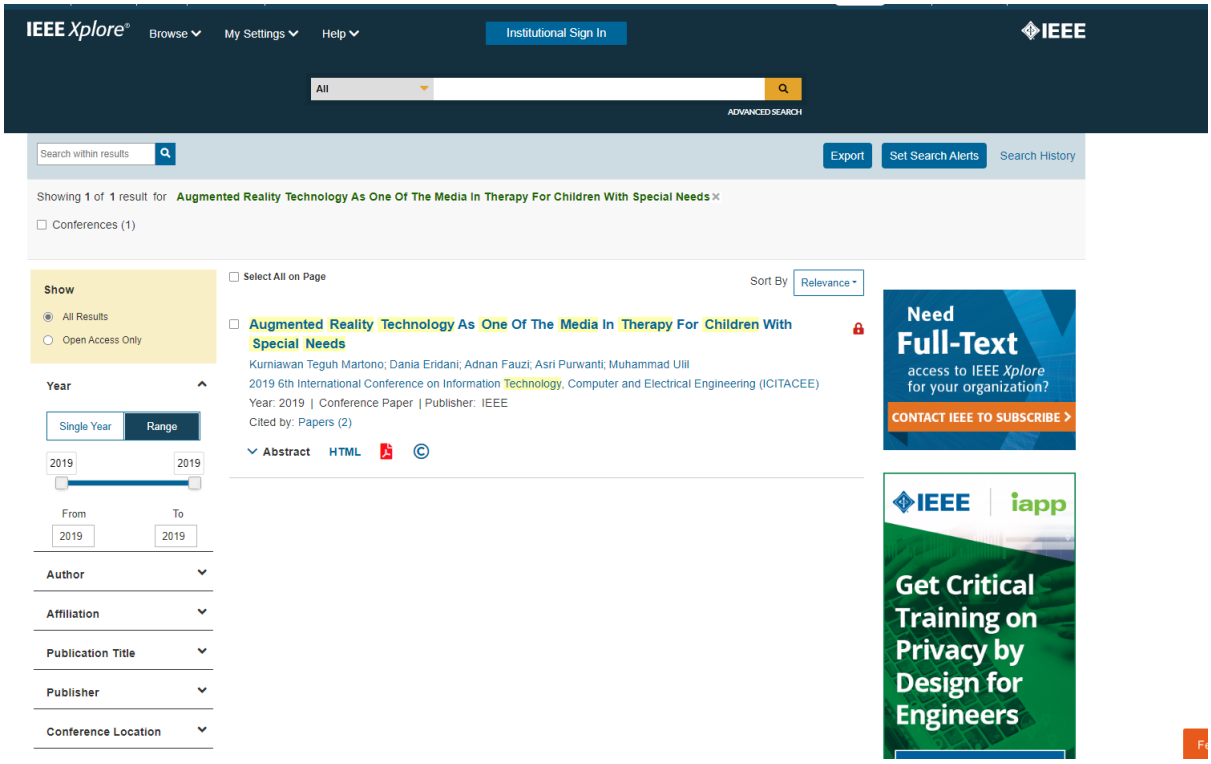
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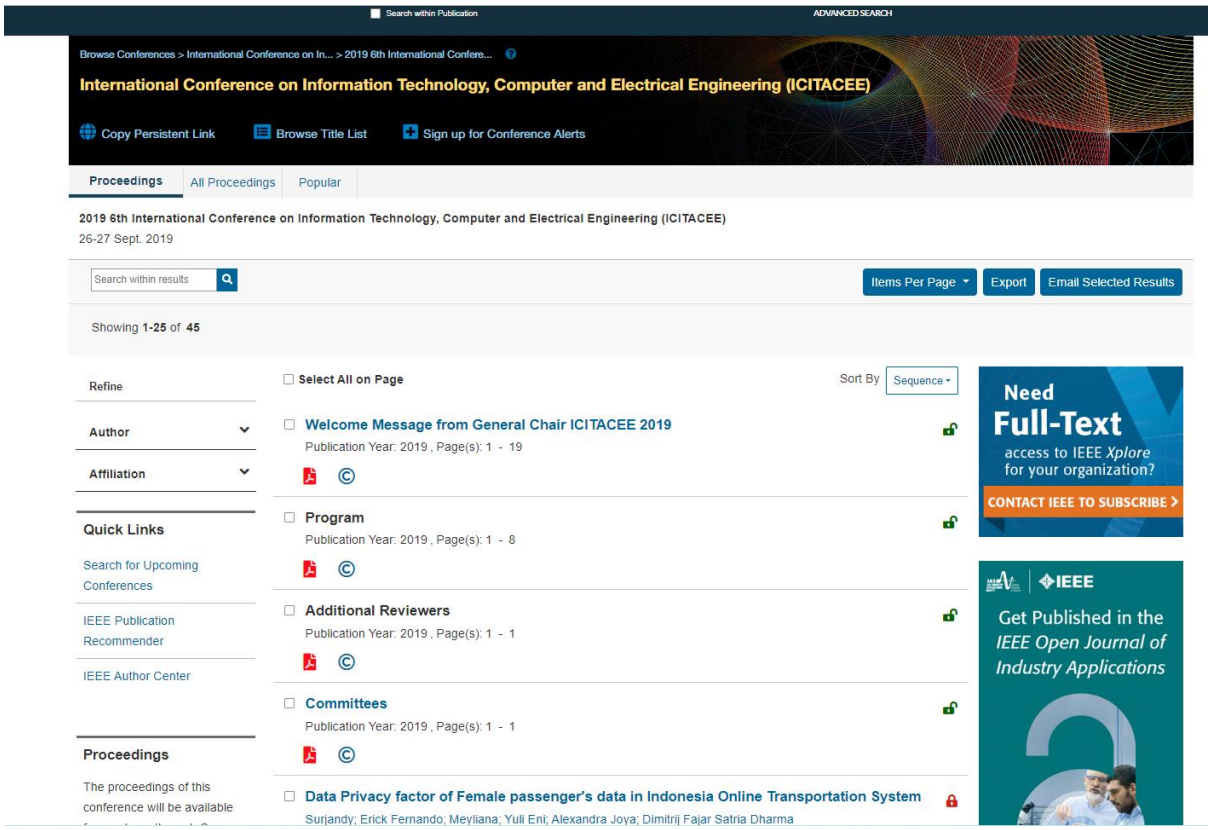
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	Thursday, September 26		Friday, September 27
7:30 - 8:00	*Registration*		
8:00 - 8:10	*Welcoming Speech by General Chair of ICITACEE 2019*		
8:10 - 8:20	*Welcoming Speech by IEEE Indonesia Section*		
8:20 - 8:40	*Welcoming Speech and Opening by Dean of Engineering Faculty, Diponegoro University*		
8:40 - 8:50	*Photo Session*		
8:50 - 9:00	*IEEE at glance by Representative of IEEE Indonesia Section*		
9:00 - 9:15			*City Tour*
9:15 - 9:30	*Coffee Break*		
9:30 - 10:00	*Invited Speaker Session 1*		
10:00 - 10:30	*Invited Speaker Session 2*		
10:30 - 11:00	*Invited Speaker Session 3*		
11:00 - 11:30	*Parallel Session 1 (Telecommunication and Vehicular Technology and Green Applications and Interdisciplinary Topic)*	*Parallel Session 1 (Power Systems)*	
11:30 - 11:40			
11:40 - 11:50			
11:50 - 12:00	*Lunch Break*		
12:00 - 13:00			
13:00 - 14:10	*Parallel Session 2 (Information and Computer Technologies 1)* *Parallel Session 2 (Telecommunications and Vehicular Technologies)*		
14:10 - 14:20			
14:20 - 14:30	*Coffee Break*		
14:30 - 15:40	*Parallel Session 3 (Information and Computer Technologies 2)*	*Parallel Session 3 (Control and Circuits)*	
15:40 - 16:00			
16:00 - 18:30	*Break*		
18:30 - 20:00	*Gala Dinner*		

