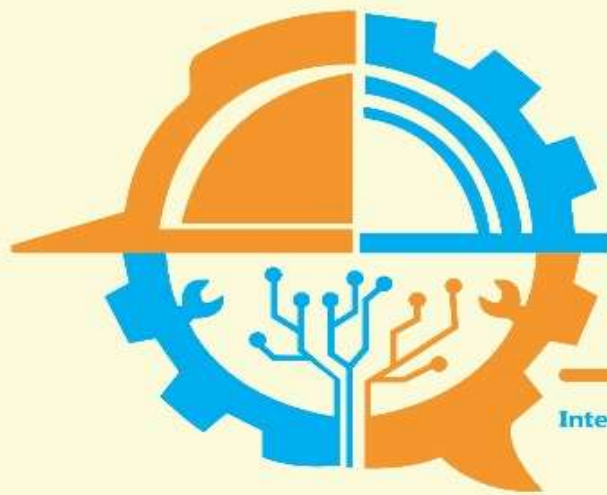


# PROGRAMME BOOK



# 2019


# IC2SE

International Conference on Computer Science and Engineering

## Proceedings International Conference on Computer Science and Engineering

**INDUSTRIAL REVOLUTION 4.0  
OPPORTUNITIES & CHALLENGES**

**26-27 April 2019  
UPI Convention Center,  
Universitas Putra Indonesia "YPTK"  
Padang, Indonesia**

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## DETAILS SESSION PROGRAMME

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Paper ID	Title of Paper	Author
2	Exploring the interaction's quality attributes of Mobile Government services	Abdulla Jaafar Mohamed, Mohd Khalit Bin Othman, Suraya Binti Hamid
6	Design of Bicycle's Speed Measurement System Using Hall Effect Sensor	Ratna Aisuwarya, Muhammad Azmi Riyan, Rahmi Eka Putri
54	Prediction of Corn Productivity in Indonesia as Anticipation Efforts to Import Using Backpropagation Neural Network	Anjar Wanto, Dedy Hartama, Risma Nurhaini Munthe, Pawan Darasa Panjaitan, Elfina Okto Posmaida Damanik, Agus Perdana Windarto
22	The Framework Accommodation of Systems Recommendation Via Social Media	Doni Ariyanto, Lukito Edi Nugroho, Adhistya Erna Permanasari
37	Practicality of E-Learning as Learning Media in Digital Simulation Subjects at Vocational School in Padang	Monica Fransisca, Yuliawati Yunus, Aminda Dewi Sutiasih, Renny Permata Saputri
Session 2, 04.00 – 05.30 pm Room 1, Ground Floor Session Chair : Billy Hendrik		
Paper ID	Title of Paper	Author
58	Designing a Multimodal Graph System to Support Non-Visual Interpretation of Graphical Information	Deni Setiawan, Bagus Priambodo, Mila Desi Anasanti, Al Hamidy Hazidar, Emil Naf'an, Inge Handriani, Asama Kudr Nseaf, Zico Pratama Putra
42	Breast cancer classification using digital biopsy histopathology images through transfer learning	Ghulam Murtaza, Liyana Shuib, Ainuddin Wahid Abdul Wahab, Ghulam Mujtaba, Ghulam Mujtaba, Ghulam Raza, Nor Aniza Azmi
49	Enhancement of OTP Stream Cipher Algorithm Based on Bit Separation	Arisman, Mahyuddin K M Nasution, Syahril Efendi
53	Online Management System of Praktik Lapangan Kerja (PLK) UPI YPTK Padang	Astri Indah Juwita, Muhammad Ikhlas
60	Implementation and Design User Interface Layout Use Leap Motion Controller with Hand Gesture Recognition	Billy Hendrik, Fauziah, Mardhiah Masril, Yunan Fauzi Wijaya, Silfia Andini.

Session 1, 1.30 – 03.30 pm Room 2, Ground Floor Session Chair : Associate Professor Dr. Maizatul Akmar Ismail		
Paper ID	Title of Paper	Author
12	Supplier Selection by Using Analytical Hierarchy Process (AHP) and Techniques for Order Preference Methods with Similarities to Ideal Solutions (TOPSIS)	Ikhsan Siregar
39	Prediction of Canal Erosion on Tidal Swamp Delta Telang I, Banyuasin Regency, South Sumatra	Achmad Syarifudin, Henggar Risa Destania, Yunan Hamdani
64	Disaster risk management strategy in the environment and disaster mitigation-based school (SWALIBA)	Sindhung Wardana , Herdis Herdiansyah , Adam Wicaksono
68	Smart IoT Flood Monitoring System	Shahirah Binti Zahir, Phaklen Ehkan, Thennarasan Sabapathy, Muzammil Jusoh and Mohd Nasrun Osman, Mohd Najib Yasin, Yasmin Abdul Wahab, Hambali and N. Ali, A.S. Bakhit, F. Husin, M.K.Md.Kamil and R. Jamaludin
73	Shallow Well Water Salinity Viewed from Distance Of Well To CoastLine And Ground Water Level Elevation In Purus Padang Village	M Chairi, W Purba, W Boy, R Imani, J Melasari
54	A Flexible UWB Antenna for 5G Applications	Syuhaimi Kassim, Hasliza A Rahim, MohammedFareq AbdulMalek, Soh Ping Jack, Muzammil Jusoh, Wee Fwen Hoon, Nur Syahidah Sabil, Nurulisma Ismail
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75	Face Recognition and Age Estimation Implications of Changes in Facial Features: A Critical Review Study	Rasha Ragheb Atallah, Amirrudin Kamsin, Maizatul Akmar Ismail
81	Standard Operational Procedure Fund Distribution System of Zakat Infaq and Shodaqah for Zakat Foundations	Inge Handriani, Bagus Priambodo, Al Hamidy Hazidar , Mardhiah Masril, Zico Pratama Putra , Asama Kudr Nseaf, Emil Naf'an
77	Automatic System to Fish Feeder and Water Turbidity Detector Using Arduino Mega	H Hendri , S Enggari , Mardison , M R Putra, L N

67	The Application of Data Mining in Determining Patterns of Interest of High School Graduates	Dedy Hartama, Agus Perdana Windarto, Anjar Wanto
36	Model Development Measurement of Interests Based on Expert System	Erdisna, Ganefri, Ridwan, Rice Novita, Wanayumini

