus on VAS differences among method and transition through experience-

*Tamotsu Imura[1], Yugo Narita[2], Michiko Nakai[3], Yuji Tanaka[4], Takemasa Ishikawa[5] (1.Chubu Gakuin Univ., 2.Mie Univ., 3.Suzuka Univ. of Med. Sci., 4.Aichi Univ. of Edu., 5.Mie Univ. Hosp.)

**Abstract:** We designed and implemented a short-term educational program with practical experiences for students on communication support for patients with neurodegenerative disorders. We aimed to (1) clear and dissolve the factor of burden in communication through students’ understanding, (2) evaluate and maintain the effects of understanding this burden through practical experiences. Two lectures and one experience session that included a three method communication trial was conducted four times every 6 months. The students learned this program two consecutive times. The burden was recorded and evaluated by a visual analog scale (VAS) before/after using the three methods. A difference in the trend between the beginners’ and experienced group was found - the former felt that communication would be possible by using some tools before the experience. While comparing the before/after experience, the significant differences found in the beginners’ group was higher as compared to the experienced group. Almost no significant difference was found between (a) the same 1st and 2nd item and (b) the after 1st and before 2nd experience. The VAS of the before experience had high significant difference before it eventually transitioned to low. The burden was low while using any tool with a good timing or signal to the device or partner. We presume that participants understood the factor of burden and found a solution during the 1st experience to realize it at re-learning. Therefore, maintaining experiences 6 months apart, suggested the effect of repeated learning.

2-C-2: The Experience of Augmentative and Alternative Communication on a Half-Day Training Program on Communication for Support of People with Amyotrophic Lateral Sclerosis-Text mining the free-text comments of students from multiple healthcare disciplines-

*Takemasa Ishikawa[1], Yugo Narita[1], Tamotsu Imura[2], Yuji Tanaka[3], Michiko Nakai[4], Keiko Fukuroku[1] (1.Mie University, 2.Chubu Gakuin University, 3.Aichi University of Education, 4.Suzuka University of Medical Science)

**Abstract:** Amyotrophic lateral sclerosis brings various communication disorders. Augmentative and alternative communication (AAC) strategies can provide effective solutions but require ongoing support from the multidisciplinary team. We planned a repeating half-day training program on communication support and delivered it to healthcare students at 4 Japanese universities. We investigated the difference in perceived burden of using AAC between “Experienced” participants who had completed training 6 months prior and “Beginner” participants using AAC for the first time, as revealed in their written comments left after AAC use. KH Coder® data mining software was used to identify “characteristic” words in the comments. Fifty-eight participants (completing 105 training sessions) participated in the program, The text mining revealed that “eyestrain” was less frequently expressed by Experienced participants than by Beginners, suggesting that a single prior AAC training experience could reduce the burden of use.

2-C-3: The Effect of a Half-Day Training Program for Students in Multiple Healthcare Disciplines on Communication Support for People with Amyotrophic Lateral Sclerosis using Pre- / Post-tests

*Takemasa Ishikawa[1],Yugo Narita[1], Tamotsu Imura[2], Yuji Tanaka[3], Michiko Nakai[4], Keiko Fukuroku[1] (1.Mie University, 2.Chubu Gakuin University, 3.Aichi University of Education, 4.Suzuka University of Medical Science)

**Abstract:** Augmentative and alternative communication has been used as support for patients with communication disorders. We made a half-day training program on communication support for patients with neurodegenerative disorders, especially amyotrophic lateral sclerosis and implemented it for students in multiple healthcare disciplines at 4 universities. Participants took part in the same training program twice at half-year intervals. We defined the group that took the course for the first time as “Beginners” and the group that took the course 6 months previously as “Experienced”. Fifty-eight participants (105 trials) were obtained from 4 universities and 4 faculties. Beginners’test scores increased after taking the course. These scores decreased again in the pre-test score 6 months later. However, the score was better than the pre-test score at the time of the first attendance. With the wait-list control design with half-year intervals, the pre- / post-test scores suggested that participants retained a certain level of knowledge for 6 months.