Thursday, September 26

Invited Speaker Session 3

Room: Amarta 2 and Amarta 3

IS3.1 ***Backward Compatible Low PAPR Preamble for Very High Throughput WLAN IEEE802.11ac***

Wahyul Amien Syafei, Achmad Hidayatno and Ajub Ajulian Zahra

Presenter bio: B.Eng 95 Electrical Engineering Faculty of Engineering Diponegoro University, Indonesia. M.Eng 02 Multimedia Telecommunication Faculty of Engineering Sepuluh Nopember Institute of Technology, Indonesia. Ph.D 09 Department of Electronics and System Engineering Computer Science and Electronics Kyushu Institute of Technology, Japan. Field: Wireless Telecommunication and Mutimedia, MIMO, OFDM, Familiar with IEEE 802.11a/b/g/n/ ac, 3rd-Dan in Karate, 3rd-Dan in Kobudo, Instructor of Okinawan Kobudo, Gold Medal Shorinji Kempo. Speaking: Bahasa Indonesia, Java, Sunda, English, Japanese, Arabic

pp. 1-6

Parallel Session 1 (Power Systems)

Room: Amarta 2

PS1-PS.1 ***Performance Improvement of Scalar Feedback Control for Induction Motors by Using Third Harmony Injection SPWM***

Alif Nabiel Luqman, MIftah Adiguna, Abdul Fandi, Mochammad Facta, Trias Andromeda, Hermawan Hermawan and Iwan Setiawan

pp. 7-12

PS1-PS.2 ***Dynamic Power Injection for Solar PV Constant Power Generation***

Muhammad Kuncoro, Rudi Darussalam, Chandra Budi Sukmono and Iwa Garniwa

pp. 13-17

PS1-PS.3 ***Fast-Charging LTO 18650 Batteries Using a DC PS-3005D Power Supply***

