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## The Evaluation of Child's Health Monitoring System Using the Usability Testing Approach

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Kurniawan Teguh Martono; Oky Dwi Nurhayati; Aris Puji Widodo [All Authors](#)

**1**  
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**132**  
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**Abstract**

Document Sections

- I. Introduction
- II. Literature Review
- III. Research Method
- IV. Result
- V. Conclusion

Authors

Figures

References

Citations

Keywords

Metrics

**Abstract:**

The development of information and communication technology brings considerable changes in every aspect. This change certainly affects humans in obtaining information. At present information is something that is very important for every organization in running its business processes. Health is one of the capitals in the development of the State. POSYANDU is one of the organizations carried out by the community in order to increase the participation of the community in developing health activities including reducing infant mortality, knowing the nutritional status of toddlers, knowing the condition of child development. The resulting data from POSYANDU activities can be used as a source in health development planning in an area. This paper discusses the evaluation of child health monitoring systems by using usability testing. The result is that the built system has fulfilled the elements of usefulness, ease of use, ease of learning, and satisfaction. The average result of a reusability test with a value of 4.2 indicates that the system is very easy to use. Requirements required by users of the system have also been met, so the system works according to user expectations.

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**I. Introduction**

Information technology has become a necessity for organizations today. All aspects of human work in an organization today require the availability of technology to assist in solving problems or tasks faced by humans. Effectiveness and efficiency of time becomes a significant need in solving a problem. Information technology is to use one of supporters in the business process in the field of education, government, and industry. Information technology brings an important role in the current era this is because with the use of appropriate information technology will make the organization can

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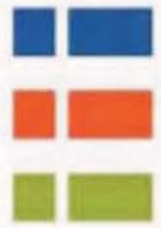


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# ICITACEE 2018



PROCEEDINGS

**GREEN TECHNOLOGY AND SMART ENVIRONMENT  
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Yoanes Bandung (Institut Teknologi Bandung, Indonesia)  
Suryono (Diponegoro University, Indonesia)

# Program

Thursday, September 27

Thursday, September 27 9:30 - 11:30

INV: Invited Paper

***Green Computing: Opportunity of Using Breadth Fixed Gossip Algorithm for Optimizing Power Supply Route in Power Plant***

Mauridhi Purnomo (Institut Teknologi Sepuluh Nopember, Indonesia)  
pp. 1-6

Thursday, September 27 13:00 - 15:15

A1: Electronic Circuit & Control

***Magnetic Field Relationship between Distance and Induced Voltage Generated by EMP***

Betantya Nugroho and Azli Yahya (Universiti Teknologi Malaysia, Malaysia); Abd Rahim (Mindmatics, Malaysia); Trias Andromeda (Universitas Diponegoro, Indonesia)  
pp. 7-10

***Communication Protocol on 64-Channel ECVT Data Acquisition System***

Arbai Yusuf (Universitas Indonesia & C-Tech Labs Edwar Technology, Indonesia)  
pp. 11-14

***Cooling System Design Based on Thermoelectric Using Fan Motor on-off Control***

Munnik Haryanti (Universitas Dirgantara Marsekal Suryadarma, Indonesia)  
pp. 15-18

***Design of The 3D Surface Scanning System for Human Wrist Contour Using Laser Line Imaging***

Riky Tri Yunardi and Ario Imandiri (Universitas Airlangga, Indonesia)  
pp. 19-23

***Temperature Controlling Using PID Controller on Rice Grain Fluidized Dryer Prototype***

Aris Triwiyatno (Diponegoro University, Indonesia)  
pp. 24-27

***PID Based Air Heater Controller Implemented With Matlab/Simulink and Arduino Uno***

Bambang Supriyo, Dadi Dadi, Sulisty Warjono, Adi Wisaksono, Sri Astuti and Kusno Utomo (Politeknik Negeri Semarang, Indonesia)  
pp. 28-32

***Design A Low Cost Wind Direction Sensor With High Accuracy***

Yoga Utama (University of Widya Kartika, Indonesia)  
pp. 33-38

***Quadruped Robot with Stabilization Algorithm on Uneven Floor using 6 DOF IMU based Inverse Kinematic***

Rofiq Prayogo (Diponegoro University, Indonesia)  
pp. 39-44

***Design and Characterization of Low-Cost Soft Pneumatic Bending Actuator for Hand Rehabilitation***

Mochammad Ariyanto, Joga Setiawan, Rifky Ismail, Ismoyo Haryanto, Tania Febrina and Doni Saksono (Diponegoro University, Indonesia)  
pp. 45-50

## B1: Electric & Power System

### ***Design and Performance Test of Three Phased SRF-PLL using DSPIC30F4011***

Syarief Ali, Iwan Setiawan and Susatyo Handoko (Universitas Diponegoro, Indonesia)  
pp. 51-56

### ***The Effect of Excitation Capacitors on Induction Generators in Loss-of-Grid Events***

Mokhammad Isnaeni Bambang Setyonegoro (Universitas Gadjah Mada, Indonesia); Danang Wijaya (UGM, Indonesia); Eka Firmansyah (Universitas Gadjah Mada, Indonesia)  
pp. 57-60