2-C-4: Primary EFL in Japan-A snapshot of L2 motivation at 11+

*MACHIKO KOBORI[1] (1.Hosei university)

**Abstract:** The motivation of Japanese primary pupils to learn English as a foreign language (EFL) was examined in a pilot study of Japanese sixth form students (aged 11–12 years). The main aim is to verify the hypothesis that Japanese primary pupils learn EFL under a clear understanding of second language (L2) instrumentality, and examine whether the latest conceptual framework of L2 instrumentality can be applied to their EFL learning. The pupils completed a questionnaire that included 39 question items about different L2 motivational variables: integrativeness, and instrumentality prevention and promotion. The results were obtained based on factor analyses to examine how related L2 motivational variables are identified. Findings indicate that a clear distinction is drawn between integrativeness and instrumentality in learning EFL and that an explicit notion of L2 instrumentality is held among Japanese primary EFL pupils, based on the conceptual frameworks of L2 motivation. In particular, their L2 instrumentality substantiates the prevention and promotion of distinct entities within the conceptual framework of the L2 Motivational Self System (L2MSS): these two internal constructs are significantly identified as distinctive factors such as Instrumentality prevention- and promotion-driven types.

2-C-5: Proposal of "The VIA Model" for PBL activation with recognizing "Snapshot-like" intuitive sense of values

*Koichi Takahashi[1] , Masahiro Kiyosumi[1] (1.Kyushu University)

**Abstract:** Entrepreneurship Education is getting popular at the universities in Japan. The university students learn various kind of business skills through lectures and PBL (Project Based Learning) on the entrepreneurship program. However, the business skills are not sufficient to complete the project work. Self-awareness is another important factor for PBL activation. In this paper, we propose “The VIA model” as self-awareness method by using personal values card sort. This method is based on The Priming Effect of cognitive psychology so that “Generation Z” students can recognize sense of values instantly and have strong intention to complete PBL

**17:30 -20:30**
**Banquet**
**Monday, 16th March**
**09:00-09:30 Registration**

**ISASE2020 Oral Presentation Sessions 3 (Room A0715 and A0765)**

**3-A: Affective Design 1 (Room A0715) 9:30 – 11:10**

3-A-1: Analysis of Perfumes Used to Create Fragrances that Give a Sense of Hospitality
*Harumi Nakagawa[1], Noriaki Kuwahara[1] (1.Kyoto Institute of Technology)
**Abstract:** Japan has a hospitality culture called “Omotenashi”. In Japan’s classical literature, there are many songs and stories about fragrances. In addition to burning incense in Buddhism rituals, Japanese created a unique world called “Kodo”. This indicates that the Japanese have a deep history with scents. Regarding the scent of hospitality, it is necessary to consider the preference of the scent when greeting people. In a previous study, we conducted a questionnaire survey of 60 Japanese males and females using 5 different fragrances and 5 different note types and examined the results. In this experiment, we conducted a questionnaire survey of 58 Japanese males and females based on the SD method using 6 different perfumes and 2 different note types. We examined the results in this and the previous study in order to understand preferences for fragrances that conjure a sense of hospitality. We conducted factor analysis and extracted factors representing the feeling of “Omotenashi” from the perfumes. We analyzed the scent of each perfume based on these factors. Moreover, it was suggested that the impressions made by of perfume is different from the note types representing attributes of perfume. From the results of this experiment, as a result of examining the scent factors that bring about a feeling of hospitality, perfumes with a fresh, pleasant and graceful sensation were suggested to be the most effective in bringing about this feeling. In this paper, we reported on our research of fragrances that evoke in “Omotenashi”, or Japanese hospitality. In the future, we will continue to research the sensibilities that perfumes give to people and also propose a unique “perfume method (Kosuido)” for the purpose of researching the design of perfume.

3-A-2: Design guideline for designing single handle faucets based on the correlations between human lifestyles and design elements
*Riku Takagi[1] (1.Shibaura Institute of Technology/TAKAGI CO. LTD.)
**Abstract:** The reason why there are many kinds of single handle faucet designs, is because there are no design guidelines for their exterior design, correlated to the present diverged consumer values. This study is on making a design guideline for single handle faucets, based on the correlations between human lifestyles and design elements. First, we developed 7 basic formed single handle faucets and had a questionnaire survey on the test subject’s basic attributes, lifestyle and image evaluation on the developed faucets. We used the mathematical quantification theory class III, to find out what kind of basic attributes and lifestyle segments, values most on the exterior designs when purchasing, and what kind of basic design configuration they prefer most. Secondly, in the same questionnaire survey, we made the test subjects evaluate 7 basic single handle faucet form’s images and their purchase intentions, in 6 levels. We used the multiple regression analysis, to abstract the image words, which has a strong correlation with the purchase intention, regarding to the abstracted basic attributes and the lifestyle. Finally, we made a questionnaire survey on the images of the existing gooseneck-type single handle faucet with various design elements, and made the test subjects evaluate the images in 6 levels. We used the mathematical quantification theory class I, to abstract the design elements, which has a strong correlation with the test subject’s purchase intention. Consequently, we were able develop a design guideline for designing single handle faucets, based on the correlations between human lifestyles and design elements.