Anggakara Syahbi Syagata, Angga, Trias Andromeda, Iwan Setiawan, Hermawan Hermawan, Abd. Rahim Mat Sidek and Imam Sumpono

pp. 18-22

PS1-PS.4 ***Power Consumption Analysis in Resonant Converter***

Mochammad Facta, Hermawan Hermawan and Muhammad Amjad

pp. 23-26

PS1-PS.5 ***Design of Temperature and Humidity Control Devices in the Leakage Current Test Chamber of 20kV Insulator***

Lastoni Wibowo, Abdul Syakur and Trias Andromeda

pp. 27-32

PS1-PS.6 ***Design of Monitoring Remote Terminal Unit(RTU) Panel Supply Based on IOT Case Study at PLN***

Fikri Shalahudin and Budi Setiyono

Presenter bio: Born in Tegal, 24 June 1995, now become student at Electrical Engineering Diponegoro University

pp. 33-38

Parallel Session 1 (Telecommunication and Vehicular Technology and Green Applications and Interdisciplinary Topic)

Room: Amarta 3

PS1-TG.1 ***Centralized Dynamic Host Configuration Protocol and Relay Agent for Smart Wireless Router***

Wahyul Amien Syafei, Yosua Alvin Adi Soetrisno and Agung Prasetijo

Presenter bio: B.Eng 95 Electrical Engineering Faculty of Engineering Diponegoro University, Indonesia. M.Eng 02 Multimedia Telecommunication Faculty of Engineering Sepuluh Nopember Institute of Technology, Indonesia. Ph.D 09 Department of Electronics and System Engineering Computer Science and Electronics Kyushu Institute of Technology, Japan. Field: Wireless Telecommunication and Mutimedia, MIMO, OFDM, Familiar with IEEE 802.11a/b/g/n/ ac, 3rd-Dan in Karate, 3rd-Dan in Kobudo, Instructor of Okinawan Kobudo, Gold Medal Shorinji Kempo. Speaking: Bahasa Indonesia, Java, Sunda, English, Japanese, Arabic

pp. 39-43

PS1-TG.2 ***Diabetes Prediction System Based on Iridology Using Machine Learning***

Ratna Aminah and Adhi Harmoko Saputro

pp. 44-49

PS1-TG.3 ***Analysis of the Effect of the Wax Coating on Firmness Prediction Model in Malang Apples Based on Visible and Near-Infrared (VNIR) Imaging***

Risti Dwi Putri and Adhi Harmoko Saputro

pp. 50-54

PS1-TG.4 ***Development Conceptual Model Smartphone Adoption for Use Mobile Banking***

Erick Fernando, Surjandy Surjandy and Meyliana Meyliana

pp. 55-59

Parallel Session 2 (Information and Computer Technologies 1)

Room: Amarta 3

PS2-ICT1.1 ***Understanding Digital Skill Use from the Technology Continuance Theory (TCT)***

Nurdin Nurdin, Sagaf S Pettalongi and Mansur Mangasing

Presenter bio: I am a senior Lecturer in Information System at IAIN Palu and the Director of STMIK Bina Mulia Palu- Indonesia. Currently I got a PhD degree in Information TeChnology at Swinburne University of Technology Australia. I have published a number of journal papers and proceedings. My skill related to information systems, e-government and social media.

pp. 60-65

PS2-ICT1.2 ***Analysis Social Media Application Message Trust Factor a Case Study University Student in Indonesia***

Surjandy Surjandy, Wanda Wandoko, Meyliana Meyliana and Erick Fernando

Presenter bio: Phd Student and researcher, Reserach Topic area - Blockchain for Enterprise System Solution (e.g. SCM) - Technology Risk Management - Financial Technology - IT Governance

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PS2-ICT1.3 ***Early Warning System of Landslide Disaster Using Generalized Neural Network Algorithm***

Aghus Sofwan and Sumardi Sumardi

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PS2-ICT1.4 ***Intelligent Multiple-Vehicular-Attributes (iMVA) Broadcast Protocol for VANETs***

Agung Prasetijo

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PS2-ICT1.5 ***Data Privacy Factor of Female Passenger's Data in Indonesia Online Transportation System***

Surjandy Surjandy, Erick Fernando, Meyliana Meyliana, Yuli Eni, Alexandra Joya and Dimitrij Dharma

Presenter bio: Phd Student and researcher, Reserach Topic area - Blockchain for Enterprise System Solution (e.g. SCM) - Technology Risk Management - Financial Technology - IT Governance

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PS2-ICT1.6 ***Success Factor of the Implementation Blockchain Technology in Pharmaceutical Industry: A Literature Review***

Erick Fernando, Meyliana Meyliana and Surjandy Surjandy

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PS2-ICT1.7 ***Hierarchical Multi-label Classification to Identify Hate Speech and Abusive Language on Indonesian Twitter***

Faizal Adhitama Prabowo, Muhammad Okky Ibrohim and Indra Budi

pp. 91-96

Parallel Session 2 (Telecommunications and Vehicular Technologies)

Room: Amarta 2

PS2-TVT.1 ***Uplink Boost Eliminate User in Massive MIMO System Using Reinsch Algorithm***

Soraya Mustika, Eko Noerhayati, Anik Nur Handayani, Siti Sendari and Langlang Gumilar

Presenter bio: • Name : Soraya Norma Mustika • Place/ Date of Birth: Malang, Indonesia. August 9th1992 • Resident Address: Jalan Cikaso 16 Malang, East Java, Indonesia 65122 Mobile. +6281944811922.