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Paper ID	Title of Paper	Author
43	Bandit algorithms in information retrieval evaluation and ranking	Sinyinda Muwanei, Hoo Wai Lam, Sri Devi Ravana, Douglas Kunda
38	Analysis of Multiple Channel Multiple Phase System for Priorities Queuing Model (N-P) with Simple Adaptive Weighting	Herman Putra Rajagukguk, Muhammad Zarlis, Sutarmam
28	Application Of Ahp Analysis To Increase Employee Career Paths In Decision Support Systems	Julius Santony, Faisal Amir, Sumijan, Rice Novita
23	Text Mining For Hotel Classification Using Naïve Bayes Algorithm	Ahmad Afif, Lukito Edi Nugroho , Adhistya Erna Permatasari
79	Design Of Expert System For Diagnosis Damage Computer Hardware	Retno Devita, Eva Rianti , Sri Rahmawati
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19	Electronic Health Cloud as Service to Improve Collaboration in Healthcare Organizations	Shady Gomaa Abdulaziz, Norizan Mohd Yasin, Zeinab AlGamal, Asmaa Hateem and Kalaimagal Ramakrishnan
35	Expert Systems Diagnosing Of Banana Pests And Diseases Use Case-Based Reasoning Method With Android	Hezy Kurnia, Vicky Ariandi, Heriyanto, Yesri Elva
11	Technology Acceptance Among Older Adults With Mild Cognitive Impairment	Nita Rosa Damayanti, Nazlena Mohamad Ali, Ely Salwana Mat Surin



1	Decision Support System In Determining Structural Position Mutations Using The Simple Additive Weighting (Saw) Method	Aulia Fitrul Hadi, Randy Permana, Havid Syafwan
21	Design Chipless Textile Tag For RFID Application	Mirza Anuar, Lee Yeng Seng, M. S. Shakhirul, F.H. Wee, Hong Seng Gan, Muzammil Jusoh, Thennarasan Sabapathy, M.N. Osman

Session 1, 1.30 – 03.30 pm Room 4, Ground Floor Session Chair : Dr. Norizan Mohd Yasin		
Paper ID	Title of Paper	Author
03	A comparative analysis of detection mechanisms for emotion detection	Vimala , Marian Cynthia Martin, Wandeep Kaur, Amir Javed
55	Determination of the Shortest Route Towards the Tourist Destination Area Using the Ant Algorithm	Ni Luh Wiwik Sri Rahayu Ginantra , T , Gita Widi Bhawika , Ida Bagus Ary Indra Iswara , Anjar Wanto
18	Multiple Thresholding Methods For Extracting & Measuring Human Brain And 3d Reconstruction	Sumijan , Pradani Ayu Widya Purnama , Syafri Arlis
44	A Comparative Review of ISMS Implementation Based on ISO 27000 Series in Organizations of Different Business Sectors	Zaidatulnajla Hamdi , Azah Anir Norman , Nurul Nuha Abdul Molok
85	Improving the modelling of Robot Bunker with camera	Emil Naf'an , Riza Sulaiman , Nazlena Mohamad Ali , Bagus Priambodo , Al Hamidy Hazidar , Asama Kudr Nseaf , Zico Pratama Putra , Harry Theozard Fikri, Inge Handriani
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08	Minimization of Palm Oil Losses on Sterilization Process by Optimization Boiling Pressure and Boiling time	Wetri Febrina , Yusrizal

13	Application of Theory of Constraints in Bottleneck Work Stations Optimization	Ikhsan Siregar
30	Designing Engineering Data Management System in Research and Development Company	Muhammad Nur, Luciana Andrawina
31	Risk Assesment of Housing Reconstruction Project Community-Based Construction after The Earthquake	Wendi Boy, Rafki Imani , Mayozi Chari
48	Industrial Revolution 4.2 Oppourtunity Challenges and Way Forward	Erry Yulian T. Adesta, Rudi Kurniawan Arief

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47	Development Database E-Costal For Fishermen's Assistance Program At Terengganu	Dara Aisyah Ali Puteh, Al Hamidy Hazidar , Muhammad Sontang Sihotang
52	Assessment for Seismic Activities in Pesisir Selatan West Sumatra in 2018	R Imani , W Boy , U Dewi , A Sari , W Purba , M Chairi, J Melasari
41	Interactive Map Model of Flat Design for Istano Basa Pagaruyung Tourism Development	T Wiraseptya , R Imani , H Yanto
29	Behavioural Intention to Use MYOB Accounting Aplication Among Accounting Students	Dwi Fitri Puspa, Desi Ilona, Zaitul

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17	The utilization of learning analytics to develop student engagement model in learning management system	Shahrul Nizam, Suraya Hamid , Haruna Chiroma

57	Backpropagation Neural Network Prediction For Cryptocurrency Bitcoin Prices	Rini Sovia, Musli Yanto ,Arif Budiman
62	Control System Of Microcontroller Based Automatic Milk Coffe Drink	Nofriadi ,Herman Saputra ,Juna Eska , Adi Prijuna , Nuriadi Manurung
24	Factors Influencing The Use Of M-Government Services From The Citizens' Perspective: Examining The Characteristics Of Adopters And Non-Adopters	J. Al-awj , N. Yasin , M. Khalit , S. Al-ammari ,N Kassim
98	Expert System For Disease Diagnosis In Cocoa Plant Using Android-Based Forward Chaining Method	Vicky Ariandi, Hezy Kurnia, Heriyanto, Hilda Mary
20	The Design of Sharia Housing Application In Padang City with CRM Concept	Hadi Syahputra, Raja Ayu Mahessya, Annisak Izzaty Jamhur, Ikhsan