3-A-3: A Discrete Event Systems Approach to Model Problem Structure of Drug Ingestion Accidents in Infants
*Naoshige Akita[1], Yoshitsugu Morita[1], Hisao Shiizuka[2] (1.Kyushu University, 2.SKEL Shiizuka Kansei Engineering Laboratory)
**Abstract:** There have been numerous incidents of infants opening drug packaging intended for adults and accidentally swallowing tablets, and this has become a social issue. The authors have previously carried out evaluation testing of child-resistant pill containers, which are difficult for infants to open but not difficult for ordinary people to use. Based on the findings from these tests, we have investigated the causes of the issue. In this paper, we modeled the problem structure of accidental drug ingestion by infants using the Petri Net Model approach, a discrete event system.

3-A-4: Emotions of Simplified and Traditional Chinese Typeface
*QIANRU QIU[1], SHU WATANABE[1], KENGO OMURA[1] (1.Fuji Xerox Co. Ltd)
**Abstract:** Chinese typeface is widely used in design works that have numbers of users. The majority of Chinese words today consist of two or more characters. Basically, the simplified forms of Chinese characters are used in mainland China, Singapore, and Malaysia. The corresponding traditional characters are used in Taiwan, Hong Kong, and Macau. This study quantifies the relationships between emotions and Chinese typefaces by the process of kansei engineering. 20 simplified types and 20 traditional types were extracted and the kansei evaluation experiment was conducted for the people in mainland China and Taiwan where are the main regions using Chinese. The results of cluster analysis, factor analysis, and dual scaling analysis are used for comparison of affective differences between mainland China and Taiwan. Particularly, it is found that for the widely used types Heiti, Songti, and Kaiti, the people in mainland China and Taiwan have opposite feelings of classic and contemporary.

3-A-5: Modeling acceptable novelty using information theory
*Masafumi Miyamoto[1], Hideyoshi Yanagisawa[1] (1.The University of Tokyo)
**Abstract:** Novelty is an essential factor in design that is deemed attractive and creative by humans. However, an individual’s acceptance of novelty depends on their emotions. Knowledge about the range of novelty which ones accept will help to create attractive design targeting certain users. We previously developed a mathematical model of emotional dimensions associated with novelty such as arousal (i.e., surprise) and valence (i.e., positivity and negativity). The model formalized arousal as Bayesian information gain and valence as a function of the arousal based on Berlyne’s arousal potential theory. The arousal model was a function of three parameters: prediction error (the difference between expectation and reality), uncertainty (i.e., unpredictability), and external noise. In Berlyne’s model, the valence against novelty forms an inversed-U curve and turns from positive to negative when novelty is large. We assumed such a point that the sign of the valence turned showed the range of novelty ones would accept. Here, we derived a prediction error where valence turns from positive to negative. We termed this acceptable novelty and defined it as the range of novelty one can accept. Our model predicted that when the order of uncertainty is larger than external noise, the higher the uncertainty is, the larger the acceptable novelty becomes. This analysis is an update from our previous model and can be a basis of designing products to certain target users.

**3-B: Affective Innovation (Room A0765) 9:30-11:10**

3-B-1: Analysis of Emotional Trigger at Powder Room-Factor of Negative and Positive Emotion through Dressing-
*Yuka Fujimoto[1], Yukari Takaku[1] (1.LIXIL Corporation)
**Abstract:** Recently, experience value has been required at a living space, and increasing affective value is needed. To clarify affective value of living, we focused on emotion and emotional trigger while staying at a living space. We chose “Dressing at a powder room” as a first target to clarify the emotions and those emotional triggers of one scene, and conducted comparative analyses about attribute differences of age and job status. From analysis result, the most influential emotional trigger was about one’s body, and full time homemaker almost only move their emotions by the trigger, while employee move their emotions from some other triggers as well. We described this difference by illustrating emotional causal relationships, and made a discussion about emotional meaning of “Dressing”.