### ***Transient Stability Study in Grid Integrated Wind Farm***

Samuel Adi Kusumo (Universitas Gadjah Mada, Indonesia); Lesnanto Multa Putranto (UGM, Indonesia); Tiyono Tiyono (Universitas Gadjah Mada, Indonesia)  
pp. 61-66

### ***Analysis of Energy Potential of Biomass Electricity from Leaf Waste by Using Briquette Method***

Herlina Wahab (Sriwijaya University & University of Indonesia, Indonesia); Rudy Setiabudy (Universitas Indonesia (UI), Indonesia); Akbar Cahyadi (Universitas Indonesia, Indonesia)  
pp. 67-72

### ***DVR to Voltage Sag Mitigation Due to Induction Motor Starting and 3 Phase Fault***

Muhammad Kuncoro and Iwa Garniwa (University of Indonesia, Indonesia)  
pp. 73-78

### ***A Single Phase 11-Level Inverter for Photovoltaic Application***

Wira Adhitama and Leonardus Pratomo (Soegijapranata Catholic University, Indonesia)  
pp. 79-83

### ***Design and Implementation of Inverter Single Phase Nine-Level Using PIC18F4550***

Natanael Novalutfi and Leonardus Pratomo (Soegijapranata Catholic University, Indonesia)  
pp. 84-88

### ***Energy Saving Measures and Potential of Energy Efficiency at The University of Surabaya***

Fitri Kartikasari (University of Surabaya, Indonesia); Elieser Tarigan (University of Surabaya & Electrical Engineering, Indonesia); Yunus Fransiscus and Tuani Lidyawati (University of Surabaya, Indonesia)  
pp. 89-92

### ***Design and Simulation of an Asymmetrical 11-Level Inverter for Photovoltaic Applications***

Christopher Tjokro and Leonardus Pratomo (Soegijapranata Catholic University, Indonesia)  
pp. 93-98

## C1: Information & Computer Technologies

### ***MRI Image Segmentation using Morphological Enhancement and Noise Removal based on Fuzzy C-means***

Robert Setyawan, Mustofa Alisahid Almahfud, Christy Atika Sari, De Rosal Ignatius Moses Setiadi and Eko Hari Rachmawanto (Dian Nuswantoro University, Indonesia)  
pp. 99-104

### ***Measurement on Real-Time Diagnostic of Gastric Tumor Model Using Wireless Endoscopy System***

Novietasari Chisnariandini (University of Indonesia, Indonesia); Arie Pangesti Aji (Universitas Indonesia, Indonesia); Yudiansyah Yudiansyah (University of Indonesia, Indonesia); Prita Dewi Mariyam, Jauharul Fuadi, Yulianto La Elo and Basari Basari (Universitas Indonesia, Indonesia)  
pp. 105-108

### ***Relational Database Structure and Operations Engineering Based on UML Diagram***

Lukman Hakim (Bandung Institute of Technology, Indonesia); Sukrisno Mardiyanto (Institut Teknologi Bandung, Indonesia)  
pp. 109-113



***Design of Secure IoT Platform For Smart Home System***

Arvandy Arvandy and Yoanes Bandung (Institut Teknologi Bandung, Indonesia)  
pp. 114-119

***Marker Image Variables Measurement of Augmented Reality in Mobile Application***

Ike Windasari, Yudi Windarto and Risma Septiana (Diponegoro University, Indonesia)  
pp. 120-124

***Sentiment Analysis and Topic Modelling for Identification of Government Service Satisfaction***

Moh Nasrul Aziz, Ari Firmanto, Ahmad Miftah Fajrin and R. V. Hari Ginardi (Institut Teknologi Sepuluh Nopember, Indonesia)  
pp. 125-130

***Prototype of Online Examination on MoLearn Applications Using Text Similarity to Detect Plagiarism***

Julianto Lemantara (Institut Bisnis dan Informatika Stikom Surabaya, Indonesia); Dewiyani Sunarto (Institute of Business and Informatic Stikom Surabaya, Indonesia); Bambang Hariadi, Tri Sagirani and Tan Amelia (Institut Bisnis dan Informatika Stikom Surabaya, Indonesia)  
pp. 131-136

***Performance Comparison Between AES256-Blowfish and Blowfish-AES256 Combination***

Muhammad Muin (Universitas AMIKOM Yogyakarta & STMIK Bina Patria, Indonesia); Arief Setyanto (Universitas AMIKOM Yogyakarta, Indonesia); Sudarmawan Sudarmawan (AMIKOM Yogyakarta University, Indonesia); Kartika Santoso (STMIK Bina Patria, Indonesia)  
pp. 137-141

***A Natural Childbirth Training Simulation in Virtual Environment For Prospective Midwife***

Alvin Nugraha, Aulia Faza, Wulan Indayani and Hanny Haryanto (Universitas Dian Nuswantoro, Indonesia); Abas Setiawan (Dian Nuswantoro University, Indonesia)  
pp. 142-146

## D1: Telecommunications & Radio Frequency

***Study on 2G Termination in Indonesia using BCG Matrix***

Alaind Fadrian and Ajib S. Arifin (Universitas Indonesia, Indonesia)  
pp. 147-151