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27	Social Entrepreneurship Learning Model in Higher Education using Social Network Analysis	Muhammad Hamirul Hamizan Roslan, Suraya Hamid, Mohamad Taha Ijab, Sarah Bukhari
14	Media Effectivity e- module Of Object-Oriented Programming II Based On Problem Based Instruction (PBI) Informatics Engineering Education Program, University Of Putra Indonesia YPTK Padang	Yulawati Yunus, Silky Safira, Monica Fransisca, Renny Permata Saputri, Aminda Dewi Sutiasih
61	Towards Data-driven Education with Learning Analytics for Educator 4.0	Salimah Mokhtar, Jawad A. Q., Ghassan O. A. Shahin
76	The Understanding of Lecturers about The New Literacy in Industrial Revolution Era 4.0: A Study case of University of Putra Indonesia YPTK Padang	Muharika Dewi, Yulia Retno Sari, Shally Amna, Rasmita, Rina Susanti
80	Impact of Learning Motivation, Cognitive and Self-Efficacy in Improving the Quality of Online Learning in the Industrial Age 4.0	Ramdani Bayu Putra, Elfiswandi, Muhammad, Sitti Rizki Mulyani , Dharma Syahrullah Ekajaya, Rio Andhika Putra

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77	Automatic System to Fish Feeder and Water Turbidity Detector Using Arduino Mega	Halifia Hendri, Sofika Enggari, Mardison, Muhammad Reza Putra Larissa N Rani
32	Digital Medical data protection compliance among medical staffs	Uning Pratimaratri, Desi Ilona, Zaitul
16	Internet of Things in Monitoring and Notification of Industrial Security Systems	Alkhairunas Riyuska, Julius Santony, Sumijan
15	Identification of Variables in Predicting Trends in Social Entrepreneurship	Nur Azreen Zulkefly, Norjihhan Abdul Ghani, Wajdi Alquliti
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70	Application Of Promotion, Map And Existing Tourism Information Systems In Solok Selatan District Using Androidjava Programming Language	Hari Marfalino, Larissa Navia Rani, Mardison, Ichsan Pribadi
10	The Kindness Behavior Management in Kindness Service Application Using Tree Structure	Luxfy Roya , Lukito Edi Nugroho , Adhistya Erna Permatasari
82	Expert System and Rule-Based Knowledge Based in Analyzing Vitamin Deficiency in the Human Body	Ruri Hartika Zain, Elmi Rahmawati
59	Predicting GDP of Indonesia Using K-Nearest Neighbour Regression	Bagus Priambodo, Sarwati Rahayu , Ahmad , Al Hamidy Hazidar , Emil , Mardhiah masril , Inge , Zico Pratama Putra , Asama Kudr Nseaf , Deni Setiawan
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56	Decision Support System For Mapping Types Of Timber And Number Of Products For Furniture Handling In The Main Work Service Using Ahp (Analytical Hierarki Process) Method In Increasing The Profits Of Production	Firdaus , Ade Saputra , Mondra Neldi , Ritna ,Novia Yolanda , Usman
80	Impact of Learning Motivation, Cognitive and Self-Efficacy in Improving Learning Quality Elearning in Industrial Era 4.0	Ramdani Bayu Putra, Elfiswandi , Muhammad Ridwan , Sitti Rizki Mulyani , Dharma Syahrullah Ekajaya , Rio Andhika Putra
50	Convergence Analysis of Acceleration and Generalization of E-Learning in the Manifestation of Globalization Education Readiness 4.0	Sitti Rizki Mulyani, Agung Ramadhanu , Desi Permata Sari , Rahmatul Husna Arsyah , Neni Sri Wahyuni Nengsih
97	Expert System Of Intrauterine Insemination	Firna Yenila, Yogi Wiyandra

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71	The Effect of Lego Mindstorms as innovative educational tool: To develop students' creativity skills for Creative Society.	Mardhiah Masril , Billy Hendrik , Harry Theozard Fikri, Al Hamidy Hazidar , Bagus Priambodo , Emil Naf'an , Inge Handriani, Zico Pratama Putra , Asama Kudr Nseaf
78	Learning Satisfaction Analysis of Online Learning Readiness with Learning Culture and Character Strength as Antecedent Variables	Agung Ramadhanu , Ramdani Bayu Putra, Hadi, Rahmatul Husna Arsyah , Desi Permata Sari
33	Technology Context and Social Media Adoption Among Small-Medium Enterprise	Desi Ilona, Zerni Melmusi , Hanna Pratiwi, Padang, Indonesia), Zaitul
34	Statistical Software Adoption Behaviour Among Undergraduate Students	Zaitul , Sitti Rizki Mulyani , Muhammad Ridwan , Desi Ilona

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84	Fuzzy Logic Applications To Predict Total Production PKO (Palm Kernel Oil) In PT AAI Pasaman Method Using Web Based Tsukamoto	Devia Kartika, Mutiana Pratiwi, Rima Liana Gema
51	Strengthening Character Education with the Implementation of Machine Learning in the Millennial Era Industrial Revolution 4.0	Ulya Ilhami Arsyah , Rahmatul Husna Arsyah , Mutiana Pratiwi , Novia Lestari
83	Analysis of the Factors Affecting the Quality of Palm Oil Using the Analytical Hierarchy Process Method	Nugraha Rahmansyah , Shary Armonitha Lusinia, Rima Liana Gema
95	Analysis Of Electronically Reconfigurable Beam Steering Antenna Array Using Phase Shifter Technique	Soh Jen Neei, Muzammil Jusoh, Thennarasan Sabapathy, Samir Salem Al-Bawri, M.N. Yaasin, Tariq Abd Latif, Mahmud A. M. Albreem
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87	Transparent Encryption Technique for Trusted Computing	Gushelmi, Abdullah Mohd Zin
89	University Student Satisfaction Analysis on Academic Services by Using Decision Tree C4.5 Algorithm (Case Study : Universitas Putra Indonesia “YPTK” Padang)	Febri Aldi, Anita Ade Rahma
90	Analysis System of Occupational Health and Safety In coal Underground Mining	Heri Prabowo, I Prengki, A Amran
91	OLAP Approach in Searching Manufacturing Industries in West Sumatera	Eka Praja Wiyata Mandal, Dewi Eka Putri, Dede Wira Trise Putra, Dio Prima Mulya
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<b>93</b>	Model Of Artificial Neural Networks In Predictions Of Corn Productivity In An Effort To Overcome Imports In Indonesia	Anjar Wanto, Dedy Hartama, Gita Widi Bhawika, Deswidya Sukrisna Hutauruk, Pinondang Hotria Siregar, Ricard Fredrik Marpaung, Salim Efendi, Rusmin Saragih, Imeldawaty Gultom, Agus Perdana Windarto
<b>94</b>	Radiation Pattern Reconfigurable Fm Antenna	Barath, Thennarasan Sabapathy, Muzammil Jusoh, Samir Al-Bawri, M.N. Yaasin, Mohamed Nasrun Osman, Hasliza Abd Rahim
<b>96</b>	Expert System Delayed Walking In The Toddler	Yogi Wiyandra, Firna Yenila, Hezy Kurnia, Suci Wahyuni, Ratih Purwasih
<b>99</b>	Smart Irrigation System Based On Internet Of Things (Iot)	Nurulisma Ismail, Sheegillshah Rajendran, Wong Chee Tak, Tham Ker Xin, Nur Shazatushima Shahril Anuar, Fadhil Aiman Zakaria, Yahya Mohammed Salleh Al Quhaif, Hussein Amer M. Hasan Karakhan, and Hasliza A. Rahim
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# Implementation and Design User Interface Layout Use Leap Motion Controller With Hand Gesture Recognition