3-B-2: Concept of Artificial Kansei-Challenge to New Artificial Intelligence-
*Hisao Shiizuka[1], Shigaku Tei[2] (1.SKEL Shiizuka Kansei Engineering Laboratory, 2.The University of Aizu)
**Abstract:** Our purpose in this paper is to propose the concept of “artificial Kansei/sensibility”. In recent years, artificial intelligence (AI) has been the focus of many people, but here we propose the basic concept of "artificial Kansei/sensibility" as a superordinate concept of artificial intelligence (AI). AI is good at deductive and inductive reasoning. Deep learning and machine learning are often performed based on deductive or inductive reasoning. Furthermore, AI cannot deal with abduction. The concept of artificial Kansei/sensibility proposed in this paper provides a methodology that can handle abduction and transilient inference, so that our new concept will extend current AI technology to treat GAN(Generative Adversarial Networks) .

3-B-3:Understanding and Supporting Users to Improve Atmosphere of Communication by Kansei Agents
*Shigaku Tei[1], Tatsuki Kawaguchi[1], Tech Ceng Sim[2], Hisao Shiizuka[3] (1.The Univ. of Aizu, 2.The Univ. of Aizu, Junior College Division, 3.SKEL Shiizuka Kansei Engineering Laboratory)
**Abstract:** In order to maintain smooth human interactions and communications, atmosphere of communication plays an important role besides exchanging information or negotiation among the persons involved in the communication, this paper proposes how Kansei/ Affective agents can detect the atmosphere and support the better communication. We also design a CNN based feasibility experiment as the first step to detect the dialogue state of communication, which is one factor of communication atmosphere.

3-B-4: A System Advised Drawing of Tessellation based on Artful Thinking Process
*LUYI HUANG[1], Shigaku Tei[1],Yilang Wu[2], Hisao Shiizuka[3] (1. The University of Aizu, 2.Digital Technology Laboratory, PKUtech Co. Ltd., 3.SKEL Shiizuka Kansei Engineering Laboratory)
**Abstract:** Tessellation, as a regular pattern performance, is useful for aesthetic appreciation or commercial purpose due to its special visual affect. However, creating a tessellation is not a simple matter, especially for those non-professionals. Based on the visual patterns surveyed from existing samples, we firstly define an artful thinking process to guide the creation of tessellation. Secondly, we demonstrate a prototype system to advise the drawing according to the visual patterns recognized from the current drawing. The case study is applied with help from student volunteers: the defined artful thinking process is practical for non-professionals to follow. The demonstration system is able to classify drawings and give classification-based advice. As for future work, we plan to revise the artful thinking process in a more fine-grained way, and train the classifier to recognize more drawing patterns to advance the system advice.

3-B-5: An Operator Interface for Autonomous Vehicles
*Zhi Wang[1],Hideyasu Sai[1], Kazuo Ogiwara[1], Daishi Watabe[1], Yukimichi Saito[2], Masayoshi Wada[3] (1.Saitama Institute of Technology, 2.Mikuni Life & Auto, 3.Tokyo University of Agriculture and Technology)
**Abstract:** In this paper, we propose an interface for autonomous vehicles that can build trust between users and computers. Several open-source pieces of software (such as Autoware and Apollo) are widely used for autonomous driving. A few researchers have also tested their algorithms on simulators such as LGSVL. To identify a broader range of problems that would not be possible by means of simulator testing, such as the sudden appearance of pedestrians in front of the autonomous vehicle, bad weather, or roads in poor condition, we attempt to test these algorithms under live conditions. Further, we design an interface for an actual autonomous vehicle. The interface is aimed at quickly tuning the parameters of various algorithms, monitoring the status of the vehicle, and most importantly, notifying the operator, driver, and passengers concerning the drive mode of the vehicle and help develop trust in autonomous vehicles. The interface was designed to provide as much relevant information as possible and enable more accessible communication with the vehicle. Accordingly, this interface can help to improve the safety of autonomous vehicles.

