

# The 2nd International Conference on Culture Technology (ICCT)

December 8~10, 2017 | Tokyo Polytechnic Univ., Tokyo, Japan



International Association for  
Convergence Science & Technology

**KOGEI** TOKYO POLYTECHNIC  
UNIVERSITY



한국과학예술포럼  
Korea Science & Art Forum



ORIENTAL CONSULTANTS GLOBAL

PARATUS INVESTMENT



Pine Tree Associates



AUTODESK.



中國設計智能大獎  
Design  
Intelligence  
Award

EUPHORIA  
SEOUL



# Opening Address

---

**Pyeongkee Kim**

President of IACST



It is my great honor and pleasure to welcome all of you to the second ICCT in Tokyo, Japan. First of all, I would like to express my deepest gratitude to Dr. Kwangyun Wohn of KAIST and Dr. Toru Iwatani of TPU for giving us special keynote speeches today, the president Ryuichiro Yoshie of Tokyo Polytechnic University, for providing us with this wonderful place and supporting us in many ways. I also give many thanks to Dr. Kazuo Sugiyama the senior advisor of IACST. I welcome all participants to present their valuable research results and lectures from all over the world.

As you know, the theme of this conference is “Culture Technology, the flower of convergence.” While culture and technology have influenced each other throughout all human history, I could not see more active and profound interactions than today. I believe this massive and deep interaction can be further accelerated when convergence idea and technologies are applied. To make effective convergence happen, researchers should have enough time of understanding different disciplines and cultures. New ideas and experiments must be tried freely and challenged from different perspectives. This is why we have this international meeting and ICCT is willing to serve as a good platform for these innovative activities.

While previous industrial revolutions helped humanity by giving power, saving time, and shortening distances, today’s and future AI technology can challenge humanity in many areas with its maximized labor productivity and intelligence. We are hearing many prospects that AI technology will take away human jobs and we will face difficult time soon in our daily lives. On the contrary, with the help of intelligent machines, I believe this is the time we can enjoy true human life. When most labors are done by smart machines, what should we do and what do you want to do? If you ask me, I will answer “Eat, Love, and Play.” These three things are things machines cannot understand but humans get joy and satisfaction from them. I would like to invite you to join us to this “Play” ground by doing research together and helping next generations academically. In addition to hosting conferences and symposiums, I would like you to join us by promoting dynamic exchange of researches and students among member organizations and hosting international exhibitions of culture design and student’s work.

Would you please enjoy the second ICCT and all IACST events together, sharing wonderful days of good memories in Tokyo? Thank you very much.

---

Dr. PyeoungKee Kim

Honorable Chair of the 2nd ICCT

# Congratulatory Message

---



**Ryuichiro Yoshie**

Honorable Chair of the 2nd ICCT

On behalf of Tokyo polytechnic University, I would like to express my heartfelt congratulations on the 2nd International Conference on Culture Technology. We are very pleased and honored to host this international conference at Nakano campus of our university.

To tell the truth, I'm not sure the definition of "Culture Technology". But I imagine that the "Culture Technology" is something like "Collaboration between Art and Technology". Tokyo Polytechnic University (TPU) originated from professional school of photography was a pioneer in combining self-expression through photography (Art) with photographic techniques (Technology). Now the TPU is a unique university in Japan in that it possesses Faculties of both Engineering and Arts. One of the important policies of me, the president of TPU, is to enhance further collaboration between "Art and Technology". In this sense, TPU is really appropriate place to hold this conference on "Culture Technology".

I would like to express my heartiest thanks to all the committee members who have been preparing this conference. I hope this conference will provide all the participants with places for active discussion and new ideas. I believe we can contribute to the quality of people's lives through both "Art and Technology", i.e. "Culture Technology"

---

Dr. Ryuichiro Yoshie  
Honorable Chair of the 2nd ICCT and President of Tokyo Polytechnic  
University,

# Welcome Message

---



**Yonguk Lee**

Organizing Chair of  
the 2nd ICCT



**Tae Soo Yun**

Organizing Chair of  
the 2nd ICCT

It is my great pleasure to welcome you all to the second International Conference on Cultural Technology (ICCT) in Tokyo polytechnic University. First, I would like to thank everyone here for the attendance and special thanks to Dr. Pyeoungkee Kim the chairman, Conference Organizing Committee members and directors from each country.

I am pleased to hold this ICCT's second conference here in Tokyo. Tokyo is a modern city where not only information from all over the world gathers together but also it spreads out to the world. Hence the new technology is invented everyday. On the other hand, old great tradition and culture of Japan can still be seen and appreciated in Tokyo. Therefore, I think it is a very suitable place to hold ICCT to discuss particularly about culture and technology. I hope everyone enjoys this conference and the stay in Tokyo during this trip.

Our Tokyo polytechnic University members and I are very excited to hear everyone's presentations and we hope this conference will be meaningful for everyone. We hope all the researchers will be able to perform their best to describe their passions and also develop the knowledge from other researchers' presentations for future works.

Lastly, I would like to take a moment to thank to Dr. Ryuichiro Yoshie, the president of the Tokyo polytechnic University, who gave us a lot of support, and each of the sponsors.

Thank you.

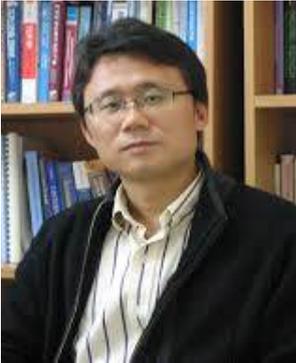
---

Dr. Yonguk Lee and  
Organizing Chair of the 2nd ICCT and Director of IACST

Dr. Tae Soo Yun  
Organizing Chair of the 2nd ICCT and Chief Vice President of IACST

## TPC Chair Message

---



**Dongkyun Kim**

TPC Chair of  
the 2nd ICCT



**Hisaki Nate**

TPC Chair of  
the 2nd ICCT

It is our great pleasure to welcome you to Tokyo, Japan from December 8 to 10, 2017, for the 2nd International Conference on Cultural Technology (ICCT). This year, ICCT has various topics on cultural technologies including information technology, and digital contents and cultural service. We have received more than 150 paper submissions from 5 countries (Korea, Thailand, Pakistan, Indonesia and Japan) in the world. Through a rigorous review process, we have selected 102 technical papers for presentation at the conference. The accepted papers were organized into 13 technical oral and 4 poster sessions. In addition, we have two more special sessions where we can share idea on design & entrepreneurship, and future making. Besides the papers contribution from all over the world, this successful program was made possible by the devoted service of technical program committee members. We would like to express many thanks to all of the TPC members as well as to the Organizing Committee Chairs for their active support and guidance. We hope that all of participants enjoy the excellent program of this 2nd ICCT and the beautiful attractions of Tokyo.