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**Abstract.** Human Computer Interaction is the study how to design, evaluate, and implement computer systems interactive, the systems can make a dialogue with human. This research was designed and implementation leap motion used hand movements into digital models, which can be used to replace the function of the mouse or keyboard and can provide an alternative in the utilization of hand movements as interactions that the naturally between human and computers and allowing users to input gesture commands into an application in place of a mouse or keyboard. Human gesture recognition as technique interaction for deliver interpretation more natural and for communicating with computers. The aim of this research to find usability leap motion, how effectiveness of the Leap Motion controller for hand gesture recognition for solve important problems in human use of mouse or keyboard. Testing and implementation from this research focused are tracking, detection, dynamic, and statis gesture recognition. The result 6 gesture recognition double outward swipe, tap, swipe, clap, circular and fly control tap accuracy of gesture interpretation data has obtained 87.62%. The uses the data for recognition model has obtain very good and testing with Leap Motion visualizer hand gesture recognition are often sensitive to poor resolution.

## 1. Introduction

Technology leap motion or hand motion tracking is now widely used, namely by means of the capture to hand movements that can replace the function of the mouse or keyboard functionality, technological of leap motion can help user with a means of controlling any instruction that will be ordered the computer device used only by giving the movement of the hands or fingers in the air. Virtual Technology is also to be developed with the aim of helping the user in the process of interaction with the Computer used, for that many development that utilize technology with virtual media as a means of interacting, communication and information, one of which is a leap that could control every motion movement of the fingers and hands from the users so that it can replace the mouse and keyboard functionality that is currently used as a medium of interaction input to computer. The problem arises when this is currently many developed 3D application models, but the limitations the use of gesture in applications that exits, to the process of with a human machine interaction to happen naturally through hand movements currently have limitations such as only for virtual based applications. At this time the use of the mouse and keyboard are often used as one of the tools interactions with the computer, but also the limitations of the device used when applications are made in the form of virtual currently started developing rapidly as a means communication, information and interaction between human and machine is still minimal use. The purpose of this research is as the user with the machine in the process as the user with the





machine in the process of interaction that can be done naturally without utilizing tools like the mouse and keyboard. The process is done in the form of gesture recognition with a process that occur by using the movement the hands and fingers through the air, so the gesture brings can be adjusted with space and shapes with unlimited movement. Natural User Interface is communication between human and machine in the purpose of this to add value to human interaction with machine naturally occurring with the use of the hand movements, gestures and other movement with grabs, gesture and body language which can then be responded quickly by machine.

## 2. Literature Review

### A. Human Computer Interaction

Is the concept of human and computer interaction is one of the interaction that occurs between people with the system or with device so communication between humans with machines to achieve a particular goal. Human Computer Interaction is defined as the scientific discipline that deals with the design, evaluation, and implementation of interactive computer system for use by humans and the study of phenomena in the environment. Human Computer Interaction is a computer science attention to continue that only use keyboard and mouse only, and so many researches to make human interaction computers with gesture spontaneous body movement that usually verbal communication and body parts that are commonly used are the hands, fingers.

### B. User Interface

Is Interface between man and computer which a component of the operating system that are in touch directly with the user. User interface can design focuses what users might need to do and ensuring that the interface has element that are easy to access, understand, and the use to facilitate those action. The user interface input, allowing the users to manipulate a system and output is the system to show the effect of the manipulation of the user. System interface design has a discipline known as User Centered Design (UCD). It is a design philosophy that places the user at the center of the system development process. System interface design is a complex and challenging job. One complaint from the end user when interacting with interface computer that is when the system is no longer able to meet the needs of system use. This makes the interface evaluation involving human participation becomes very important [1]. The user interface should be easy to use (ease of use), playfulness and usefulness, for that practitioners should develop information systems targeted at system attributes, associated with the reception quality since initialization to use, so that customer satisfaction is achieved [2].

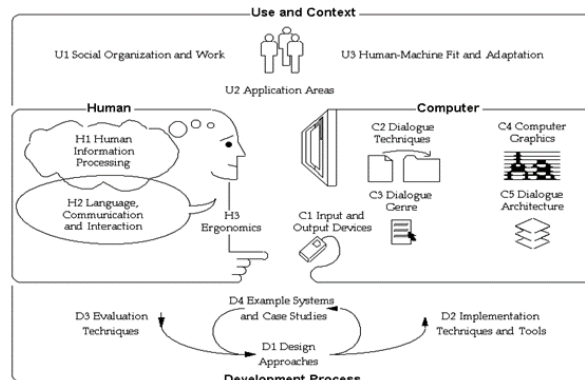
Things to look for in the design of the user interface are:

- a. User Friendly has a nice interface, easy to operate, easy to learn and users are comfortable with the look designed.
- b. Have high quality, admired by users, circulating outside and often imitated.

The importance of good interface design because of:

- a. Reduce Cost to Write Program  
In program a graphical user interface on average 70% writing programs related to interface.
- b. Easy to publish Product  
An early appearance of the product is visible from the side view of user interface.
- c. Improve the usability of computer for the human.