**4-A: Affective Design 2 (Room A0715) 11:30-13:10**

4-A-1: Recommender system based on personal kansei evaluation tendency
*Yuya Kondo[1], Hiroshi Takenouchi[2], Masataka Tokumaru[1] (1.Kansai University,2.Fukuoka Institute of Technology)
**Abstract:** In the present paper, we propose a recommender system that considers the current user behavior tendencies to evaluate relevant contents. In, the proposed model, the user preference factors are estimated based on the collected kansei evaluations and image features of recommended contents. The features are acquired from the image of the content by using a deep neural network, and the user evaluation for each feature is estimated by applying the gradient boosting decision tree. In addition, we analyze the relationship between the user evaluation and the image feature, and search for the users with the similar evaluation tendency with regard to changes in the feature. Based on the obtained results, we recommend the individuals that are presumed to be highly rated by other users. In addition, we estimate the features that are the factors of the user preference corresponding to recommendation results, and present the common features as images. The effectiveness of the proposed model is verified by performing a simulation using the user evaluation data.

4-A-2: A sticker-based dialog system considering shared emotions in group chat
*Ryo Ito[1], Masataka Tokumaru[2] (1.Graduate School of Science and Engineering System Science and Engineering course, Kansai University, 2.Kansai University)
**Abstract:** In this paper, we propose a sticker-based dialog model considering shared emotion in group chats. Previous communication robots support only one-on-one conversations. It, therefore. was difficult for the robot to communicate with multiple people. Opportunities for people to communicate using group chat are increasing with the development of SNS. The dialog system, therefore, must behave properly in a group chat. The proposed model estimates the shared emotion in a group chat and judges the emotion sympathy. Our experiments reveal that the proposed model can estimate the shared emotion in a group chat. Further study, however, is required to construct a dialog system for human-like dialog.

4-A-3: Optimization Model to Express Emotions of Pet Robot

*Chihiro Morita[1], Masataka Tokumaru[2] (1.Graduate School of Kansai University, 2.Kansai University)

**Abstract:** In present study, we propose an emotional expression optimization model that is focused on action. Our previously developed emotion generation model is able to generate only complex emotions. Humanoid robots can express emotions through speech or gestures. However, most of pet robots do not have the ability to speak like human, and it is necessary for them to express emotions only through various actions. To resolve this issue, we apply the interactive tabu search proposed in our previous research works. According to the proposed model, the robots can change their actions depending on the intended emotional expressions, and thereby they are able to express complex emotions appropriately.

4-A-4: Emotional Meaning of Eyelid Positions on a One-Eyed 2D Avatar

Eiji Onchi[1], Daniel Saakes[2], *Seung Hee Lee[1] (1.Univ. of Tsukuba, 2.KAIST)

**Abstract:** Expressing emotions of virtual and robotic agents require complex animations that mimic human behavior. By abstracting the core features in human faces for the emotions described by Ekman, et al., a single-eyed 2D avatar was designed that only moves the upper and lower eyelids. The relationship between how much each eyelid covers the eye and the perceived emotion was evaluated with a within-subjects study with 31 college students. The results showed that it is possible to convey different emotional meanings by changing the eyelids, and adding a white dot to simulate gloss affected the meaning of some emotions considerably. This research contributes to the development of virtual and robotic agents that can show emotions without increasing the complexity of the system, ultimately leading to more natural interactions with artificial systems.

4-A-5: A survey of the effects of non-emotional motion features on emotion

*Hiroaki Tanazawa[1], Tokumaru Masataka[1] (1.Kansai University)

**Abstract:** We aim to express robots' emotions with more natural movements. In this paper, we investigate the impression of the physical characteristics of the robots' motion on the user. We found that some physical features were deeply related to emotions. First, subjects estimated the emotion close to anger when the robot's arm moved faster. Furthermore, they estimated the emotion close to anger when the robot's gestures became larger. Finally, the subjects estimated the emotion close to pleasant when the robot took longer to change its behavior.

**4-B: Affective Science and Engineering (Room A0765) 11:30-13:10**

4-B-1: Risk Feeling Index of Autonomous Vehicle Behavior-Modeling Individual differences based on Expectation Effect Theory-

*Takashi Hashimoto1, Hideyoshi Yanagisawa1 (1.The University of Tokyo)

**Abstract:** Studies of autonomous driving systems are being conducted to realize a safe and secure mobile society. According to these studies, the safety of the system and the driver's feeling of security often do not match. To enable automatic driving control according to the driver's comfort, previous researchers introduced risk feeling index to quantify the driver's feeling of security, without accounting for the effects of drivers' individual differences. The purpose of this study is to quantify the risk feeling perceived by the driver while considering individual differences. We extracted the factor of individual differences comprehensively to examine the model of risk feeling based on the expectation effect theory. Using a driving simulator, we investigated the effect of the extracted factor on the subjective assessment of risk feeling while overtaking. The results suggest that risk is perceived based on both the individual driving characteristic of anxiety while driving and the experimentally manipulated prior prediction. These findings will enable the development of a secure automatic driving system that suits each driver by controlling the system appropriately based on the driver's driving characteristics.