---

Dr. Dongkyun Kim

TPC Chair of the 2nd ICCT and Vice President of IACST

Dr. Hisaki Nate

TPC Chair of the 2nd ICCT and Director of IACST

# Organization

## Organizing Committee

### Honorable Chairs

- Dr. Ryuichiro Yoshie, President of TPU, Japan
- Dr. Kazuo Sugiyama, Oriental Consultants Global, Japan
- Dr. Pyeoungkee Kim, President of IACST

### Organizing Chairs

- Dr. Tae Soo Yun, Dongseo University, Korea
- Dr. Yonguk Lee, Tokyo Polytechnic University, Japan
- Dr. Soon Ki Jung, Kyungpook National University, Korea

### Registration Chairs

- Dr. Se Hyun Park, Daegu University, Korea
- Dr. Donghwa Lee, Daegu University, Korea

### Local Arrangement Chair

- Dr. Hisaki Nate, Tokyo Polytechnic University, Japan
- Mr. Keisuke Ota, Oriental Consultant, Japan

### Publicity Chair

- Dr. Eun Yi Kim, Konkuk University, Korea
- Dr. Syed Hassan Ahmed, University of Central Florida, USA
- Ms. JiYoun Wang, Oriental Consultant, Japan

### Publication Chair

- Prof. Kyung Su Kwon, Dongseo University, Korea

## International Advisory Committee

- Dr. Kazuo Sugiyama, Oriental Consultant, Japan
- Dr. Tongjin Kim, Purdue University, USA
- Dr. Lei Li, Hosei University, Japan

## Exhibition Committee

### Design Program Chairs

- Dr. Bumkyu Kang, Dongseo University, Korea
- Dr. Kwang Chib Chang, Kyunghee University, Korea
- Dr. Kiesu Kim, Silla University, Korea

### Cultural Design Chairs

- Dr. Sung Hyun Kim, Konkuk University, Korea
- Dr. Pil Je Park, Cachon University, Korea
- Dr. Seungpok Choi, Silla University, Korea

## Technical Program Committee

### TPC Chairs

- Dr. Dongkyun Kim, Kyungpook National University, Korea
- Dr. Hisaki Nate, Tokyo Polytechnic University, Japan
- Dr. Rattasit Sukhahuta, Chiang Mai University, Thailand
- Dr. I Putu Agung Bayupati, Udayana University, Indonesia
- Dr. Sungpil Lee, Dongseo University, Korea
- Dr. Jiman Hong, Soongsil University, Korea
- Dr. Haeyoung Ko, Seoul Women's University, Korea

### Steering Committee

- Dr. PyeoungKee Kim, President of IACST
- Dr. Tae Soo Yun, Dongseo University, Korea
- Dr. Rattasit Sukhahuta, Chiang Mai University, Thailand
- Dr. Thomas Chun, Loughborough University, UK
- Dr. Yonguk Lee, Tokyo Polytechnic University, Japan
- Dr. Hisaki Nate, Tokyo Polytechnic University, Japan
- Dr. Thepchai Supnithi, NECTEC, Thailand
- Dr. Rolly Intan, Petra Christian University, Indonesia
- Dr. He Xiao Qing, Shanghai University, China
- Dr. Sun Guoyu, Communication University of China, China
- Dr. Se Hyun Park, Daegu University, Korea
- Dr. Kyudeuk Yeon, Christ University, India
- Dr. Intiraporn mulasastra, Kasetsart University, Thailand
- Dr. Dongkyun Kim, Kyungpook National University, Korea
- Dr. Eun Yi Kim, Konkuk University, Korea
- Dr. Jung Wha Lee, Dong-eui University, Korea
- Sang Hyo Lee, PineTree Associates, Korea
- Jong Soo Rhee, PineTree Associates, Korea

# Keynote Speech

## Ten Unsolved Problems in Human-Cultural Artifact Interaction

### Professor Emeritus Kwangyun

**Wohn** KAIST, Korea



Chairman of Korea NST /Professor Emeritus, KAIST, Korea

He used "Culture Technology" first in the world

1986~1990: Professor, University of Pennsylvania, USA

1991~2004: Professor, KAIST, Korea

2005 ~ 2011 Founder & Dean, Graduate School of Culture Technology, KAIST

2005~ President, HCI Association, Korea

2017.10.23~ Chairman, National Research Council of Science & Technology, Korea

## How to Create a Good Game on "PAC-MAN" experience

### Professor Toru Iwatani

TPU, Japan



Game Creator /Professor, Tokyo Polytechnic University

President for Digital Games Research Association Japan

BANDAI NAMCO Entertainment Inc. fellow member

1955: Born in Tokyo.

1977: Entered the namco Ltd. (Current: BANDAI NAMCO Entertainment Inc.)

1980: Produced the video game "Pac-Man" whose theme is "Eating". It was appreciated

# Schedule

Time	Program		
<b>December 8(Friday), Place: Tokyo Polytechnic University (Nakano Campus), Tokyo, Japan</b>			
14:00~15:00	Registration		
15:00~17:30	International Culture & Marine Design Exhibition Room# 3101(Building 3)		
<b>December 9(Saturday), Place: Tokyo Polytechnic University (Nakano Campus), Tokyo, Japan</b>			
08:00~09:00	Registration		
09:00~10:40	Oral Presentation 1 (Session A, B, C, D) Room# 1201~1204		
10:40~10:50	Tea Break		
10:50~11:30	Opening Ceremony - Opening Address(President Pyeoungkee Kim, IACST) - Congratulatory Message (Dr. Ryuichiro Yoshie, President of TPU, Japan) - Congratulatory Message (Dr. Kazuo Sugiyama, Director of Oriental Consultants, Japan) - Welcome Message (Dr. YongUk Lee, TPU, Japan) Room# 1B01		
11:30~12:10	Keynote Speech 1 (Speaker: Prof. Kwangyun Wohn, KAIST, Korea) Room# 1B01		
12:10~13:10	Lunch Room# Cafeteria(Building 2)		
13:10~13:50	Keynote Speech 2 (Speaker: Prof. Toru Iwatani, TPU, JAPAN) Room# 1B01		
13:50~15:30	Oral Presentation 2 (Session E, F, G, H) Room# 1201~1204	Special Session A: Color Science and Art Research Center of Color Science &Art, Tokyo Polytechnic Univ. Room# 1205	
15:30~16:20	Poster Presentation (Session P1, P2, P3, P4) Room# Cafeteria(Building 2)	Special Session B: Design and Entrepreneurship(16:00~) Prof. TJ Kim, Purdue Univ., USA Mr. Sunghwe Kim, 3D Plus, Korea Prof. Henri Christiaans, UNIST, Korea Prof. WangPo, Western Univ., Vietnam Room# 1205	Special Session C: Future Making (16:00~) Prof. Ted Shin, MSU Denver, USA Mr. Jared Vanscoder, Autodesk, USA Mr. Jeffrey Smith, Autodesk, USA Mr. Thomas Kim, Sindoh Corp., Korea Room# 1206
16:20~18:00	Oral Presentation 3 (Session I, J, K, L) Room# 1201~1204		
18:00~20:00	Banquet - Welcome Message (Vice President Taesoo Yun, IACST) - TPC Chair Message (TPC Chair Dongkyun Kim, KPNU) - Best Paper Awarding (TPC Chair Hisaki Nate, TPU) - Dinner (at Cafeteria)		
<b>December 10(Sunday), Place: Tokyo Polytechnic University (Nakano Campus), Tokyo, Japan</b>			
09:00~10:30	Video Presentation (Session VI)		
10:30~12:00	Evaluation (by Organizing Committee)		