***Performance of 8FSK base on PACTOR I protocol over AWGN channels***

Mohd Yazid Ab Razak (National University of Malaysia & Mindmatics Sdn Bhd, Malaysia); Abd Rahim Mat Sidek (Mindmatics Sdn Bhd, Malaysia); Nasharuddin Zainal (Universiti Kebangsaan Malaysia, Malaysia)  
pp. 152-156

***Development of Radio Direction Finder using 6 Log Periodic Dipole Array Antennas***

Kartiko Nugroho, Azli Yahya and Nor Hisham Khamis (Universiti Teknologi Malaysia, Malaysia); Nuramirah Mohd Nor (Mindmatics Sdn. Bhd., Malaysia); Abd Rahim (Mindmatics, Malaysia); Mohammad Razman Shaari (Mindmatics Sdn. Bhd., Malaysia)  
pp. 157-160

***Directional 2x2 MIMO Microstrip Antenna Design and Optimization for LTE Band-3 Application***

Tommi Hariyadi and Rizky Megantara (Universitas Pendidikan Indonesia, Indonesia)  
pp. 161-166

***High Throughput Wireless Printer Server Based on IEEE 802.11n***

Wahyul Amien Syafei (Diponegoro University, Semarang & Kyushu Institute of Technology, Iizuka, Indonesia); Imam Santoso (Diponegoro University, Indonesia)  
pp. 167-170

***Analysis on Batik Water Waste Monitoring System based on LoRa Communication***

Michael Stephen Moses Pakpahan, Eko Didik Widiyanto and Risma Septiana (Diponegoro University, Indonesia)

pp. 171-175

***A GIS-based Waste Water Monitoring System Using LoRa Technology***

Yudi Windarto and Agung Prasetijo (Diponegoro University, Indonesia); Galang Damara (Universitas Diponegoro, Indonesia)

pp. 176-179

***Filtering for Data Acquisition on Wireless Sensor Network***

Aghus Sofwan, Sumardi Sumardi and Nely Ulwiyati (Diponegoro University, Indonesia)

pp. 180-184

Thursday, September 27 15:30 - 18:45

**A2: Electronic Circuit & Control**

***Predictive Control for Relative Performance Management***

Dharma Aryani (State Polytechnic of Ujung Pandang, Indonesia); Nur Asyik Hidayatullah (State Polytechnic of Madiun, Indonesia)

pp. 185-190

***Design and Development of Injection Current Control On Inverter-Based Proportional Resonant Method***

Abdul Haris Kuspranoto and Iwan Setiawan (Universitas Diponegoro, Indonesia); Mochammad Facta (Diponegoro University, Indonesia)

pp. 191-196

***Development of Object Tracking System Using Remotely Operated Vehicle Based on Visual sensor***

Erwin Saputra and Ronny Mardiyanto (Institut Teknologi Sepuluh Nopember, Indonesia)

pp. 197-202

***Predictive Control Approach for Restricted Areas Avoidance of Autonomous System***

Sutrisno Sutrisno, Widowati Widowati, Sunarsih Sunarsih and Kartono Kartono (Diponegoro University, Indonesia)

pp. 203-207

***Kufarm: A Modified Platform of Automation Planting System***

Damar Pramuditya (Telkomuniversity, Indonesia); Agung Nugroho Jati and Fairuz Azmi (Telkom University, Indonesia)

pp. 208-213

***Tracking Object based on GPS and IMU Sensor***

Wahyudi Wahyudi (Department of Electrical Engineering, Diponegoro University)

pp. 214-218

***Development of Navigation Method of Buoyant Boat for Maintaining Position of The Boat and ROV***

Ronny Mardiyanto, Heri Suryoatmojo and Badrut Tamam (Institut Teknologi Sepuluh Nopember, Indonesia)

pp. 219-224

***Development of a Low-Cost Quadrapedal Starfish Soft Robot***

Mochammad Ariyanto, Munadi M and Joga Setiawan (Diponegoro University, Indonesia)

pp. 225-229

***Performance Improvement of Robot Warehouse Based on Battery Operational Conditions***

Almira Budiyanoto, Aris Setiawan and Setyawan Wahyu Pratomo (Universitas Islam Indonesia, Indonesia)

pp. 230-233

**B2: Electric & Power System**

***Design of Adaptive PID Controller for Fuel Utilization In Solid Oxide Fuel Cell***

Darjat Darjat, Sulisty Sulisty and Aris Triwiyatno (Diponegoro University, Indonesia)

pp. 234-239

***Study on Photovoltaic Hosting in Yogyakarta Electric Distribution Network***

Faishal Fuad Rahman Soeharto (Universitas Gadjah Mada, Indonesia); Kristianto Adi Widiatmoko and Sarjiya Sarjiya (Gadjah Mada University, Indonesia); Lesnanto Multa Putranto (UGM, Indonesia)  
pp. 240-244

***Analysis of Grounding System in 150 kV Kudus Substation***

Riza Pratama, Hermawan Hermawan and Mochammad Facta (Diponegoro University, Indonesia)  
pp. 245-250