4-B-2: Developing a program to detect plastic bags hanging on overhead railway power lines through the use of drone photography

*Naoki Matsuura[1], Jue Zhang[1] (1.Kogakuin Univ.)

**Abstract:** There is an ongoing problem affecting railway companies, caused by plastic garbage flying on to overhead power lines. When such an issue occurs, the general way to deal with it is as follows - when a station employee receives a notice, they will patrol the area by foot to visually confirm the issue. However, there are several problems with this method, as secondary hazards may subsequently occur, and a significant amount of time may occur before the plastic hazard is discovered. Meanwhile, the railway companies, in an effort to deal with this issue, have begun practical field tests using drone photography. However, the footage shot by the drones will still need to be verified by human eyes, and currently, there are no methods of automated detection of plastic hazards being conducted at this time. This report will explore the development of a method enabling the automated detection of such plastic hazards on overhead wires through binary coded processing, using aerial footage shot by drones, and investigate the benefits of such a method. Furthermore, we considered the practical applications of such a method, and developed a GUI program that will be compatible with several different formats of image sizes.

4-B-3: Influences of pre-presented information on multi-armed bandit task

*Kouhei Kudo[1], Takashi Takekawa[1] (1.Kogakuin University)

**Abstract:** Various information are taken into account on decision making. For example, we determine the transportation means or outfit of the day based on "weather forecast". In addition, the behavior of a person also depend on the reliability of the information. In this study, we consider the case of repeating the action of selecting one from multiple choices with unknown rewards, which is well known task as multi-armed bandit, in pre-presented information. At the first time, pre-presented information is unreliable, and the effect of the information to the behavior is small. Participants can easily modify information to match the results of task if the information should be incorrect. We assume that participants may become difficult to correct the behavior due to prior information after correct information continues to be presented. It is because the reliability of information increases by repetitive correct information. Therefore, we verified how the information is corrected by the actual results and how the correction could be modified by the reliability of the pre-presented information. In particular, we analysis the participant behavior in the situation that the incorrect information is suddenly presented after the correct information is continuously presented. As a result, we found that the ratio of the incorrect choice is increased and the fixation of the behavior is delayed after the repetitive correct information.

4-B-4: Effects of Lighting Color on Promoting Emotional States

*Yuka Matsumoto[1], Midori Tanaka[1], Takahiko Horiuchi[1], Yuki Nakahodo[2], Maki Sakamoto[2], Toyoshige Nohnishi[3] (1.Chiba University, 2.The University of Electro-Communications, 3.KONICA MINOLTA, INC.)

**Abstract:** It is known that the colors in our surroundings affect our emotions in the real-world environment. Previous studies investigated the relationship between environmental colors and emotions. In this study, we first discuss a psychophysical experiment showing that even if the surrounding colors are equivalent, the emotions recalled might differ depending on the situation. We then set up an environment in which a specific emotional state was triggered by conversation and investigated the lighting conditions that promote that emotional state through psychophysical experiments. We found no significant effect on positive emotional states such as happiness under a single uniform lighting condition generated by a recall color. In contrast, negative emotional states such as sadness were significantly promoted under the single uniform lighting condition. An additional experiment suggests that positive emotional states could be promoted by illumination with a spatial combination of a color recalled from the emotion and its opponent color.