# Program

## December 9, 2017 (Oral Presentation)

### Session A - ICT Trends and Applications I

**09:00~10:40, Room 1201, Session Chair: Donghwa Lee (Daegu University, Korea)**

- 237 "Design of a User-centered Classifier for evaluating Voice Condition based on the S-choker," Seonghee Min and Yoosoo Oh (Daegu University, Korea)
- 396 "Simple Automatic Passenger Counting System(SAPCoS)," Disorn Tantigate and Somchoke Ruengittinun (Kasetsart University, Thailand)
- 239 "Genome Sequencing Report Exchange System," Hwijun Kwon, Shinwoong Lee, Mingyu Kim and Ilkon Kim (Kyungpook National University, Korea)
- 295 "Water Volume Detection System in Galon using Arduino," Agustinus Noertjahyana, Denny Kuriando and Resmana Lim (Petra Christian University, Indonesia)

### Session B - ICT Service Technologies

**09:00~10:40, Room 1202, Session Chair: Prof. Hongsik Park (Dongseo University, Korea)**

- 147 "A Path Recovery Method using Cooperative Service Networks for Underwater Service Oriented Networks," Yonghwan Jeong, Sungwon Lee, Yeongjoon Bae, Eunbae Moon, Dongkyun Kim (Kyungpook National University, Korea)
- 188 "Modern day detection of Mines; Using the Vehicle Based Detection Robot," Hafiz Suliman Munawar, Usama Khalid and Adnan Maqsood (NUST, Pakistan)
- 222 "Autonomous Driving Car Technology Development Trend," Min-Joon Kim and Jong-Wook Jang (Dong-Eui University, Korea)
- 301 "Private Cloud Deployment on Shared Computer Labs," Henry Novianus Palit, Agustinus Noertjahyana, Albert Halim and Christian Adi Widjaja (Petra Christian University, Indonesia)

### Session C - ICT Trends and Applications II

**09:00~10:40, Room 1203, Session Chair: Prof. Rolly Intan (Petra Christian University, Indonesia)**

- 249 "Utilizing Emulab for Machine Learning Resource Pool," Gi-Beom Song and Man-Hee Lee (Hannam University, Korea)
- 187 "Recent Studies of FACTS devices for Power Flow Control," Umair Khalil, Sheeraz Ahmed, M. Danyal, M. Yousaf Ali and Fazal-e-Wahab (Gomal University, Pakistan)
- 388 "Appearance based filtering of matched line segments with topological constraints," Ik Hyun Jo, Jae Seok Jang, and Soon Ki Jung (Kyungpook National University, Korea)
- 346 "Location inference and verification techniques for cultural heritage attraction," Watchira Buranasing, Thepchai Supnithi, Monthika Boriboon and Marut Buranarach (National Electronics and Computer Technology Center, Thailand)

### Session D - Digital Contents I

**09:00~10:40, Room 1204, Session Chair: Prof. Hyeyoung Ko (Seoul Women's University, Korea)**

- 197 "Common Interest between You and Me: Investigating Common Interest among Developers in GitHub Pull Requests," Sunbin Park and Eunjoo Lee (Kyungpook National University, Korea)
- 305 "Emotion Recognition Technology using Face Feature Vectors," Jung-Wun Lee, Kyung-Ae Cha, Jeong-Tak Ryu and Se-Hyun Park (Daegu University, Korea)
- 317 "A Study on Big Data Application in Animated Characters," Young-Suk Lee (Dongguk University, Korea)
- 202 "Weeds classification system for selective herbicides using broad weed estimation," Imran Ahmed, Sheeraz Ahmed, Noor-ul-Amin and Ayub Khan (Gomal University, Pakistan)

### Session E - ICT Trends and Applications III

**13:50~15:30, Room 1201, Session Chair: Prof. Manhee Lee (Hannam University, Korea)**

- 390 "Analysis of Camera Movement Affecting the Visual Cognition of the Audience in Animation," Jing Gu, Hyungjin Jeon and Hongsik Pak (Dongseo University, Korea)
- 403 "Hooking on 64-Bit Windows Using INT 3 Interrupt," Taehyoung Kim and Jong-Wook Jang (Dong-Eui University, Korea)
- 240 "Visual Tracking with Deep Neural Network-based Object Detection and Dynamic Image Masking," Dong-Hyun Lee (Kumoh National Institute of Technology, Korea)
- 275 "An Augmented Reality Application for Studying the Lives of Animals," Yulia, Liliana and Robert Hartono (Petra Christian University, Indonesia)

### **Session F - Digital Contents II**

**13:50~15:30, Room 1202, Session Chair: Prof. Sung Pil Lee (Dongseo University, Korea)**

- 351 "A Design Study through the Self-Report Emotion Measurement of Beach Bench Users," Chao Huang and Jung-Wook Go (Dongseo University, Korea)
- 245 "PGHD generation and sharing service design for visually impaired using speech recognition and FHIR," Woo Jin Kim, Dae-young Kim, and Il Kon Kim (Kyungpook National University, Korea)
- 196 "Who should pick me up? An approach for identifying suitable source files," Geunho Choi and Eunjoo Lee (Kyungpook National University, Korea)
- 203 "IoT for Real Time Data Logger and pH Controller," Leo Willyanto Santoso, Andreas Kwariawan and Resmana Lim (Petra Christian University, Indonesia)

### **Session G - Culture Service I**

**13:50~15:30, Room 1203, Session Chair: Prof. Yooseo Oh (Daegu University, Korea)**

- 324 "Design Development of a Step for Children," Jo HyeonSeong (Dongseo University, Korea)
- 389 "A User-engaging Interactive Digital Media Art System based on Masterpieces in Virtual Reality," In Su Kim, JunHyeok Hwang, Filsang Kim, Sunij Lee, Jaeseok Jang and Soon Ki Jung (Kyungpook National University, Korea)
- 172 "An Analysis of Chinese Traditional Patterns in Mobile Game Interface of Chinese Style -A Case Study of Fantasy Westward Journey-," Rongfang Zhang and Donghyuk Choi (Dongseo University, Korea)
- 399 "Handwritten Balinese Character Recognition using K-Nearest Neighbor," I Wayan Agus Surya Darma and Ni Kadek Ariasih (STMIK STIKOM, Indonesia)