***Maximum Power Tracking of Solar Panel using Modified Incremental Conductance Method***

Trias Andromeda (Universitas Diponegoro, Indonesia); Betantya Nugroho (Universiti Teknologi Malaysia, Malaysia); Susatyo Handoko (Universitas Diponegoro, Indonesia); Azli Yahya (Universiti Teknologi Malaysia, Malaysia); Hermawan Hermawan and Mochammad Facta (Diponegoro University, Indonesia); Iwan Setiawan (Universitas Diponegoro, Indonesia)  
pp. 251-255

***Electrical Load Forecasting Study Using Artificial Neural Network Method for Minimizing Blackout***

Husein Mubarak and Mukhamad Sapanta (Universitas Islam Indonesia, Indonesia)  
pp. 256-259

***Comparison Study on Leakage Current of 20 kV Silicon Rubber and Epoxy Resin Insulator Under Dry and Wet Condition***

Taryo Taryo (Diponegoro University, Indonesia); Abdul Syukur (Universitas Diponegoro, Indonesia); Hermawan Hermawan (Diponegoro University, Indonesia)  
pp. 260-263

***Leakage Current Characteristics of 20 kV Epoxy Resin Insulators Under Variation Humidity***

Pertiwi Utami and Hermawan Hermawan (Diponegoro University, Indonesia); Abdul Syukur (Universitas Diponegoro, Indonesia)  
pp. 264-267

***Measurement System for Surface Leakage Current at Epoxy Resin Insulating Materials***

Abdul Syukur (Diponegoro University, Indonesia); Wahyudi Wahyudi (Departemen Teknik Elektro UNDIP, Indonesia); Jumrianto Jumrianto, Jr (Diponegoro University & NET TV, Indonesia)  
pp. 268-271

***An Investigation of Direct Grounding Effect on Modeling of Lightning and Tower in Transmission Line***

Mochammad Facta, Abdul Syukur and Hermawan Hermawan (Diponegoro University, Indonesia)  
pp. 272-275

## C2: Information & Computer Technologies

***Halstead Metric for Quality Measurement of Various Version of Statcato***

Iwan Binanto (Sanata Dharma University, Indonesia); Bahtiar Saleh Abbas and Nesti Sianipar (Bina Nusantara University, Indonesia); Harco Leslie Hendric Spits Warnars (Bina Nusantara University & Doctor of Computer Science, Indonesia)  
pp. 276-280

***Environmental Health Monitoring with Smartphone Application***

Kodrat Iman Satoto, Eko Didik Widiyanto and Sumardi Sumardi (Diponegoro University, Indonesia)  
pp. 281-286

***Two-Step Ranking Document Using the Ontology-Based Causality Detection***

A. A. I. N. Eka Karyawati and L. A. A. Rahning Putri (Udayana University, Indonesia)  
pp. 287-292

***Knowledge Management Model in Syariah Banking***

Nurdin Nurdin (Institut Agama Islam Negeri Palu); Sagaf S Pettalongi and Khaeruddin Yusuf (Institut Agama Islam Negeri Palu, Indonesia)  
pp. 293-298

***The Spreading of Misinformation online: 3D Simulation***

Pardis Pourghomi and Milan Dordevic (American University of the Middle East, Kuwait); Fadi Safieddine (Queen Mary University of London, United Kingdom (Great Britain))  
pp. 299-304

***IT Management Flexibility Concept for Higher Education***

Wasilah Wasilah (Gajah Mada University (UGM) & Informatics and Bisniss Institute (IBI DARMAJAYA) Bandar Lampung, Indonesia); Lukito Edi Nugroho and Paulus Insap Santosa (Universitas Gadjah Mada, Indonesia)  
pp. 305-309

***Review on Cost-Value Approach for Requirements Prioritization Techniques***

Tan Amelia (Institut Bisnis dan Informatika Stikom Surabaya, Indonesia); Rozlina Mohamed (Universiti Malaysia Pahang, Malaysia)  
pp. 310-314

***Critical Success Factor of Information Technology Implementation in Supply Chain Management***

Erick Fernando and Surjandy Surjandy (Bina Nusantara University, Indonesia); Harco Leslie Hendric Spits Warnars (Bina Nusantara University & Doctor of Computer Science, Indonesia); Meyliana Meyliana (Bina Nusantara University, Indonesia); Raymond Kosala (Faculty of Computing & Media, Indonesia); Edi Abdurachman (Bina Nusantara University, Indonesia)  
pp. 315-319

***The Evaluation of Child's Health Monitoring System Using the Usability Testing Approach***

Kurniawan Martono (Diponegoro University, Indonesia)  
pp. 320-324

## D2: Information & Computer Technologies

***Ticketing Chatbot Service using Serverless NLP Technology***

Eko Handoyo and M Arfan (Diponegoro University, Indonesia); Yosua Alvin Adi Soetrisno (Diponegoro University & Faculty of Engineering, Indonesia); Maman Somantri, Aghus Sofwan and Enda Wista Sinuraya (Diponegoro University, Indonesia)  
pp. 325-330