4-B-5: Communication through Typefaces: Affective Selection of English, Myanmar and Japanese Typefaces

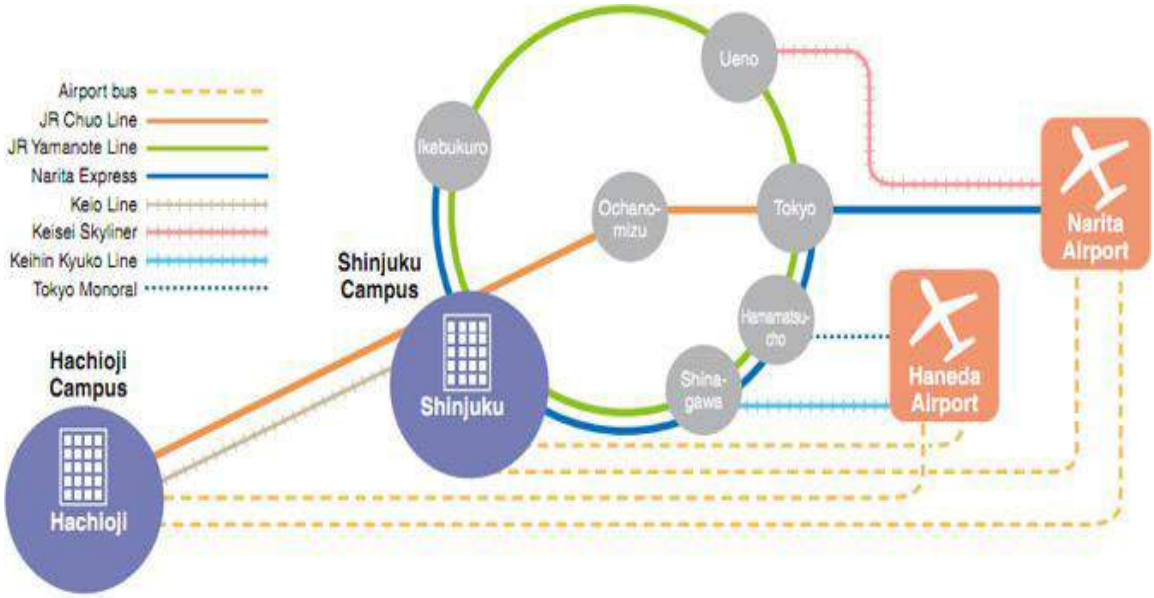
*Naw Victory Gabriel[1], Mina Ryoke[1] (1.University of Tsukuba)

**Abstract:** Typefaces play an important role in business communication as they are found to shape consumers' perceptions and impressions towards products. One way typefaces shape perception is by carrying connotative meanings which are often difficult to identify. Since connotative meanings are implicit, incorrect choice of typefaces can ruin the effectiveness of communication. This study tried to build typeface recommendation guidelines for 3 languages - English, Myanmar, and Japanese - through subjective evaluation. Results could pinpoint suitable typefaces for each of the 36 Kansei adjectives, and also find 5 clusters of adjectives and types. Findings that are consistent with prior studies on English and Japanese typefaces are derived for Myanmar language where no such study exists. In addition, points of caution regarding relying on originally specified font-weight, and how using fonts with 'exciting' Kansei can impact readability are also noted.

## Access Map

Kogakuin University, Shinjuku Campus
1-24-2 Nishi-Shinjuku, Shinjuku-ku, Tokyo 163-8677
Tel: 03-3342-1211 (main switchboard)