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PS2-TVT.2 ***Accuracy Comparison of Radio Direction Finder with 6 and 4 of Log Periodic Dipole Array Antennas***

Kartiko Nugroho, Azli Yahya, Nor Hisham Khamis, Nuramirah M Nor, M Razman Shaari and Abd. Rahim Mat Sidek

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PS2-TVT.3 ***Design and Construction of Helical Antenna in GSM 900***

Yuli Christyono

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PS2-TVT.4 ***Bandwidth Enhancement Using Stacked Patch MIMO Antenna with Low Mutual Coupling for 3.5 GHz***

Subuh Pramono

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PS2-TVT.5 ***The Track Characteristics and the Propagation Model in Train Traffic for Automatic Traffic Door System***

Elfira Nureza Ardina

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PS2-TVT.6 ***Multi-hop Uplink for Low Power Wide Area Networks Using LoRa Technology***

Misbahuddin Misbahuddin, Muhamad Syamsu Iqbal and Giri Wahyu Wiriasto

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PS2-TVT.7 ***Automatic Sprinkler System for Water Efficiency Based on LoRa Network***

Arif Nursyahid, Tholud Aprilian, Thomas Agung S, Helmy Helmy, Ari Sriyanto Nugroho and Deddy Susilo

pp. 126-131

Parallel Session 3 (Control and Circuits)

Room: Amarta 2

PS3-CC.1 ***Design of Fabric-Based Soft Robotic Glove for Hand Function Assistence***

Rifky Ismail

Presenter bio: An assistant professor in Department of Mechanical Engineering, Diponegoro University, Indonesia. A researcher in Center for Biomechanics, Biomaterial, Biomechatronics and Biosignal Processing (CBIOM3S) Diponegoro University. I conduct a research on biomechanics, biomaterial, biomechatronics, tribology and engineering design.

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PS3-CC.2 ***Spark Gap System of Electrical Discharge Machining (EDM)***

Betantya Nugroho, Azli Yahya, Trias Andromeda, Abd. Rahim Mat Sidek and Nor Hisham Khamis

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PS3-CC.3 ***Development of Omni-Wheeled Mobile Robot Based-on Inverse Kinematic and Odometry***

Aghus Sofwan, Hafidz Mulyana, Hadha Afrisal and Abdul Goni

pp. 143-148

PS3-CC.4 ***Three-Fingered Soft Robotic Gripper Based on Pneumatic Network Actuator***

Mochammad Ariyanto and Rifky Ismail

Presenter bio: I am working on the area of dynamics system and control in Department of Mechanical Engineering, Diponegoro University. My expertises are: - Biomechatronics and biomedical Engineering - Unmanned vehicles, VTOLs and rotorcraft - Flight dynamic modeling, simulation, Navigation, and control - Hardware in-the loop simulation (HILS) & Pilot in-the loop simulation (PILS) - Flying Robot/Aerial robot - object interaction - Control system design, optimization design, Artificial Neural Network (ANN), & Genetic Algorithm (GA) - Biorobotics, robotic hand, supernumerary robotic limbs, exoskeleton robot

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PS3-CC.5 ***MFCC Feature Extraction and KNN Classification in ECG Signal***

Siti Agrippina Alodia Yusuf and Risanuri Hidayat

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PS3-CC.6 ***Design Semi-Automatic Control System Using PLC for Stalling Materials in the Forming Machine***

Syahril Ardi

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PS3-CC.7 ***Designing a Fuzzy Controller of Crude Oil Dilution in Palm Oil Mills***

Enda Wista Sinuraya

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PS3-CC.8 ***Inertial Navigation System of Quadrotor Based on 10-DOF IMU and GPS Sensors***

Sumardi Sumardi, Taufik Rahmadani and Hadha Afrisal

Presenter bio: Taufik Rahmadani was born on August 19th, 1997 in Semarang city, Middle Java province, Indonesia. In 2015, he joined the Department of Electrical Engineering, University Diponegoro, as a student specially in Control and instrumentation. His current research interests include inertial measurement unit, quadcopter, IoT, and power electronics. he has collaborated actively with researchers in several other disciplines of science and technology.