Models humans interact with Computers and development process of interaction:



**Figure 1.** Aspects interaction, source: Dix, Alan, et.al, Human Computer Interaction.

From the figure 1, aspects of interaction are: use and context of computers (Social organization network, application area, Human-machine fit and adaptation), Human Characteristic (Human Information Processing, Language, Communication and Interaction, Ergonomics), Computer system and interface architecture (Input and Output Devices, Dialogue technique, Dialogue genre, Computer Graphics, Dialogue Architecture). Development Process (Design approaches, implementation techniques and Tools, Evaluation Techniques).

### C. Natural User Interface

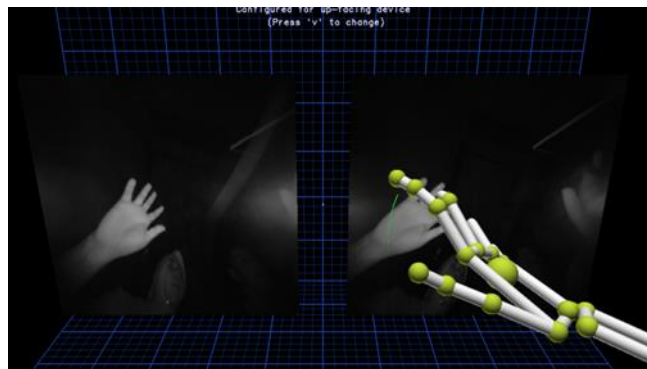
Natural User interfaces show great promise to define new and potentially large niches of interactive computing. The promise of Natural Computing Interfaces (touch and gesture) stems from at least two sources -- the prospect of touch and gestural computing becoming as ubiquitous as currently dominant paradigms (e.g. GUI.) and technical breakthroughs. However, this new field of research and commercial development faces significant challenges (Steven C. Ph.D., Dennis Wixon, Ph.D, Ann Morrison, Giulio Jacucci, Ph.D., 2010).

### D. Gesture Recognition

Gesture Recognition is an interface that can recognize the motion and movement an interaction that can be understood by the computers and gesture recognition can also be used to interact with the computer and tracking how to read human body movements that can be processed by a computers as trigger to do the next process that was made in advance capable of reading and translate the movement made by humans become a command that can be read and processed by computer. Human Computer Interaction through the use gesture can be one of the ways to improve the comfort in the process of interaction between humans with machines, especially when interaction models that is served base by 3D, in the gesture recognition a model must be understanding gesture hand movement with tap gesture, swipe gesture and others gesture.

Gesture interaction can be into with two groups are:

- a. Gesture interaction model based on the pattern of the gesture with capture picture and recognize the gesture of identification on the pattern the hand detection with hand gesture. The hand was captured by the Leap Motion Controller in accordance with the pattern of hand movements.
- b. Gesture Recognition can be seen as a way for computers to begin to understand the language of the human body so the rich build bridges between machine and humans. Gesture can original from any gesture with hands, gesture recognition can be seen as a way for computer to begun understanding the language of the human body rich build bridges between machines and human than Graphic User Interface which still restrict the majority of input to keyboard and mouse.



**Figure 2.** Gesture Hand Understand the language of human body

*E. Leap Motion and Gesture Controller*

The Leap Motion Controller is a modern device and technology products can sense naturally move and style with point, grab, wave, reach. The Product its Very small but a very fantastic idea, it's just a swipe hand of movement fingers and you can variety of activities in operating a computer with the Product

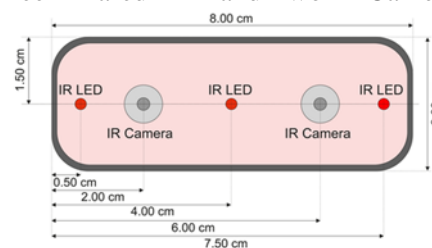


**Figure 3.** The Leap Motion Controller  
<http://www.google.com>



**Figure 4.** The Leap Motion Controller  
<http://www.google.com>

In the Leap Motion Controller have Three Infrared LED and Two IR Camera



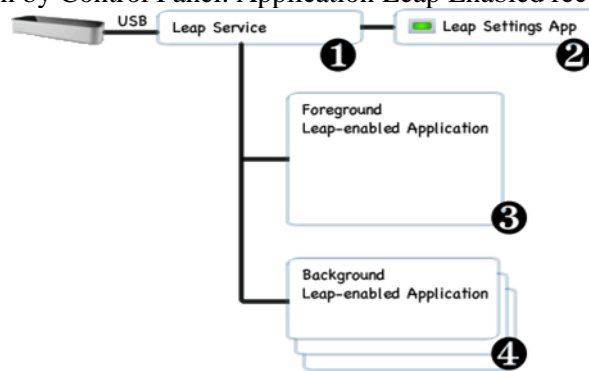
**Figure 5.** <http://www.mdpi.com/1424-8220/13/5/6380/htm>

*F. Leap Motion Exploration*

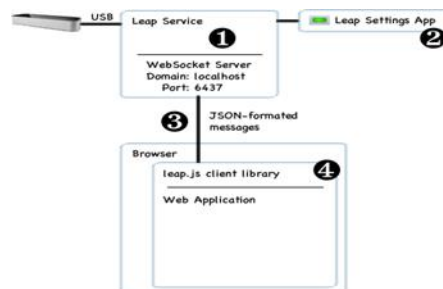
Leap Motion can addition to replacing the functions of the mouse, leap motion can turn out to be a function of the keyboard with the emitting that represent letters and numbers on my keyboard. Application that have been support the “Leap Enable” can be access the service Motion for Leap Motion SDK provides two type of API to get data leap Motion are:

- a. Native Interface
- b. Web socket Interface

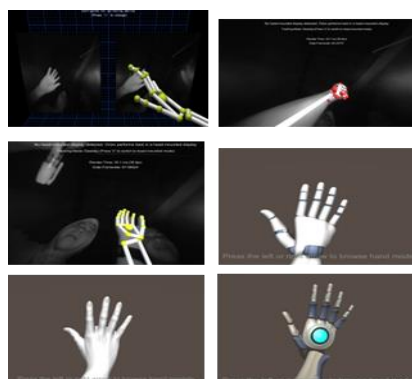
Native interface is a library dynamic and that can be used to created new applications and have featured “Leap Enabled”. Web Socket interface is a library can create a web application that supports the “Leap Enabled”. Native Application interface provided loaded library leap motion and tracking data in application, the library connects with using programming language C++, C#, Java or Python. In the feature Native interface receive data from the motion controller via BUS Leap USB and then process the information. Application Leap Motion apart from the service and allows computer user to configure the installation Leap Motion by Control Panel. Application Leap Enabled received data tracking result.