### **Session H - Digital Contents & Culture Service I**

**13:50~15:30, Room 1204, Session Chair: Prof. Intiraporn Mulasastra (Kasetsart University, Thailand)**

- 272 "Quadruped rigging with Quick rig in Maya software," Yangyang He and Chul Young Choi (Dongseo University, Korea)
- 181 "A Study on the Space Form and Sculpt of 3D Animation Background Modeling - Focused on The Gestalt Principle of Organization -," Lingfeng Gu, Hyungjin Jeon and Hongsik Pak (Dongseo University, Korea)
- 384 "Evaluation of connectives between color and typical adjective metaphor in Japanese language," Takashi Yamazoe, Yhuki Gouma and Yoshihiko Azuma (Chiba University, Japan)
- 216 "Use of AMR and CEI for Load Management due to Power Crisis in Pakistan," Sheeraz Ahmed, Gul Nabi Syed, Zahoor Ali Khan, Kashif Ali Awan and Amjad Khattak (Career Dynamics Research Center, Pakistan)

### **Session I - ICT Trends and Applications IV**

**16:20~18:00, Room 1201, Session Chair: Prof. Eun Yi Kim (Konkuk University, Korea)**

- 225 "Creating Cycle Routes on Strava Segments," Wichpong Kao-ian and Intiraporn Mulasastra (Kasetsart University, Thailand)
- 365 "Trend Prediction of Detected Lightning Whistler using DBSCAN," I Putu Agung Bayupati and Ketut Adi Purnawan (Udayana University, Indonesia)
- 250 "Implementation of Indoor Positioning System using ID-Based VLC Beacon," Cheol-Min Kim, Min-Woo Jung and Seok-Joo Koh (Kyungpook National University, Korea)
- 364 "Conversion System of Earthquake Data from Microsoft Excel to Database at Indonesian Agency for Meteorological, Climatological and Geophysics Denpasar," Gusti Made Arya Sasmita and I. Gusti Putu Krisna Pradipta (Udayana University, Indonesia)

### **Session J - Digital Contents III**

**16:20~18:00, Room 1202, Session Chair: Prof. Chul-Young Choi, Dongseo University, Korea**

- 173 "An Association Study on the Aesthetic Characteristics of Digital Lighting and Impressionist Painting -- Taking "Zootopia" as an example," Guochao Sha and Donghyuk Choi (Dongseo University, Korea)
- 385 "VR Entertainment System "Ideal Vacation": A Game Designing Focused on the Sense of Presence," Yusuke Numazaki, See-Sheng Toh and Masanobu Endoh (Tokyo Polytechnic University, Japan)
- 323 "Aesthetic Implication and Thought Significance of Film Semiotics -- Focusing on Chinese Documentary," Xi Fang and Won-ho Choi (Dongseo University, Korea)
- 191 "Curse of Drug Addiction among Youth in Pakistan," Farhat Shabbir (University of the Punjab, Pakistan)

### **Session K - Digital Contents & Culture Service II**

**16:20~18:00, Room 1203, Session Chair: Prof. I PUTU AGUGANG BAYUPATI (Udayana University, Indonesia)**

- 342 "The comparative study of the animated movie industries of China, America, and Japan," Yan Jihui, Liu Jing and Chul Young Choi (Dongseo University, Korea)
- 325 "A Study on the Women-friendly Urban Regeneration Design of Overpass Sub-space," ShunPing He and KwanSeon Hong (Dongseo University, Korea)
- 192 "Conducive Environment Provided to Married Working Women by their Families and Society in Pakistan," Farhat Shabbir (University of the Punjab, Pakistan)

- 398 "Preprocessing system to Improve image quality of Ancient Balinese Manuscript," Ni Putu Sutramiani and I. Nyoman Piarsa (Udayana University, Indonesia)

### Session L - Culture Service II

16:20~18:00, Room 1204, Session Chair: Prof. Yun Seon Do (Kyungpook National University, Korea)

- 401 "e-Culture Platform for Cultural Heritage Services," Watchira Buranasing (National Electronics and Computer Technology Center, Thailand)
- 345 "Multimodal Discourse Analysis of Chinese Traditional Cultural in the Mobile Game <King of Glory>," Ding Zhi Bo and Seung-keun Song (Dongseo University, Korea)
- 221 "Linked Open Data Development for Sharing the 3D Cultural Artifacts," Weeraphan Chanhom and Pongpon Nilaphruek (Chiang Mai University, Thailand)
- 204 "Fire detection through Image Processing; A brief overview," Hafiz Suliman Munawar, Usama Khalid and Adnan Maqsood (NUST, Pakistan)

### Special Session - Color Science and Art

13:50~15:30, Room 1205, Session Chair: Prof. Yonguk Lee (Tokyo Polytechnic University, Japan)

- 158 "Color-Tunable Single Pixels Using Stacked Transparent Organic Light Emitting Diodes and Color-Tunable Lighting Domes," Takayuki Uchida, Takumi Takeuchi, Shuhei Ueda and Satoshi Kawamura (Tokyo Polytechnic University, Japan)
- 145 "Interactive Art Generating Innovative Color Expression Using Deep Learning Neural Networks," Yasuo Kuhara (Tokyo Polytechnic University, Japan)
- 163 "Virtual Environment for Visualizing Vocal Features and Its Application to Voice Training," Yoya Nakashima and Tsuyoshi Moriyama (Tokyo Polytechnic University, Japan)
- 318 "The Philosophy of the International Color Science and Art Center as the Brand Strategy of University," Yasushi Noguchi and Ryuichiro Yoshie (Tokyo Polytechnic University, Japan)

## December 9, 2017 (Poster Presentation)

### Session P1

16:20~18:00, Room#: Cafeteria (Building 2), Session Chair: Prof. Yoosoo Oh (Daegu University, Korea)

- 381 "VR Animation Production Based on Game Engine," Lin Qu, Taesoo Yun and Chul Young Choi (Dongseo University, Korea)
- 195 "Light Therapy System: Combining Real-time Emotion Recognition and Learning-based Color Recommendation," Yaohui Yu, Eunjeong Ko, Jinxi Li and Eun Yi Kim (Konkuk University, Korea)
- 227 "Controller's Behaviors Logging System of Therapeutic Contents for Collecting User Actions," Sunghee Lee (Kyungpook National University, Korea)
- 201 "Content-Based Image Selection for Automatic Report Generation," Jeongwook Choi, Jeongin Seo and Hyeyoung Park (Kyungpook National University, Korea)
- 215 "Wireless Sensor Networks Security," Eun-Ji Cheon, Seung-Ju Cha and Eun-Jung Choi (Seoul Women's University, Korea)
- 207 "Possibility of Using Virtual Reality, Augmented Reality and Mixed Reality for Educational Contents of STEAM," Jeongwon Na and Hyeyoung Ko (Seoul Women's University, Korea)
- 393 "Topic-based News Categories Classification using Latent Dirichlet Allocation and Convolutional Neural Networks," Taekeun Hong, Eunji Lee, Pankoo Kim and Jiman Hong (Soongsil University, Korea)
- 184 "Leap Motion Interface for Multi-modal UI/UX Engine of Car Control System," YoungJick Jang and Tae-Soo Yun (Dongseo University, Korea)
- 164 "Characteristics of Gaze Information according to Player's Experience under Searching Spaces of FPS Games," GyuHyeok Choi and Mijin Kim (Dongseo University, Korea)
- 167 "The Comparative Studies on the Cyber Punk Style in Animation and Film by Focusing on <Ghost in the Shell>," XuePing Gu, MinSik Hwang and HyunSeok Lee (Dongseo University, Korea)
- 369 "Media Characteristics for Effective Transmission Media," Yong yeongji and Donghyuk Choi (Dongseo University, Korea)