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PS3-CC.9 ***Design of Data Acquisition System for Position and Attitude Quadcopter***

Aris Triwiyatno, Sumardi Sumardi, Hadha Afrisal, Dhamastya Adhi Putra and Taufik Rahmadani

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PS3-ICT2.1 ***Towards Smart LMS to Improve Learning Outcomes Students Using LenoBot with Natural Language Processing***

Dina Fitria Murad, Dfm, Adhi Iskandar, Erick Fernando, Deryan Maured and Tica Octavia

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PS3-ICT2.2 ***Using Minimum Distance to Classify Uttered Arabic Words into Subject - Object Name***

Salam Hamdan, Arafat A. Awajan and Akram Al-kouz

Presenter bio: I am a PhD candidate in Computer Science at Princess Sumaya University for Technology. I received my bachelor's degree in Computer Engineering from Al-Balqa Applied University, 2012.I received my master's degree in Information System Security and Digital Criminology from PSUT, 2015. My research interests include hardware security, network security and vehicular ad hoc networks.

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PS3-ICT2.3 ***MEC Deployment with Distributed Cloud in 4G Network for 5G Success***

Andika Hairuman, Amalia Zahra, I Gede Putra Kusuma Negara and Dina Fitria Murad, Dfm

Presenter bio: Andika Hairuman received his Bachelor degree in Information Systems from Bina Nusantara University, Indonesia in 2019. He is currently pursuing the Master degree in Computer Science at Bina Nusantara University, Indonesia. He is working as a consultant for 15 years and been working in Telecommunication and IT Industry for 18 years. Deep knowledge of GSM, WCDMA, LTE, 5G Technology as a domain expert of RF, RAN and Virtualized RAN, Cloud and Edge Computing, NFV, Automation and Machine Learning.

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PS3-ICT2.4 ***LC-MS Analysis: Mini Review Frequently Used Open Source Softwares***

Iwan Binanto, Bahtiar Saleh Abbas, Harco Leslie Hendric Spits Warnars and Nesti Sianipar

Presenter bio: Lecturer at Department of Informatics, Sanata Dharma University, Yogyakarta, Indonesia.

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PS3-ICT2.5 ***Geometric Verification Method of Best Score Increasing Subsequence for Object Instance Recognition***

I Gede Putra Kusuma Negara, Kristopher David Harjono and Muhammad Taufik Dwi Putra

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PS3-ICT2.6 ***Augmented Reality Technology as One of the Media in Therapy for Children with Special Needs***

Kurniawan Martono

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PS3-ICT2.7 ***Implementation of Neural Network Classification for Diabetes Mellitus Prediction System Through Iridology Image***

Rievanda Putri and Adhi Harmoko Saputro

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Proc. of 2019 6th Int. Conf. on Information Tech., Computer, and Electrical Engineering (ICITACEE), Sep 26-27, 2019, Semarang, Indonesia

Augmented Reality Technology As One Of The Media In Therapy For Children With Special Needs

Kurniawan Teguh Martono
Computer Engineering Department
Diponegoro Univeristy
Semarang, Indonesia
k.teguh.m@live.undip.ac.id

Dania Eridani
Computer Engineering Department
Diponegoro Univeristy
Semarang, Indonesia
dania@ce.undip.ac.id

Adnan Fauzi
Computer Engineering Department
Diponegoro Univeristy
Semarang, Indonesia
adnan@live.undip.ac.id

Asri Purwanti
Department of Pediatric
Diponegoro Univeristy
Semarang, Indonesia
asripurwanti.ap@gmail.com

Muhammad Ulil
Computer Engineering Department
Diponegoro Univeristy
Semarang, Indonesia
ulilalbam@gmail.com

Abstract— **Learning is a need that must be fulfilled by each human. However, in its development, each human is facing a difference from one to each other. Say, in real life, there are some children with a growth different from the condition in common. The difference in this growth is called with the condition of children with special needs. The existence of children with special needs requires a special treatment. A variety of the methods are used to help children with special needs to growth optimally. The development of computer technology has provided a new breakthrough in helping the children with special needs in improving their motoric ability. One of the breakthroughs used is the development of Medical Rehabilitation Tool by using the augmented reality technology. This technology is able to give a new experience for its user in that the users can directly interact with the virtual objects so as to be able to increase the perception in understanding a form of an object. In this research, the process of testing on the usability of the application to 30 respondents was performed consisting of medical rehabilitation staffs for the speech therapy and occupational therapy. The test on the usability covered the test of Usefulness, Ease of Use, Ease of Learning and Satisfaction. The results of the test from the usefulness aspect showed the result of 81.06%, the aspect of Ease of Use showed the result of 79.13%, the aspect of Ease of Learning showed the result of 78.70% and the aspect of Satisfaction showed the result of 78.40%. With those results obtained, the respondents agreed that the level of usability from the application can help children with special needs to study.**

Keywords - Usability, Augmented Reality, Learning, Computer Technology, Therapy.