**Figure 6.** Architecture Native Interface <http://users.itk.ppke.hu>



**Figure 7.** Architecture Native Interface <http://users.itk.ppke.hu>



**Figure 8.** The Leap Motion Exploration and Sample Capture for Movement Hands and Hands Model

### 3. Related Work

The Leap Motion Controller hand movement and gesture recognition in the research provides an informative representation of hands, utilize tracking data through the API of Leap Motion Controller to recognize hand movement and hand gestures. The Experiment shows that our method based on hand gesture accurately when no occlusion happens [3].

Gesture Recognition is the process of recognizing human gestures via mathematical algorithms. Effective gesture recognition without wearing any device on the arm is achieved depth cameras like leap motion. Gesture Recognition devices be it a depth camera or a normal camera generate tracking data about the hands in the field of view [4].

The Leap Motion Controller is a new device for hand gesture-controlled user interfaces with declared sub millimeter accuracy. However, up to this point its capabilities in real environments have not been analyzed. In this research present a first study of Leap Motion Controller, the main focus of attention is on the evaluation of the accuracy and repeatability. For an appropriate evaluation a position accuracy of 0.2 mm [5].

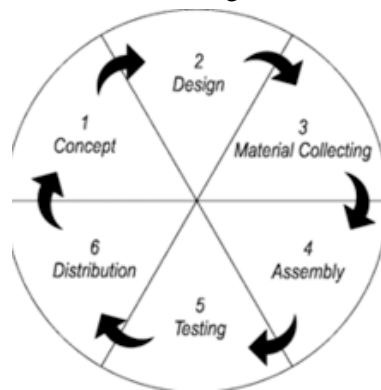
This research present an early exploration of the suit ability of the Leap Motion Controller for Australian Sign Language recognition. Testing showed that the controller is able to provide accurate tracking of hands and fingers and to track movement. This detection loses accuracy when the hand moves into a position that obstructs the controller's ability to view, such as when the hand rotates and is perpendicular to the controller [6].

### 4. Implementation Leap Motion Controller and Design Interface Application

The process of implementation of the Leap Motion Controller on design application introduce the architecture stage of several buildings (Monas, BNI, BI, MPR/DPR buildings)

#### A. Methodology for design and implementation Leap Motion Controller.

Step by step for design use MDLC (Multimedia Development Life Cycle): Concept, Design, Material Collecting, Assembly, Testing and Distribution. In Figure 9 MDLC Methodology



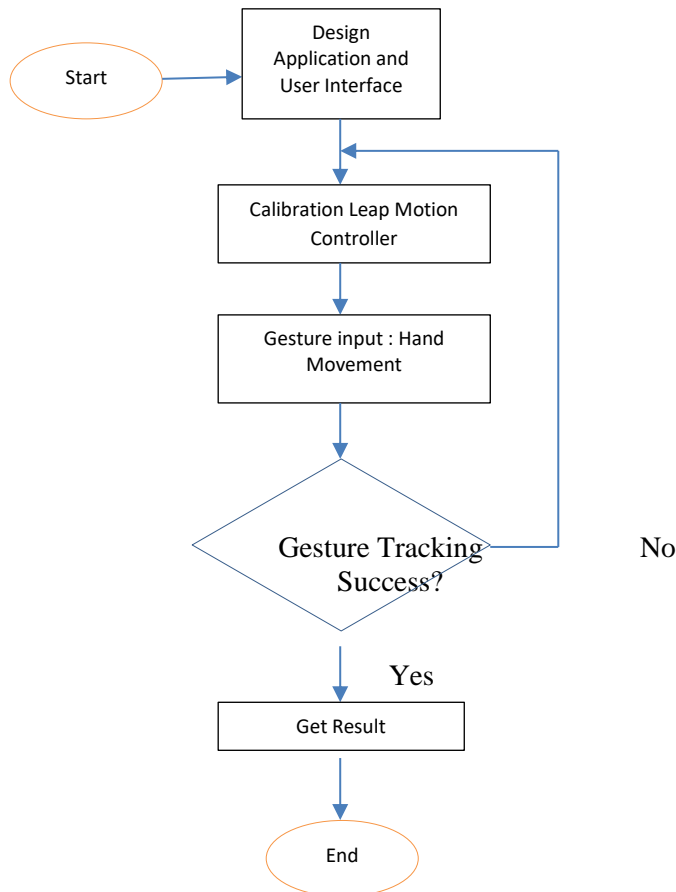
**Figure 9.** Multimedia Development Life Cycle

From the figure 7, step by step on MDLC Methodology are:

1. Concept Inside stage this there is some steps that need a note, among others: 1. Determine the aim application made
2. Design on stage this made specification application in a manner detailed in a design application. where manufacture adjusted based on: Design Flow Diagram (Flowchart). The designs are made too adjusted with the theme in question for example design BNI building, BI, Monad, MPR and DPR
3. Material Collecting (collection material), adjusted with building What is used on the theme this for example building Monas, BNI, BI, MPR and DPR
4. Stage assembly (manufacture) is stage Where all object or multimedia material made. Making application based on the flowchart. All object or material made and combined to be one application intact

5. Testing is stage testing existing applications and adjusted with the object being tested
6. Inside Distribution stage this, the application has been finished in test and stated well corresponding with aim manufacture, will distribute corresponding with results expected

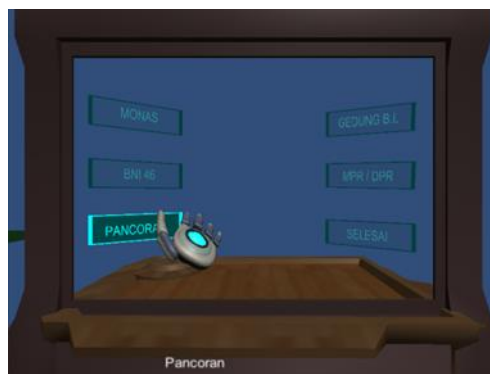
*B. Flowchart design application and Integrated Leap Motion Controller.*