### Session P2

16:20~18:00, Room#: Cafeteria (Building 2), Session Chair: Jiman Hong (Soongsil University, Korea)

- 210 "Development of Interactive Virtual Reality Educational Contents for Middle School Students to Experience Earth Science Education," Minha Park, Jeongwon Na, Hyundam Yoon and Hyeyoung Ko (Seoul Woman's University, Korea)
- 211 "IoT Device Security Guide Trend and Analysis Research," Seul-Ki Han, Ye-na Lee and Myuhng-Joo Kim (Seoul Women's University, Korea)
- 219 "MRF model based Real-time Traffic Flow Prediction with Support Vector Regression," Eun Yi Kim and Eunjeong Ko (Konkuk University, Korea)

- 220 "Vision-based Wheelchair Navigation using Geometric AdaBoost Learning," Eun Yi Kim (Konkuk University, Korea)
- 254 "A study on the Improvement of Corporate Image Through Convergence Design Management -Focusing on the CBI and CCSR -," Hoe Jeong Gon (Seoul National University of Science and Technology, Korea)
- 236 "Deep Learning-Based Face Detection on Embedded Systems," Donghwa Lee (Daegu University, Korea)
- 238 "A Prototype Implementation of Light-Weight Graphics System with Direct Rendering Manager Support," Nakhoon Baek (Kyungpook National University, Korea)
- 260 "Risk Information Communication in Science and Technology between Science Museum and Users in the EPL Mode," Daegil Hong (Seoul National University of Science and Technology, Korea)
- 311 "Evaluating Usability of Intelligence Assistant Applications," Chae Won Park, Jae Hyung Park, Issac Han and Hohyun Lee (Paul Math School, Korea)
- 176 "Analysis on Persuasive Function and TV Public Service Advertising," Ke-Jing Wen and Won-ho Choi (Dongseo University, Korea)
- 174 "Implementation of Infantry Squad Organization for Realistic Squad Battle Game," Nak Hyeon Goo, Dong Hoon Lee and Mi Jin Kim (Dongseo University, Korea)
- 218 "Color Therapy: Estimating Hidden Relationship between Colors and Human Emotions," Yaohui Yu, Eunjeong Ko and Eun Yi Kim (Konkuk University, Korea)

### Session P3

16:20~18:00, Room#: Cafeteria (Building 2), Session Chair: Donghwa Lee (Daegu University, Korea)

- 165 "A Method for Procedural Building Destruction from Houdini to UE4," JiaNi Zhou and Tae Soo Yun (Dongseo University, Korea)
- 392 "Research for Sign System Design of Public Parking Lot," Zhang Feng, Wangyang and Lee Sung Pil (Dongseo University, Korea)
- 375 "Societal Implications of Crowdfunding Success for Korean and Chinese films on Sexual Slavery - through in Korea and <22> in China," Jiang Danwei and Chang Eun jin (Dongseo University, Korea)
- 335 "Research on Elderly TV Programs Based on the Characteristics of the Times and the Demands of the Elderly," DanYa Liu and DongHun Lee (Dongseo University, Korea)
- 333 "A Study on the Traditional Color Metaphorical Function of 'Chinese School 'Animation,'" Hao Shen and DongHun Lee (Dongseo University, Korea)
- 321 "A Study on Kinetic Art as Synesthesia Visualization by Music Waveform," WonUng Jeong and SeHwa Kim (Dongseo University, Korea)
- 171 "Ethnocultural Characteristics in the Animation of Chinese School," Ting-Wu and Mijin Kim (Dongseo University, Korea)
- 253 "Plasmonic color structures embedded on imaging devices for augmented reality," Yun Seon Do (Kyungpook National University, Korea)
- 255 "A study on Qualitative Evaluation Model for Specialized Trade Exhibition," Young Soo Kim (Seoul National University of Science and Technology, Korea)
- 368 "Workflow of the Digital Actor Hologram Performance based on Digital Synthesis," Fu Linwei, Jiang Haitao, Ji Yun, Young Jick Jang and Tae Soo Yun (Dongseo University, Korea)
- 402 "File carving analysis in the Pagefile.sys," SeungJu Cha and EunJung Choi (Seoul Women's University, Korea)
- 178 "Proposal of Spatial Structure Image Elements Appliance to Enhance Immersion in Virtual Reality Space," Hyungjin Jeon, Eeljin Chae, Hongsik Pak and Taesoo Yun (Dongseo University, Korea)
- 182 "The Analysis of the Continuity of the Scenes and screen Transformation in 3D Animation," Qiwen Song, Hyungjin Jeon and Hongsik Pak (Dongseo University, Korea)
- 367 "A Study on Ink Painting Blurring Effect for Making CG Ink Painting Animation," Dong JiaJia, Hou ZhengDong, YoungJick Jang and ChulYoung Choi (Dongseo University, Korea)

### Session P4

16:20~18:00, Room#: Cafeteria (Building 2), Session Chair: Hyeyoung Ko (Seoul Women's University, Korea)

- 256 "A study on Evaluation System Construction Method for Convergence Design Education Program based on Design and Engineering," Yi Yeon Kim (Seoul National University of Science and Technology, Korea)
- 257 "A study on Establishing EVE (Exhibit Value Engineering) System for Improving the QUALITY of Exhibits in Science Center," Yoon Ho Uh (Seoul National University of Science and Technology, Korea)
- 258 "A study on the Design Convergence Attitude of Nano Technology and Art," Gyu Woon Oh (Seoul National University of Science and Technology, Korea)
- 259 "The Influences that Virtual Reality Exercises on Educational Effectiveness and Return Visitors in Experiential Safety Hall Activities - Focus on Elementary School Students -," Hee Hyoung Chung (Seoul National University of Science and Technology, Korea)
- 261 A study on Composition of Evaluation Model and Setting Up Weighted Value for Coffee Remote Education," Sung Kwon Hong (Seoul National University of Science and Technology, Korea)
- 329 "Research on the Regeneration of Chinese Ancient Towns Based on Theory of the Production of Space," WenLi Chen and Kwan-Seon Hong (Dongseo University, Korea)