I. INTRODUCTION

Children with special need is the individual human with characteristics different from other common individuals. Hence, children with special need show the characteristics which are different physically, intellectually and emotionally compared to other children in normal condition. Such condition has made the children with the condition of special need require a particular treatment to optimize the ability they have. To optimize the ability of children with special need, a variety of stimuli such as medic rehabilitation with physiotherapy, therapy occupation or other activities is needed. Children with special needs are the children in the educational process or in running the life need a particular and different treatment compared to other ordinary children. A child can be called the one with special need if there is something less or more in him or her. Commonly, the condition child with special need covers two categories: first, child with permanent special need caused by certain disorder and second, child with temporary special need in which they experience a hindrance in study and growth due the condition and situation of environment. Down syndrome is one of types of condition of child with special needs. It is a chromosome disorder that is the formation of chromosome 21due to the failure of a pair of chromosome to separate to each other during the splitting process [1] [2].

The advance of computer technology has brought certain impacts on each aspect of human life. Any computer based technology has been developed to help people in solving the problems. The use of computer has a very significant impact in solving any problems. Here, humans will have a different perspective when solving the problem with the assistance of computer technology. The use of computer also can improve the critical thinking among students of senior high school. In this research, the media of computer is used to stimulate the way of thinking among students enabling them to ask critically about a problem with any perspectives.

Augmented reality is one of interactive model between human and computer by using the capability of graphic computer technology development in this era. The use of augmented reality technology has given a new experience that can be felt by the application users [3] [4]. This paper discusses about the analysis on the usability of the application of medic rehabilitation aid to the children with special need based upon the information and technology. The test was done in the group of occupation therapy and speech therapy involving the sample of 30 people.

Graphic computer is a part of computer technology related to the manipulative process and the creation of pictorial objects. The use of graphic computer technology includes the game technology, image processing and animation process. Augmented reality itself is one of technologies inside the graphic computer. This technology combines the object created or developed using the graphic computer in real environment. The technology of augmented reality today has been widely developed and implemented in any sectors such as tourism, automotive, manufacture, health and military. In tourism, the development of augmented reality technology is

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used in helping the tourists in obtaining information about the tourist objects nearby the users. This technology use has made the tourists to have a new experience when interacting with the tourism environment [5]. Other research on this technology is in the health sector in which a number of models have been developed to assist the doctors or medical practitioners in solving any health issues. Figure 1 shows the use of augmented reality technology in health sector.

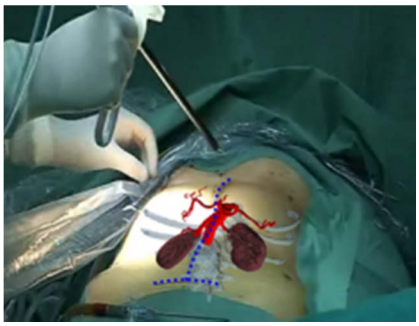

Figure 1. Augmented Reality to help the operation process[6]

Figure 1 shows how the Augmented Reality Technology can help the doctors or medical practitioners in doing the operation process. The use of this technology can help the doctors and medical practitioners in visualizing the human organ when doing any operation act in order to minimize any errors. Other research on the use of the Augmented Reality Technology is in military used to develop the simulator system of shooting. The use of shooting simulator with the Augmented Reality Technology can help the related parties in improving the effectiveness and efficiency in shooting practice [4]. Augmented reality is one method in the process of interaction between human and computer by combining the real environment and virtual environment. The use of the Augmented Reality Technology can give an assessment from a similar angle. The Augmented Reality Technology is a part of Reality-Virtual Continuum. Figure 2 shows the structure in the Reality-Virtual Continuum.

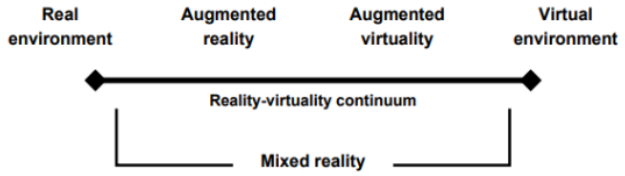

Figure 2. Reality - Virtuality Continuum[7]

Figure 2 shows the division of group from the real environment, augmented reality, augmented virtuality and Virtual environment. The real environment in this scheme shows that the condition occurs in the real environment. This environment is in the location similar with the environment of application users. Augmented reality and augmented virtuality are the process of combining the real world and the virtual world. The 3-dimensional object developed in virtual environment would be combined in the real environment. Meanwhile, in virtual environment, it showed that between object and environment, the interaction is in the virtual environment. There are two models to display the object in the application of augmented reality: by using video see through model and optical see through. Video see through is the way to display an object in the Augmented Reality Technology by using a display monitor and for the interaction with the real environment, it is by using a camera. The real environment captured through the camera would be forwarded to computer to be processed to be displayed on the display monitor. Figure 3 shows the design of Video See Through