***Design of Water Quality Control for Shrimp Pond Using Sensor-Cloud Integration***

Maman Somantri, Aghus Sofwan, M Arfan, Vivi Endar Herawati and Hafidhin Abdurrasyiid (Diponegoro University, Indonesia)  
pp. 331-335

***A Comparative Study of Image Cryptographic Method***

De Rosal Ignatius Moses Setiadi, Eko Hari Rachmawanto and Christy Atika Sari (Dian Nuswantoro University, Indonesia); Ajib Susanto (Universitas Dian Nuswantoro, Indonesia); Mohamed Doheir (Universiti Teknikal Malaysia Melaka, Malaysia)  
pp. 336-341

***Handwriting Ownership Recognition using Contrast Enhancement and LBP Feature Extraction based on KNN***

Nurul Diyah Ayu Partiningsih, Rizki Ramadhan Fratama, Christy Atika Sari, De Rosal Ignatius Moses Setiadi and Eko Hari Rachmawanto (Dian Nuswantoro University, Indonesia)  
pp. 342-346

***Comparison of HSV and LAB Color Spaces for Hydroponic Monitoring System***

Thomas Agung S and Setyo Aji Riwinanto (Politeknik Negeri Semarang, Indonesia); Suhendro S (Politeknik Negeri Semarang, Indonesia); Helmy Helmy and Arif Nursyahid (Politeknik Negeri Semarang, Indonesia); Ari Sriyanto Nugroho (Politeknik Negeri Semarang, Indonesia)  
pp. 347-352

***Automatic Docking Based on Visual Feedback on Remotely Operated Vehicle***

Muhammad Qomaruzzaman and Ronny Mardiyanto (Institut Teknologi Sepuluh Nopember, Indonesia)  
pp. 353-358

***Performance Improvement of Human Activity Recognition based on Ensemble Empirical Mode Decomposition***

Enda Wista Sinuraya (Diponegoro University, Indonesia); Yosua Alvin Adi Soetrisno (Diponegoro University & Faculty of Engineering, Indonesia); Denis Denis (Diponegoro University, Indonesia); Aminuddin Rizal (National Taiwan University of Science and Technology, Taiwan)

pp. 359-364

***Naive Bayes Classifier For Prediction Of Volcanic Status In Indonesia***

Firman Tempola (Universitas Khairun Ternate, Indonesia)

pp. 365-369

***Case Based Reasoning For Determining The Feasibility Of Scholarship Grantees Using Case Adapatation***

Firman Tempola (Universitas Khairun Ternate, Indonesia)

pp. 370-374

***A Development of Executive Information Based on Satisfaction Level of Students***

Mochammad Facta, Eflita Yohana, Karina Adhiriva and Awalina Sayekti (Diponegoro University, Indonesia)

pp. 375-378

***Compressive Sensing Approach with Double Layer Soft Threshold for ECVT Static Imaging***

Nur Afny Catur Andryani (Tanri Abeng University & University of Indonesia, Indonesia); Dodi Sudiana and Dadang Gunawan (Universitas Indonesia, Indonesia)

pp. 379-384

***Context-based Hydrology Time Series Data for A Flood Prediction Model Using LSTM***

Indrastanti Ratna Wideasari (Satya Wacana Christian University & Universitas Gadjah Mada, Indonesia)

pp. 385-390

# The Evaluation of Child's Health Monitoring System Using the Usability Testing Approach

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**Abstract**— The development of information and communication technology brings considerable changes in every aspect. This change certainly affects humans in obtaining information. At present information is something that is very important for every organization in running its business processes. Health is one of the capitals in the development of the State. POSYANDU is one of the organizations carried out by the community in order to increase the participation of the community in developing health activities including reducing infant mortality, knowing the nutritional status of toddlers, knowing the condition of child development. The resulting data from POSYANDU activities can be used as a source in health development planning in an area. This paper discusses the evaluation of child health monitoring systems by using usability testing. The result is that the built system has fulfilled the elements of usefulness, ease of use, ease of learning, and satisfaction. The average result of a reusability test with a value of 4.2 indicates that the system is very easy to use. Requirements required by users of the system have also been met, so the system works according to user expectations.

**Keywords** — *Information, Mortality, Health, Usability, Information Technology Medic.*

## I. INTRODUCTION

Information technology has become a necessity for organizations today. All aspects of human work in an organization today require the availability of technology to assist in solving problems or tasks faced by humans. Effectiveness and efficiency of time becomes a significant need in solving a problem faced by the organization. Information technology is to uses one of supporters in the business process in the field of education, government, business, military or health. Information technology brings an important role in the current era this is because with the use of appropriate information technology will make the organization can determine the right decision [1] [2].

Health field is one of the areas that currently start to take advantage of information technology in handling problems. Use of this information technology can help the role of medical personnel starting from the registration process, treatment, medicine and post-treatment to be more effective and efficient. Mother and child health surveillance information system is one application that takes advantage of the development of information technology. The benefits gained from using this system are maternal and child health data can be monitored effectively and efficiently[3][4].