- 
- 336 "Analysis of Wharf Park Project based on placeness," Ma DongQing and Yoon JiYoung (Dongseo University, Korea)
- 205 "A Heuristic Checklist for the usability Evaluation of English Learning Mobile Application," Hyebin Jeon and Hyeyoung Ko (Seoul Women's University, Korea)
- 397 "A Railway Accident Prevention System Using MobileNets," Ziyu Fang and Pyeoungkee Kim (Silla University, Korea)
- 344 "A Resear on the Potential of Limited Animation Techniques Function in Computer," Gu Jie and Chul-Young Choi (Dongseo University, Korea)
- 166 "Representing the Aesthetic Characteristic of <the Great Wave off Kanagawa> in Animation <Kubo and the Two Strings> and <Miss Hokusai>," Han Zhe, MinSik Hwang and HyunSeok Lee (Dongseo University, Korea)
- 391 "A Comparative Study on the Value of Design Concept between Service Provider and Service Receiver," Lee Sangki, Chung Joo Young and Lee Sung Pil (Dongseo University, Korea)
- 352 "Research on the Application of Real-Time Motion Capture Technology in VR," Lin-Chao Gao, Lin Qu, Tae-Soo Yun and Chul-Young Choi (Dongseo University, Korea)

# Guide Line for Authors/Chairs

---

## Guideline for Authors

### Oral Sessions

#### 1. Duration of the Presentation

The allotted time for each speaker is 15 minutes to present and 5 minutes for Q&A.

#### 2. Equipment in Presentation Room

Each presentation room will have a projector, a screen and a laptop computer running PowerPoint under MS Windows, equipped with USB port.

#### 3. Preparation for Your Presentation Session

Bring a USB memory with your PowerPoint presentation and make sure that your file is copied on the laptop computer before your session starts. Please show up 15 minutes before the actual session starts and introduce yourself to the session chair. Be prepared to give some bibliographic details about yourself to the chairperson so that he/she can introduce you before your presentation.

### Poster Sessions

#### 1. Duration of the Presentation

The poster session has 60 minutes, requiring all presenters to be available at their posters during the session.

#### 2. Poster Specification

Posters must be designed to fit a 841mm wide x 1189mm tall board. Posters may be prepared as a single poster or as several smaller sections mounted together. The heading of the poster should list the paper title, author(s) name(s), and affiliation(s).

#### 3. Poster Set-Up

Posters may be attached to the boards by push pins or tapes, which will be provided. Posters must be set up by presenters 10 minutes before the session starts. Posters must be removed by presenters right after the session is over. Posters not removed by 10 minutes after the session will be removed by volunteers (session organizers not responsible for posters left after this deadline).

## Guideline for Chairs

### Before Your Session

#### 1. Check the Program

Prior to departure for the meeting, check the program on our website (<http://icct.iaacst.org>) to find the time slot for the session that you are chairing.

#### 2. Pick Up the Materials for Session Chair from Registration Desk

Please arrive at the registration desk about 20 minutes prior to the start of the session and pick up the material prepared for a session chair.

#### 3. Check the Meeting Room

Please arrive at the session room about 10 minutes prior to the start of the session and familiarize yourself with the controls for lights, microphones, a pointer, and a projector. If you encounter problems, immediately alert the session staff who is serving your session in the session room. Meanwhile, you have to check the presence of individual speaker in your session.

## **During Your Session**

### **1. Introduction**

At the start of the session, briefly introduce yourself and explain the timing system to the audience, and as often during the session as you think necessary.

### **2. Time Allotment**

The allotted time for each speaker is 15 minutes to present and 5 minutes for Q&A. If possible, you may give a brief introduction of the speaker to the audience, including his or her affiliation and position, at the beginning of each presentation.

### **3. Absent Speakers**

Should a speaker fail to appear, you may recess the session until it is time for the next scheduled abstract. If you are notified of the absence of any speaker before the session starts, please announce it to the audience. You have to report the absence of any speaker to the secretariat for conference administration at the registration desk.



# Oral Presentation (Session A, B, C, D)

December 9, 2017

## Session A : ICT Trends and Applications I

09:00~10:40, Room 1201

Session Chair : Donghwa Lee (Daegu University, Korea)

- |     |  |    |
|-----|--|----|
| 237 | "Design of a User-centered Classifier for evaluating Voice Condition based on the S-choker,"   | 3  |
|     | Seonghee Min and Yoosoo Oh (Daegu University, Korea)   |    |
| 396 | "Simple Automatic Passenger Counting System (SAPCoS),"   | 5  |
|     | Disorn Tantigate and Somchoke Ruengittinun (Kasetsart University, Thailand)                    |    |
| 239 | "Genome Sequencing Report Exchange System,"  | 9  |
|     | Hwijun Kwon, Shinwoong Lee, Mingyu Kim and Ilkon Kim (Kyungpook National University, Korea)    |    |
| 295 | "Water Volume Detection System in Galon using Arduino,"  | 14 |
|     | Agustinus Noertjahyana, Denny Kuriando and Resmana Lim (Petra Christian University, Indonesia) |    |

## Session B : ICT Service Technologies

09:00~10:40, Room 1202

Session Chair : Prof. Hongsik Park (Dongseo University, Korea)

- |     |  |    |
|-----|--|----|
| 147 | "A Path Recovery Method using Cooperative Service Networks for Underwater Service Oriented Networks,"                        | 19 |
|     | Yonghwan Jeong, Sungwon Lee, Yeongjoon Bae, Eunbae Moon, Dongkyun Kim (Kyungpook National University, Korea)                 |    |
| 188 | "Modern day detection of Mines; Using the Vehicle Based Detection Robot,"  | 22 |
|     | Hafiz Suliman Munawar, Usama Khalid and Adnan Maqsood (NUST, Pakistan)   |    |
| 222 | "Autonomous Driving Car Technology Development Trend,"   | 27 |
|     | Min-Joon Kim and Jong-Wook Jang (Dong-Eui University, Korea)   |    |
| 301 | "Private Cloud Deployment on Shared Computer Labs,"  | 31 |
|     | Henry Novianus Palit, Agustinus Noertjahyana, Albert Halim and Christian Adi Widjaja (Petra Christian University, Indonesia) |    |

## Session C : ICT Trends and Applications II

09:00~10:40, Room 1203

Session Chair : Prof. Rolly Intan (Petra Christian University, Indonesia)

- |     |  |    |
|-----|--|----|
| 249 | "Utilizing Emulab for Machine Learning Resource Pool,"   | 36 |
|     | Gi-Beom Song and Man-Hee Lee (Hannam University, Korea)  |    |
| 187 | "Recent Studies of FACTS devices for Power Flow Control,"  | 40 |
|     | Umair Khalil, Sheeraz Ahmed, M. Danyal, M. Yousaf Ali and Fazal-e-Wahab (Gomal University, Pakistan)   |    |
| 388 | "Appearance based filtering of matched line segments with topological constraints,"  | 46 |
|     | Ik Hyun Jo, Jae Seok Jang and Soon Ki Jung (Kyungpook National University, Korea)  |    |
| 346 | "Location inference and verification techniques for cultural heritage attraction,"   | 49 |
|     | Watchira Buranasing, Thepchai Supnithi, Monthika Boriboon and Marut Buranarach (National Electronics and Computer Technology Center, Thailand) |    |