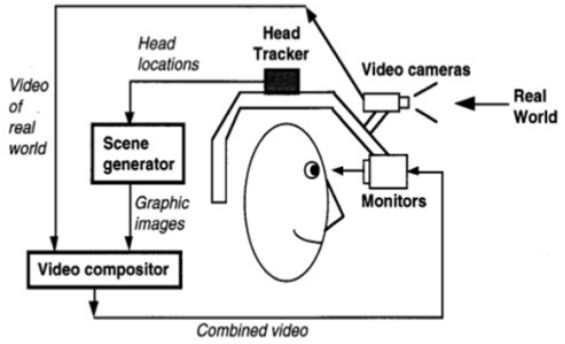

Figure 3. Video See Through Augmented Reality[8]

In the model of Optical See Through, the interaction process of users is done by using an optic system. Display monitor would be directed to the optic that later on will reflect a display from display monitor to the eyes of the user. The user can directly interact with the real environment through the optic lens. Figure 4 shows the design of Optical See through.

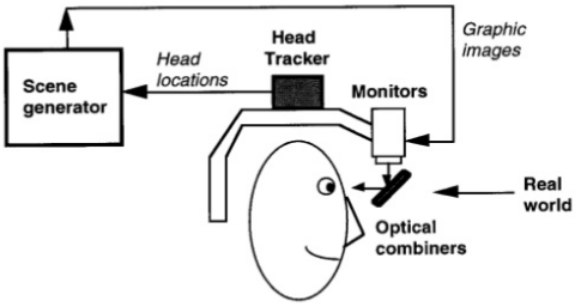

Figure 4. Optical See Through[8]

To build an Augmented Reality-based application, an additional library is required to be used for the object manipulation processes. One of the libraries used in this study is ARToolkit used for object manipulation processes which included the process of camera tracking against markers, the real-time marker orientation process and the interaction process on virtual objects in the application. The work process of the ARToolkit library consists of five stages:

- The camera or webcam will seek the location of the marker. The detected marker will then be translated into the binary file.
- The camera or webcam will find the marker position and will calculate the distance with the real camera position
- The camera or webcam will do the marker identification process, whether the marker pattern matches the model that has been stored in memory
- The position and orientation of the marker will be transformed so that object 3 can be placed

- The rendering process of 3-D objects is performed and will be displayed above the marker [9].

Usability refers to the quality level of a system whether it is simple in use or easy to learn and how to make application users to be able to use the application as a good tool. To find out if an application has an ideal level of reusability, then it can be tested through the following aspects: Learnability, Efficiency, Memorability, Errors, and Satisfaction. To measure Usability is dependent upon the ability of users to complete a series of tests. Some parameters for measuring Usability include:

- Success Rate, to measure the success level of users in completing all the "tasks" on an application.
- The Time a Task Requires, to measure the time required by a user to complete a "task" on an application.
- Error Rate, the level of error made by the user when completing the "task" on an application.
- User's Subjective Satisfaction, the level of user satisfaction in completing the entire "task" when interacting on an application[10].

II. RESEARCH METHOD

The user performance test method was used in this study to measure the usability level of the application. This method was used to test whether the interface of the application can be studied and used within a certain time period by the user. There were 30 samples used in this study taken from the speech therapist group and occupational therapist group. Figure 6 below shows the usability evaluation process.

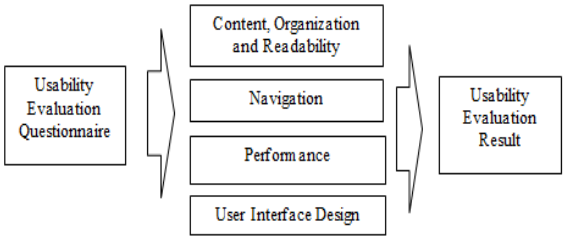

Figure 5. Usability Evaluation Process

To measure the perception value or respondent opinions, a method with a Linkert scale was used with 5 scales: strongly agree, agree, neutral, disagree and strongly disagree. To obtain the interpretation value, the highest value would be determined through the symbol of X and the lowest value with Y. Equation 1 shows the calculation of the value of X and Y.

$$X = Higher\ Value\ Linkert\ Scale\ x\ Number\ of\ Responden$$

$$Y = Lowest\ Value\ Linkert\ Scale\ x\ Number\ of\ Responden \quad \ldots(1)$$

The interval of each scale is shown in eq. 2.

$$\text{Interval} = \frac{100}{number\ of\ Criteria}\ \% \quad \ldots(2)$$

Table 1 shows the interval class and criteria used in the determination of the results. The interval used by equation (2) is as follows

$$\text{Interval} = \frac{100}{5}\ \% = 20\ \%$$

Table 1. Criteria and Interval

Interval	Criteria
0% – 19.99%	Strongly Disagree
20% – 39.99%	Disagree
40% – 59.99%	Neither
60% – 79.99%	Agree
80% – 100%	Strongly Agree

III. DISCUSSION

The media of medic rehab tools using the Augmented Reality Technology was implemented in a set of desktop computer as shown in Table 2.