In other studies the use of information technology in the field of health is to help reduce the errors caused by human factors and in this case the medical personnel. The resulting mistake will certainly affect the decision to be made to the

patient. The slightest mistake can have a fatal impact on the patient, therefore the use of this information technology can help to reduce the error rate[5].

Child health monitoring system is one system used to monitor the development of children from the age of 0 years to age 5 years, this is because at this time is the golden age of child development. At that age is in the best development for the child's physical and brain. Child growth period is a very risky period for every child's life, therefore it should be noted all aspects that support and affect this growth. Growth and development, two distinct but interrelated events and affect each other.

To support the process of child development, the Government of Indonesia through the Center of Health Services PUSKESMAS conducting monitoring process of growth and development through the program of "Pos Pelayanan Terpadu" (POSYANDU). POSYANDU program is one of the community self-help programs at village level, where the managers are volunteers who will get training from health personnel of PUSKESMAS. In POSYANDU activities, the community can be the implementer or as a party who is gets health services or about family planning. The main objectives in POSYANDU are the decrease of Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR). The targets of POSYANDU services are all people, especially babies, toddlers, pregnant women, nursing mothers, postpartum women, and women of infertile age (WUS) and fertile couples (EFA). POSYANDU activities consist of Maternal and Child Health (KIA), Family Planning (KB), immunization, nutrition improvement, prevention and control of diarrhea [6].

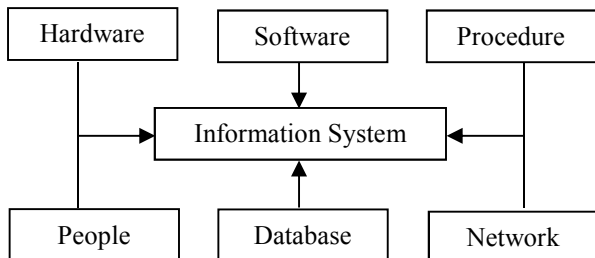
Problems encountered in the process of monitoring the child's health or child development is done either at the level of POSYANDU or in PUSKESMAS is the data presented unstructured. Data is still manually managed by involving minimal computer usage. This problem causes storage, dissemination and information management to be more risky. In general, the data generated in POSYANDU activities currently still use paper. Risks arise when the paper-based recording system includes requiring large space in storing data, data is damaged by environmental factors and it takes a long time to retrieve data ever entered. Another risk that can arise is an error in entering the measurement results either in the form of weight measurement or height measurement.

The use of computers to carry out the process of recording health data is now starting to do a lot. Various computer-based information systems are developed to produce accurate information. This paper discusses the

testing of children's health monitoring system with usability testing approach. Tests conducted to the application user group that is, health cadres at POSYANDU level and medical personnel at PUSKESMAS. The purpose of this test is to test the quality level of the software system whether it is easy to use, learn and encourage users to use the system as a positive tool in completing the task.

## II. LITERATURE REVIEW

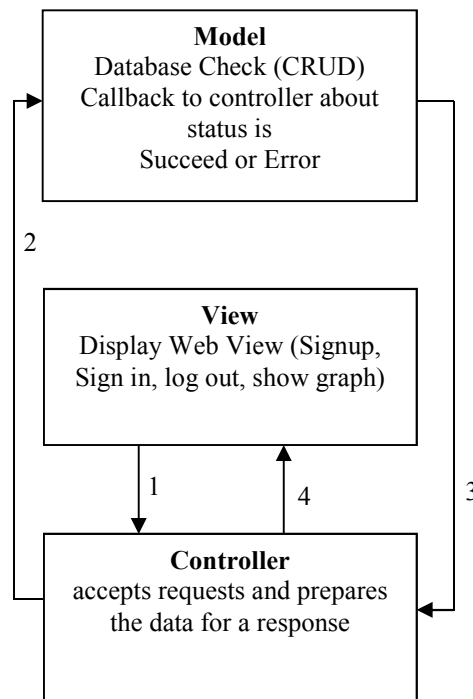
A computer-based information system requires the supporting components display in Fig. 1.



**Fig. 1** Information System Components

Hardware is a physical component used in a computer-based information system. The hardware component consists of input components, processing components and output components. Software is a component that consists of a set of commands that allow hardware to be able to work in doing data processing. Procedure is a set of rules that are used to realize the processing of data and the desired output results. People are the parties responsible for the development of information systems, processing, and use of information systems output. A database is a collection of data stored systematically in a computer that can be processed or manipulated to become information. Network is a connecting system that allows resources shared or accessed by a number of users at a time.

To build an information system framework usage is very necessary, it is intended that in the future development of the system does not have difficulty. In addition, the use of framework can also speed up the work because the components are structured. One of the frameworks used in this research is to use the Code Igniter framework. This framework uses the MVC concept (model, View, Controller), using this concept will make it easier in system development, in addition the use of MVC can also reduce the time in the development of a system[7][8][9]. The model is part of the component that handles the validation, session state and control tasks, the data source structure (database). View is part of the component that serves to translate the code into the form of graphic or visual, so that the user can capture the information submitted. The controller is part of the component that handles the process of relationship between the model part and the view section. Controller functions to receive requests and data from the user then determine what will be processed by the application. Fig. 2 is display the schematic of the MVC concept.