## Transportation from Narita & Haneda Airport

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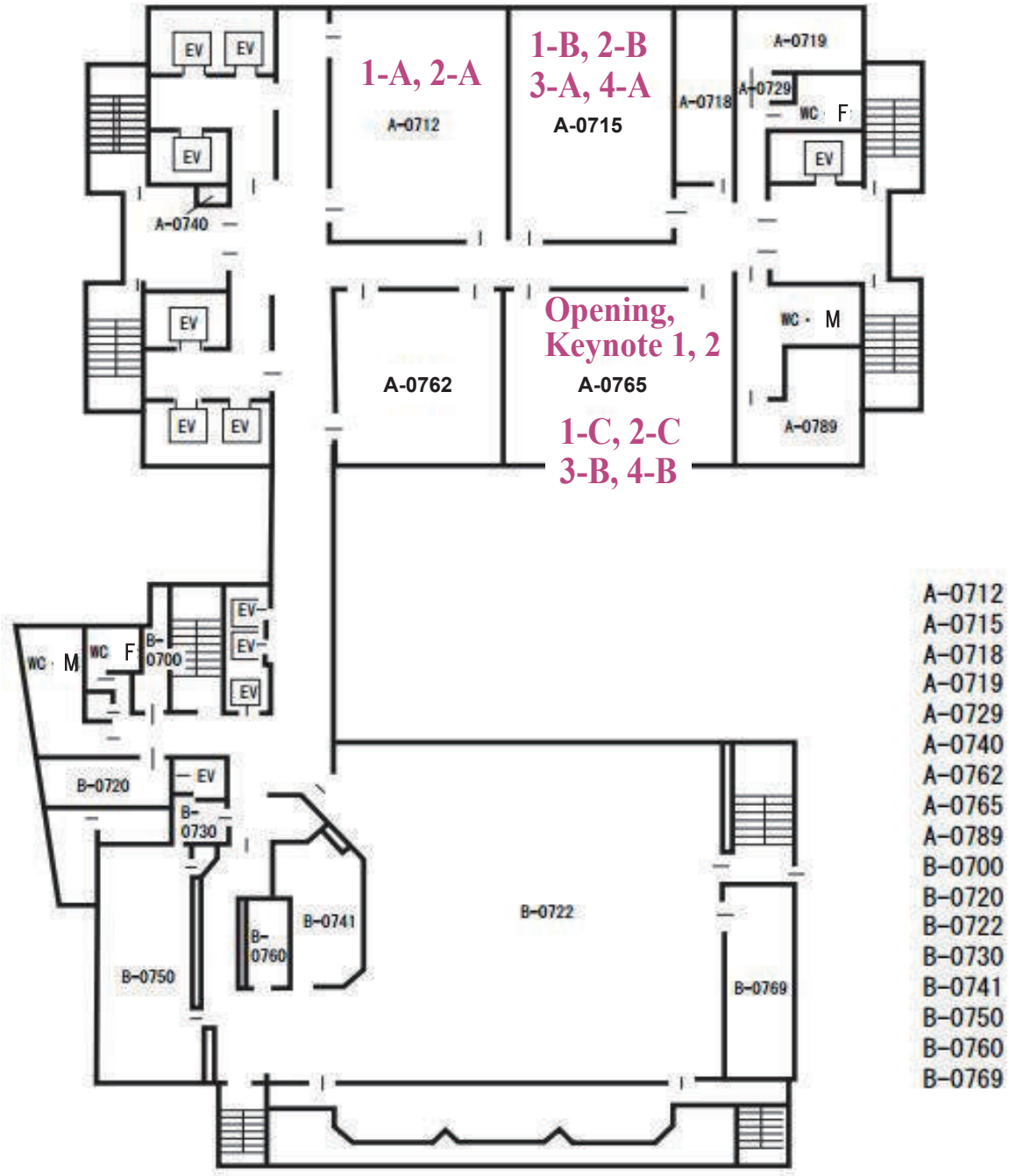
|---|---|---|---|---|
| Narita Airport | Narita Express (approx. 80 min.) | | | Shinjuku |
| Narita Airport | Keisei Skyliner (approx. 60 min.) | Ueno | JR Yamanote Line (approx. 24 min.) | Shinjuku |
| Narita Airport | Airport bus (approx. 85 min.) | | | Shinjuku |
| Narita Airport | Airport bus (approx. 160 min.) | | | Hachioji |
| Shinjuku | JR Chuo Line (approx. 35 min.) | | | Hachioji |
| Shinjuku | Keio Line (approx. 34 min.) | | | Hachioji |
| Haneda Airport | Airport bus (approx. 35 min.) | | | Shinjuku |
| Haneda Airport | Airport bus (approx. 75 min.) | | | Hachioji |
| Haneda Airport | Keihin Kyuko Line (approx. 13 min.) | Shinagawa | JR Yamanote Line (approx. 18 min.) | Shinjuku |
| Haneda Airport | Tokyo Monoral (approx. 13 min.) | Hamamatsucho | JR Yamanote Line (approx. 21 min.) | Shinjuku |

## Access Map

Kogakuin University, Shinjuku Campus
1-24-2 Nishi-Shinjuku, Shinjuku-ku, Tokyo 163-8677
Tel: 03-3342-1211 (main switchboard)


- A five-minute walk from JR Shinjuku Station, west exit
- A five-minute walk from Shinjuku Station on the Keio, Odakyu, Toei, or Tokyo Metro lines
- A three-minute walk from Tochomae Station on the Toei Oedo Line
- A 10-minute walk from Seibu Shinjuku Station on the Seibu Shinjuku Line

# Floor 7, Venue Map




Affective Science & Engineering

ISASE

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