**Figure 10.** Flowchart design application and Integrated Leap Motion Controller.

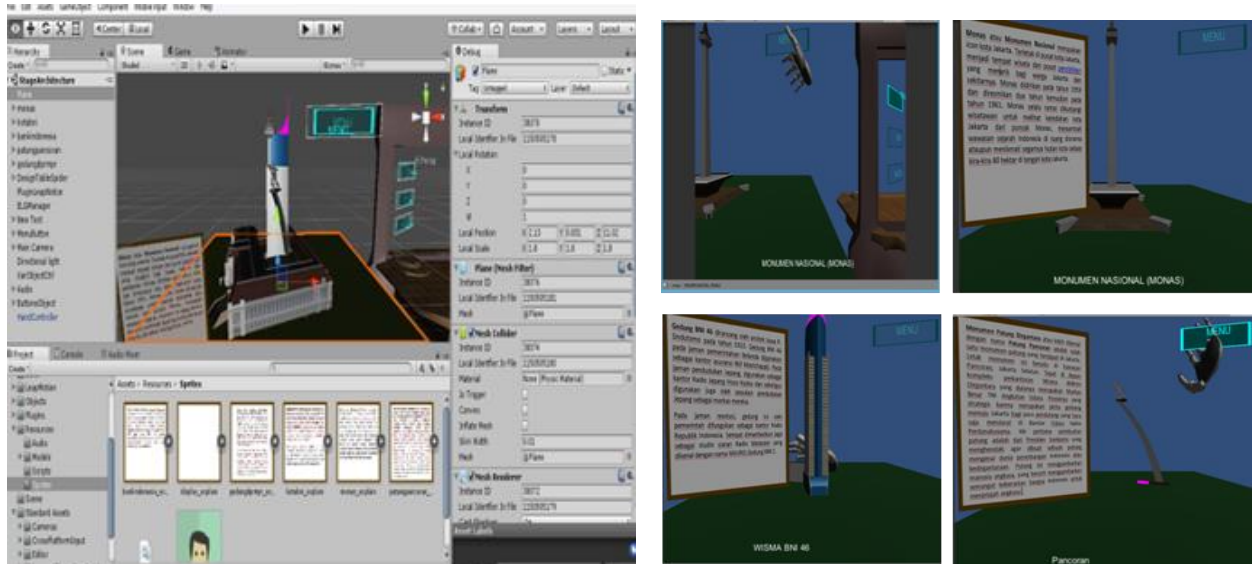
The flowchart explains step by step design application and user interface before tracking hand movement, the computer and Leap Motion Controller must integrate in to USB port and then calibration Leap Motion controller (service, Device, Calibration, Tracking, Bandwidth, Lighting, Smudge Status). The next Step gesture and tracking hand movement, if a success capture the result and calculate accuracy hand movement and finish, if no return to back calibration about the Leap Motion Controller.

*C. Design Interface*



**Figure 11.** Design Application with Gesture Hand Movement and Integrated Leap Motion Controller

Figure 9 explain design application with stage architecture and design object with 3D Unity. The design interface can implemented about the gesture hand movement with hand models like robot. The figure 8 explain breakdown feature if choice menu (stage architecture Monas, BI, BNI, MPR/DPR and finish). The hand models respond quickly if hand movement if choice the menu.



**Figure 12.** Feature and Explanation the feature or menu in Design interface Stage Architecture. The Figure 10 explain about breakdown feature if select the menu.

*D. Code Program C# From Design Interface Stage Architecture*

```
using Unity Engine;
using System. Collections;
using LM Widgets;
public class Button To Monas : Button Toggle Base
{
    public ButtonDemoGraphics onGraphics;
    public ButtonDemoGraphics offGraphics;
    public ButtonDemoGraphics midGraphics;
    public Button Demo Graphics bot Graphics;

    public Color Mid Graphics On Color =
        new Color(0.0f, 0.5f, 0.5f, 1.0f);

    public Color Bot Graphics On Color =
        new Color(0.0f, 1.0f, 1.0f, 1.0f);
    public Color Mid Graphics Off Color =
        new Color(0.0f, 0.5f, 0.5f, 0.1f);
    public Color Bot Graphics Off Color =
        new Color(0.0f, 0.25f, 0.25f, 1.0f);
    private Transform camera;
    private Transform hand;
    public float buttonstate = 0;
    public float movementSpeed = 30;
    public override void ButtonTurnsOn()
    {
```

```
if (ButtonDemo Graphics. button Enabled == true)
{
    Button Demo Graphics. Button Enabled = false;

    TurnsOnGraphics ();
    StartCoroutine (MyCoroutine ());
}
print (Button Demo Graphics. button Enabled);
}

public override void ButtonTurnsOff()
{
    //TurnsOffGraphics();
}
private void TurnsOnGraphics()
{
    on Graphics Set Active (true);
    off Graphics. Set Active (false);
    mid Graphics. Set Color (Mid Graphics On Color);
    bot Graphics. Set Color (Bot Graphics On Color);
    Game Object. Find ("beep1").Get Component<Audio Source> ().Play();
}
private void Turns Off Graphics()
{
```

```

on Graphics. Set Active (false);
off Graphics. Set Active (true);
mid Graphics. Set Color (Mid Graphics Off Color);
bot Graphics. Set Color (Bot Graphics Off Color);
button state = 0;
}

private void Update Graphics()
{
    Vector3 position= transform. Local Position;
    position. z = Math f .Min(position. z,

m_ local Trigger Distance);
    on Graphics. transform. Local Position

= position;
    off Graphics. transform. Local Position

= position;
    Vector3 bot _ position = position;
    bot _ position.z = Mathf.Max

(bot _ position. z, m_ local Trigger

Distance - m_ local Cushion Thickness);
    bot Graphics. transform. Local Position

= bot _ position;
    Vector3 mid _ position = position;
    mid _ position .z =

(position. z + bot _ position. z) / 2.0f;
    mid Graphics .transform. local Position

= mid _ position;
}
protected override void Start()
{
    camera = Game Object .Find With Tag

("Main Camera").Get Component<Transform>();
    hand = Game Object. Find With Tag("Player").

Get Component<Transform>();
    base. Start();
    Turns Off Graphics();
}
private void Late Update ()
{

private void Update Graphics()
{
    Vector3 position= transform. Local Position;