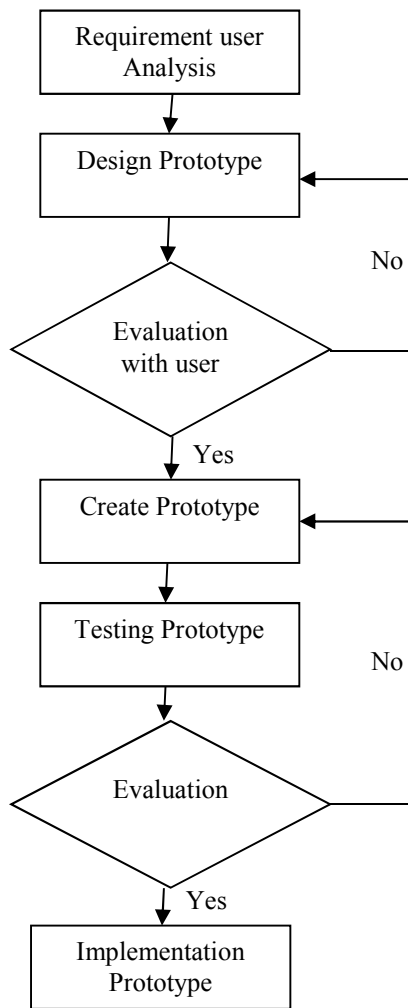


**Fig. 2** MVC Schema

The database is one component in the development of information systems. Database is a very important aspect in the information system because it serves as a place for data storage to be processed further, therefore required a proper design process for data generated does not occur duplicate data, avoid the relationship between data is not clear. The database design process consists of 6 stages: data collection and analysis, conceptual database design, DBMS selection, database design logically, physical database design, and database system implementation.

## III. RESEARCH METHOD

To achieve the goal, the right method is needed so that what has been described in the beginning can be achieved. The Prototyping method is used for the process of designing the monitoring system and for testing using reusability testing. Prototyping is one of the most widely used software development methods. The steps taken in this prototyping method is the process of collecting needs, together define the software format, identify the needs and the system created. Build prototype build prototyping by making temporary design. Evaluation Prototyping, this stage is done by the user whether it is appropriate or not and done until the user declared appropriate. Coding the system, at this stage the agreed prototyping is translated into the appropriate programming language. Testing the system, it aims to reduce software errors when used. Evaluation system, at this stage the user to evaluate the system that has been made is as desired. If not appropriate, then the process will be repeated again in the coding and testing stages. Using the system, Software that has been tested and accepted is ready to use. Fig. 3 is display a diagram of the prototyping method.

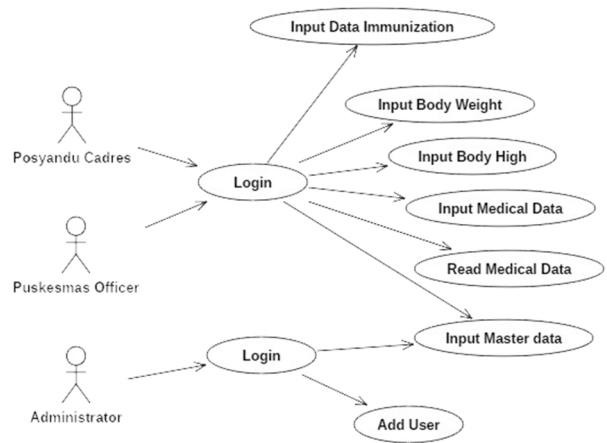


**Fig. 3** Prototyping Method for Developing Software

The need for a child health monitoring system is as follows;

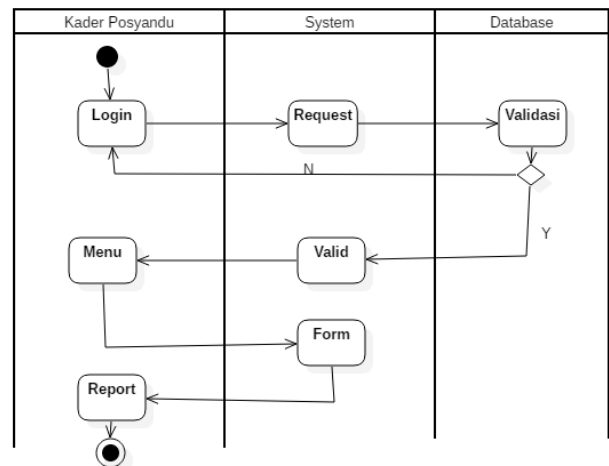
- System can read data from Member Card which has been equipped with RFID
- System can enter data of child health data in the form of immunization data, weight data, height data, medical history
- The system can visualize health data in graphical form

Prototype design process is done two stages of logic stage by using use case diagram and visual stage by using user interface design. In the use case diagram, there are three actors who will be involved in the health monitoring system of children, POSYANDU cadres, PUSKESMAS officers and system administrators. The use case diagram of the child health monitoring system is shown in Fig. 4.



**Fig. 4** Use Case Diagram Monitoring System

Activity diagram of the system can be seen in Fig. 5.