**Session D : Digital Contents I**

**09:00~10:40, Room 1204**

**Session Chair : Prof. Hyeyoung Ko (Seoul Women's University, Korea)**

- |  |           |
|--|-----------|
| <b>197 "Common Interest between You and Me: Investigating Common Interest among Developers in GitHub Pull Requests,"</b> | <b>53</b> |
| Sunbin Park and Eunjoo Lee (Kyungpook National University, Korea)  |           |
| <b>305 "Emotion Recognition Technology using Face Feature Vectors,"</b>  | <b>57</b> |
| Jung-Wun Lee, Kyung-Ae Cha, Jeong-Tak Ryu and Se-Hyun Park (Daegu University, Korea)                                     |           |
| <b>317 "A Study on Big Data Application in Animated Characters,"</b>   | <b>60</b> |
| Young-Suk Lee (Dongguk University, Korea)  |           |
| <b>202 "Weeds classification system for selective herbicides using broad weed estimation,"</b>                           | <b>62</b> |
| Imran Ahmed, Sheeraz Ahmed, Noor-ul-Amin and Ayub Khan (Gomal University, Pakistan)                                      |           |

# An Augmented Reality Application for Studying the Lives of Animals

Yulia, Liliana, Robert Hartono

Petra Christian University  
Siwalankerto 121-131  
Surabaya, East Java, Indonesia  
yulia@petra.ac.id

## Abstract

**Augmented reality is an interaction tool for human and machine that integrates the digital information with the user's environment in real time, uses the existing environment and overlays new information on top of it. This paper discusses the development process of an interactive augmented reality for children in learning about the lives of animals. Children can see the lives of animals in real three-dimensional form. The main objective of this study is to aid students and it could potentially enhance their learning process about the lives of animals. The study found that children's perception of the use of augmented reality is positive based on the average score was quite good.**

*Keywords-augmented reality, the lives of animals, learning process*

## I. Introduction

Nowadays, the way of learning is changing, technologies give the opportunity for children to communicate and interact with multimedia learning resources and artificial simulated environments. Adding the technology can help children to acquire information whenever they need it. With advances in technology, it can stimulate the learning environment and encourage children motivation. These are important factors in a learning process [1].

This research uses a technology called Augmented Reality (AR). Unlike Virtual Reality (VR) that works by disconnecting real-world contacts and creating a new world virtually, AR actually enriches the real world with virtual or imaginary content. In general, AR is the process of adding virtual content to the real world, so users can interact with virtual content directly in the real world. It can be viewed using some devices like computer or mobile device equipped with at least one back camera and a see-through Head Mounted Display (HMD).

In this research, AR technology is presented using a mobile device as an assistive learning tool to provide flexibility for children to learn without being limited by time and place. Children will learn about the lives and behaviors of animals.

There are two conditions associated with learning: location and time [1]. Based on these, there are some problems in learning. Currently, parents do not have enough time to take

their children to the zoo to learn about the lives of animals. Whereas children will be easier to understand by seeing directly. However, these problems could be solved by introducing alternative learning resources such as mobile learning tools. Children can learn about the lives of animals by seeing directly anytime and anywhere.

The proposed approach is designed for children to gain their knowledge about the lives of animals. It offers the possibility to interact in a more active and attractive way with the technology and the contents to be learned, by changing their perception of the real environment.

## II. Concept

AR covers a variety of areas which it can be used to provide innovative solutions or approaches to real-world problems. In the related literature, it has been shown that AR can be applied to different tasks – problems in the modern life [2–6]. AR refers to a broad spectrum of technologies that project computer-generated materials, such as text, images, and video, to the user's perception of the real world [7]. Ludwig and Reimann (2005) define AR as “human-computer-interaction, which adds virtual objects to real senses that are provided by a video camera in real time” [8].

AR can provide a variety of important information and users can use all of their senses in using AR, so that users can more easily in learning and training [9-11]. AR itself includes the level of semi-immersive/mixed reality [12] (Fig. 1).

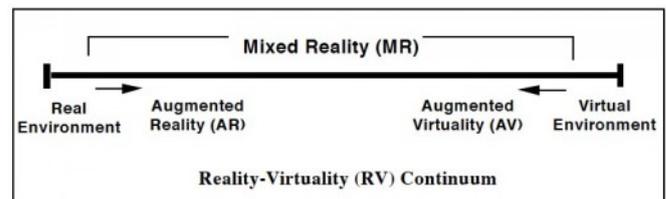


Fig. 1 Mixed reality [13]

The purpose of AR is to enable users to interact with virtual and real environment in real time. The user will really feel the virtual world in real terms. AR has three important aspects: first, AR is not limited to particular display technologies such as HMD. Second, AR is not only through sight but it can be through hearing, touch, even smell. Third, AR eliminates real objects with virtual objects [4].

There are two tracking device ability: marker tracking and



B. Design of “Attack and Chase Enemy” Flowchart

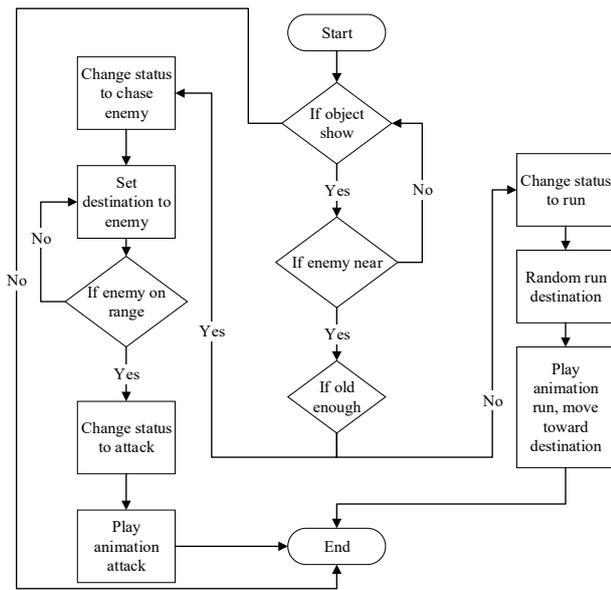


Fig. 5 “Attack & Chase Enemy” Flowchart

Attack or run animation begins by checking whether the animal object has been displayed. If the animal object has been displayed, the application will check on other objects that are around this animal object. If any other animal object is near and it is an enemy of the animal object then it will check the age or size of the animal object. If the object of this animal has an age that is mature enough, then the object of this animal will enter into the “chase enemy” state and do the animation chase. Animal object will run up to other animal objects and will do “attack” state and do the attack animation. If the animal object is not mature enough, then the animal object will enter the “run” state. To determine the destination point of the animal, it is done by comparing the distance between the point that has been determined at the beginning with the position of the enemy animal object, and taken the most distant point of the enemy animal object. Once the destination point has been determined the animal object will do the run animation and the animal object will run to a predetermined destination point. Fig. 5 is a flowchart attack enemy and chase enemy or run.