```

```

position. z = Math f .Min(position. z, m_ local Trigger Distance);
on Graphics. transform. Local Position = position;
off Graphics. transform. Local Position = position;
Vector3 bot _ position = position;
bot _ position. z = Math f. Max

(bot _ position.z, m_ localTriggerDistance - m_ localCushionThickne

ss);
bot Graphics. transform. Local Position = bot _ position;
Vector3 mid _ position = position;
mid _ position .z = (position. z + bot _ position. z) / 2.0f;
mid Graphics .transform. local Position = mid _ position;
}
protected override void Start()
{
    camera = GameObject.FindWithTag("MainCamera")

.GetComponent<Transform>();
    hand = Game Object. Find With Tag("Player").

GetComponent<Transform>();
    base. Start();
    Turns Off Graphics();
}
private void Late Update ()
{
    if (button state == 1) {

Object. stage = 1 ;
    object. stage = "monas";
    object. Name

stage = "MONUMEN NASIONAL (MONAS)";

    if (camera. Position .x > 0) {
        camera. transform. Translate (Vector3.right

        *movement Speed *Time. delta Time);
        hand. transform. Translate

(Vector3.right * movement Speed * Time .delta Time);
render. sprite name = Object. stage+" _explain";
    Object. Go(1);
    }else{
        button state = 0;
        Button Demo Graphics. button Enabled = true;
    }
}
}
protected override void Fixed Update()
{
    base. Fixed Update();
    Update Graphics();
}

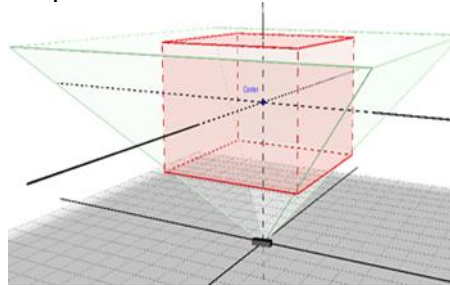
IE numerator My Co routine()
{
    yield return new Wait For Seconds(1);
    button state = 1;
    yield return new Wait For Seconds(2);
    Turns Off Graphics();
}
}

```



### E. Testing and Implementation Leap Motion For Gesture Recognition

1. Testing for Dynamic Hand Gesture Recognition after final stage to get and find out the ideal value of each variable parameters that are determined by the data type float in stage with Multimedia Development Life Cycle. In the implementation with different version alpha, beta and last version for key tap, double outward swipe, tap, swipe, clap, circular and fly control have a good respond.
2. Testing from Interaction Leap Motion Box



**Figure 13.** Leap Motion Interaction Box. <http://www. Leap Motion Development>

Figure 11 is a Leap Motion Interaction Box and the testing can make with the other corner ( $15^\circ$ ,  $45^\circ$  and  $60^\circ$ ). Range of Leap motion doing tracking data is about  $150^\circ$ ; the testing with 10 iteration from the 3 corner and see the recommended corner for tracking hand movement.

#### a. Accuracy for $15^\circ$

**Table 1.** The average accuracy for the hand movement gesture

Gestures	Known	Unknown
Key tap	8	2
Double Outward Swipe	9	1
Tap	8	2
Swipe	9	1
Clap	9	1
Circular	8	2
Fly Control	7	3

From the table 1, the average accuracy for the hand movement gesture is:

Key Tap: For Know: 80%, Double Outward Swipe: 90, Swipe: 90%, Tap : 80%, Clap: 90%, Circular : 80% and Fly Control : 70%, so the average hand movement for corner  $15^\circ$  is : 82.86%.

#### b. Accuracy for $45^\circ$

**Table 2.** Accuracy With  $45^\circ$

Gestures	Known	Unknown
Key tap	10	0
Double Outward Swipe	9	1
Tap	9	1
Swipe	9	1
Clap	10	0
Circular	8	2
Fly Control	10	0

From the table 2, the average accuracy for the hand movement gesture is:

Key Tap: For Know: 100%, Double Outward Swipe: 90%, Tap : 90%, Swipe : 90%, Clap: 100%, Circular : 80% and Fly Control : 100%, so the average hand movement for corner 15° is : 92.86%.

c. Accuracy for 60°

**Table 3.** accuracy with 60°

Gestures	Known	Unknown
Key tap	7	3
Double Outward Swipe	10	0
Tap	8	2
Swipe	9	1
Clap	9	1
Circular	9	1
Fly Control	9	1

From the table 1, the average accuracy for the hand movement gesture is:

Key Tap: For Know: 70%, Double Outward: 100%, Tap: 80%, Swipe: 90%, Clap: 90%, Circular: 90% and Fly Control: 90%, so the average hand movement for corner 60° is: 87.15%. From the three simulation with the different corner the average is: 87.62%.

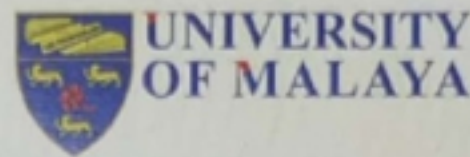
### Conclusion

1. Human Computer Interaction is the concept of human and computer interaction is one of the interactions that occurs between people with the system or with device so communication between humans with machines to achieve a particular goal.
2. The user interface input, allowing the users to manipulate a system and output is the system to show the effect of the manipulation of the user. System interface design has a discipline known as User Centered Design (UCD). It is a design philosophy that places the user at the center of the system development process.
3. Natural User interfaces show great promise to define new and potentially large niches of interactive computing.
4. Gesture Recognition is an interface that can recognize the motion and movement an interaction that can be understood by the computers and gesture recognition can also be used to interact with the computer and tracking how to read human body movements.
5. From the three simulation with the different corner the average is: 87.62%.

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# CERTIFICATE

**MARDHIAH MASRIL**

PARTICIPANT

In International Conference On Computer Science And Engineering  
"Strategies to Face Industrial Revolution 4.0"  
on Friday-Saturday , April 26-27<sup>th</sup>, 2019 at UPI Convention Center, Padang, West Sumatera, Indonesia

Rector  
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