Table 2. Specification of Computer

Name of Part	Specification
Processor	Intel core i7 @2,80GHz
Random Access Memory	4 GB
Video Graphic Adapter	Intel HD Graphics 530
Web Cam	Web cam Logitech C922
Display	Asus LED 23 inch

The resulting display of this application is shown in Figure 8. Virtual objects in the 3D model will be displayed above the pre-defined markers. In this study children with special needs with Down syndrome accompanied by a therapist were given this application. In the application will display 3D objects in accordance with the images in the marker.

Figure 8. Appearance of Augmented Reality Applications

The test on usability was conducted by giving a treatment to respondents that is by trying an Augmented Reality-based medical rehabilitation tool. The respondents used were medical therapists which included speech therapists and occupational therapists. The questionnaire model used in this study was to test the level of Usefulness, Satisfaction, and Ease of Use of content, font type, navigation, performance and interface design. Figure 9 shows the graph of usability testing results with 30 respondents.

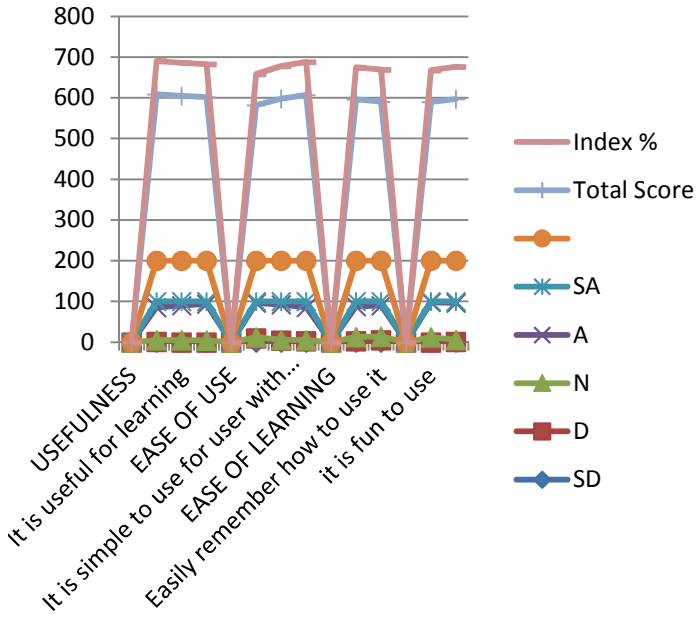

Figure 9. Graph of Usability Test

Table 3 shows the results of data processing for the aspect of usefulness, ease of use, ease of learning and satisfaction.

Table 3. Result of Respondent

Question	Index %
USEFULNESS	
It helps user be more effective for learning	81.80
It is useful for learning	81.00
It save time when use it	80.40
EASE OF USE	
It is easy for use	76.40
It is simple to use for user with disability	79.60
It is user friendly	81.40
EASE OF LEARNING	
User learned to use it quickly	79.20
Easily remember how to use it	78.20
SATISFACTION	
it is fun to use	78.00
I would recommend it to a friend	79.40

The results obtained for the mean value of each aspect are presented as follows:

1. Aspect of Usefulness = $\frac{81.80+81.00+80.40}{3}$ = 81.06%
2. Aspect of Ease of Use = $\frac{76.40+79.60+81.40}{3}$ = 79.13%
3. Aspect of Ease of Learning = $\frac{79.20+78.20}{2}$ = 78.70%
4. Aspect of Satisfaction = $\frac{78.00+79.40}{2}$ = 78.70%

Based on the results obtained, the usefulness aspect was found at 81.06% meaning that the respondents strongly agreed with the usability of the system. Respondents stated that the application is very useful for children with special needs, considering its ability to help children to learn about objects and the types of activities that can be done every day. The aspect of Ease of Use was found at 79.13% showing that respondents agreed that this system is easy to use in the process of medical rehabilitation. The Ease of Learning aspect furthermore was found at 78.70% in which the respondents agreed that this system is easy to learn for users, especially for medical rehabilitation therapists. Finally, the satisfaction aspect was found at 78.40% indicating that the respondent agreed with the satisfaction of the application built. With all results that show values above 75% for each aspect, the system can be stated to have good reusability and suitable with the needs of users in adding a model of medical rehab using the help of Augmented Reality technology.

IV. CONCLUSION

Based on the results of the test on usability conducted on 30 respondents, it can be concluded that the application of medical rehabilitation tools for children with special needs by utilizing augmented reality technology overall can be accepted by respondents. The test results from the usefulness aspect showed the results of 81.06%, the Ease of Use aspect with the results of 79.13%, the Ease of Learning aspect with the results of 78.70% and the Satisfaction aspect with the results of 78.40%. With these results, the respondents agreed that the usability level of the application can help children with special needs to study.

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