Fig. 6 Marker and lion

IV. Testing and Evaluation

A. Finite State Machine Testing

This study used Visual Studio C#, Unity, and Adobe Illustrator to develop the learning system and content. The interface of the learning system was presented as a book containing some animal picture. The marker and the object are displayed in Fig. 6.



Fig. 7 Lion on “walk” state

In Fig. 7, the lion performs a “walk” state and will alternate with the “roar” state if there is no interaction between the other animals.



Fig. 8 Lion on “roar” state

In Fig. 8 the lion performs a “roar” state at the time the marker is detected and in every 15 seconds, the male lion will perform a “roar” state for a few seconds.



Fig 9 Lion on “chase food” state

In Fig. 9 lion enters into “chase food” state when zebra is in the savanna.



Fig. 10 Lion on “eat” state

In Fig. 10 the lion goes into “eat” state when zebra is dead or zebra hit point is less or equal to zero



Fig. 11 Lion on “run” state

In Fig. 11 lions enter the “run” state when there is a bear in the savanna and the lion is still not in the adult stage. The lion enter the adult stage at the age of 4 years. When the lion is caught or a bear has been very close to the lion, the bear will attack the lion.



Fig. 12 Lion on “gethit” state

In Fig. 12 the lion enters into the “gethit” state when caught by a bear, and the lion still has not entered the adult stage.



Fig. 13 Lion on “chase enemy” state

In Fig. 13 the lion goes into the “chase enemy” state when in

the savanna there is bear and the lion is in the adult stage.



Fig. 14 Lion “attack enemy” state

In Fig. 14 the lion performs “attack enemy” state when the lion is in the adult stage and when the bear and the lion are close together. Lions and bears will attack each other.



Fig. 15 Lion on “dead” state

In Fig. 15 lion enter into the “dead” state when the lion has a Hit Point that is less or equal to zero and when the lion has appeared in the application for 3 minutes.

### B. Evaluation of Interface, Ease of Use and Usability

About twenty children participated in the pilot tests to evaluate the interface and functions of the application. For each pilot test, the researcher asked children to fill out a questionnaire and discussed with them regarding their responses. The children gave positive feedback about the application. 80% said that the application is good. 70% said that the application is easy to use. 80% said that they are happy to use this application.

## V. Conclusion

This paper presented the development of a mobile AR for children in learning the lives of animals. Importance of the study is associated with research efforts performed to evaluate the effectiveness of AR on improving children learning experiences. Based on observational study, the children are

considerably interested in the application. Regarding the future work, it has been planned to improve the application by adding new states and functions.

### References

- [1] A. Holzinger, A. Nischelwitzer, and M. Meisenberger, "Lifelong-learning support by m-learning: example scenarios. eLearn," *eLearn Magazine*, 2005(11), pp. 2, doi: 10.1145/1125280.1125284
- [2] R. Azuma, Y. Baillot, R. Behringer, S. Feiner, S. Julier, and B. MacIntyre, "Recent advances in augmented reality," *IEEE Computer Graphics and Applications*, vol. 21(6), pp. 34-47, Nov/Dec 200, doi: 10.1109/38.963459
- [3] SC-Y. Yuen, G. Yaoyuneyong, and E. Johnson, "Augmented reality: an overview and five directions for AR in education," *Journal of Educational Technology Development and Exchange*, vol. 4(1), pp. 119–140, Oct 2011
- [4] DWF, Krevelen and R. Poelman, "A survey of augmented reality technologies, applications and limitations," *The International Journal of Virtual Reality* 2010, vol. 9(2), pp 1–20, 2010
- [5] M.M. Zarzuela, F.J.D. Pernas, L.B. Martínez, D.G. Ortega, and M.A. Rodríguez, "Mobile serious game using augmented reality for supporting children's learning about animals," 2013 International Conference on Virtual and Augmented Reality in Education, *Procedia Computer Science*, 2013, pp. 375 – 381, doi: 10.1016/j.procs.2013.11.046
- [6] A.B. Tomia and D.R.A. Ramblib, "An interactive mobile augmented reality magical playbook: learning number with the thirsty crow", 2013 International Conference on Virtual and Augmented Reality in Education, *Procedia Computer Science*, vol. 25, pp. 123 – 130, 2013, doi: 10.1016/j.procs.2013.11.015
- [7] S.C.Y. Yuen, Y. Gallayanee and E. Johnson, "Augmented reality: an overview and five directions for ar in education," *Journal of Educational Technology Development and Exchange (JETDE)*, vol. 4(1), Article 11, 2011, doi: 10.18785/jetde.0401.10. [online] Available: <http://aquila.usm.edu/jetde/vol4/iss1/11>
- [8] C. Ludwig and C. Reimann, "Augmented reality: information at focus," *Cooperative Computing & Communication Laboratory*, vol 4(1), 2005, Universität Paderborn. [Online] Available: [http://s3.amazonaws.com/zanran\\_storage/www.c-lab.de/ContentPages/885600851.pdf](http://s3.amazonaws.com/zanran_storage/www.c-lab.de/ContentPages/885600851.pdf)
- [9] S.S. Jamali, et al., "Utilising mobile augmented reality for learning human anatomy," *Social and Behavioral Sciences*, Elsevier Ltd. Selection, Vol. 197, pp. 659-668, July 2015, doi: /10.1016/j.sbspro.2015.07.054
- [10] U. Kose, et al., "An augmented reality based mobile software to support learning experiences in computer science courses," *Computer Science. Elsevier Ltd. Selection*, vol. 25, pp. 370-374, 2013, doi: 10.1016/j.procs.2013.11.045
- [11] J. Kysela and J. Storkova , "Using augmented reality as a medium for teaching history and tourism," *Social and Behavioral Sciences*, Elsevier Ltd. Selection, Vol. 174, pp. 926-93, 2014
- [12] R.S. Patkar, S.P. Singh, S.V. Birje, "Marker based augmented reality using android os," *International Journal of Advanced Research in Computer Science and Software Engineering*, vol. 3(5). pp. 64-69, 2013
- [13] P. Milgram and F. Kishino, F, "A taxonomy of mixed reality visual displays," *IEICE Transactions on Information and Systems*, vol. 77(12), pp.1321–1329, 1994
- [14] D. Cushnan and H.E. Habbak, *Developing ar games for ios and android*, 10<sup>th</sup> ed., Birmingham, UK: Packt Publishing Ltd.Halliday,
- [15] Realglitch.com, <http://www.realglitch.com/2013/04/augmented-reality-with-edrawing-on-ipad/>
- [16] (<http://gamedev.stackexchange.com/questions/116522/object-not-augmenting-on-small-marker>)
- [17] F. Wagner et al, "Modeling software with finite state machines," Florida, US: Auerbach Publications, 2006, ISBN:0849380863