**Fig. 5** Activity Diagram

The design of the database table to be used is shown in Table 1 through Table 4.

TABLE 1. Table tb\_baby

No	Field	Type	Length	Index
1	id	Integer	11	Primary key
2	name	Varchar	30	
3	dateofbirth	Date		
4	sex	Varchar	10	
5	Mothername	Varchar	30	
6	idMom	Integer	11	Foreign key
7	status	integer	1	

TABLE 2. Table tb\_mom

No	Field	Type	Length	Index
1	idMom	Integer	11	Primary key
2	name	Varchar	30	
3	dateofbirth	Date		
4	sex	Varchar	10	
5	address	Varchar	300	



6	nik	Varchar	20	
6	namehusband	Varchar	30	
7	status	integer	1	

TABLE 3. Table tb\_medicalbaby

No	Field	Type	Length	Index
1	id	Integer	11	Primary key
2	id_baby	Integer	11	Foreign key
3	date	date		
4	imun	varchar	200	
5	dateimun	date		
6	idMom	Integer	11	Foreign key
7	status	integer	1	

TABLE 4. Table tb\_posyandu

No	Field	Type	Length	Index
1	id	Integer	11	Primary key
2	id_baby	Integer	11	Foreign key
3	date	date		
4	bb	decimal	(6,2)	
5	tb	decimal	(6,2)	
6	idMom	Integer	11	Foreign key
7	status	integer	1	

Testing the system using a usability test that aims to achieve the level of ease of the user side of the application at the time of interacting with the system. Tests conducted by distributing questionnaires to system users ie posyandu cadres, puskesmas officers and doctors public health centers. The measuring instrument used in the reusability testing is by using a Likert scale. The criteria used are 5 criteria, so the interval of each criterion is shown in equation 1.

$$\text{Interval} = \frac{\text{High Range} - \text{low Range}}{\text{number of Criteria}} \quad (1)$$

Table 5 shows the interval class and criteria used in the determination of the results. The interval used by equation (1) is as follows

$$\begin{aligned} \text{Interval} &= \frac{5-1}{5} \\ &= 0.80 \end{aligned}$$

TABLE 5. Criteria and Interval

Interval	Criteria
1.00 – 1.79	Very difficult
1.80 – 2.59	Difficult
2.60 – 3.39	Quite easy
3.40 – 4.19	Easy
4.20 – 5.00	Very Easy

#### IV. RESULT

Implementation is done on a local server using XAMPP software. This monitoring system has four functions, namely

- Manage child and parent data
- Store child health data
- Displays weighting and height measurement information
- Displays a health information graph

Initial implementation is the database used in child health monitoring systems. Fig. 6 to Fig. 9 shows the results of database implementation.

Fig. 6 Implementation database tb\_baby

Fig. 7 Implementation database tb\_mom

Fig. 8 Implementation database tb\_medicalbaby

Fig. 9 Implementation database tb\_posyandu

Usability testing is by distributing 30 questionnaires to respondent of child health monitoring systems. The questionnaire model uses USE (Usefulness, Satisfaction, and Ease of use) Questionnaire. The use of this Questionnaire aims to determine the extent to which the system has been made can be used by the user [10]. Table 6 display USE (Usefulness, Satisfaction, and Ease of use) Questionnaire used in the usability testing.

TABLE 6. USE Questionnaire

No	Variable	Mean
<b>USEFULNESS</b>		
1	The system helps improve effectiveness in child health monitoring.	4.50
2	The system is useful for parents to monitor the development of children's health and development.	4.76
3	The system can convey child health information in a short time.	4.56
4	The system is in line with user expectations.	4.50
<b>EASE OF USE</b>		

1	Easy to use system.	4.19
2	System is user friendly.	4.02
3	System needs requires the fewest steps possible to accomplish what I want to do with it.	4.20
4	Users can use it without written instructions.	3.56
5	User can use it successfully every time.	3.59
<b>EASE OF LEARNING</b>		
1	User learned to use it quickly	3.73
2	User easily remember how to use it	3.85
3	The text of information delivery is easy to understand.	4.20
<b>SATISFACTION</b>		
1	Users satisfied with it	4.22
2	This system is fun to use in child health monitoring process.	4.50
3	The system works according to user expectations.	4.47

The results obtained for the mean of each category are as follows:

- Usefulness,
 
$$\text{Mean} = \frac{4.50+4.76+4.56+4.50}{4}$$

$$\text{Mean} = \frac{18.32}{4}$$

$$\text{Mean} = 4.58$$
- Ease of Use
 
$$\text{Mean} = \frac{4.19+4.02+4.20+3.56+3.59}{5}$$

$$\text{Mean} = \frac{19.56}{5}$$

$$\text{Mean} = 3.91$$
- Ease of Learning
 
$$\text{Mean} = \frac{3.73+3.85+4.20}{3}$$

$$\text{Mean} = \frac{11.76}{3}$$

$$\text{Mean} = 3.92$$
- Satisfaction
 
$$\text{Mean} = \frac{4.22+4.50+4.47}{3}$$

$$\text{Mean} = \frac{13.19}{3}$$

$$\text{Mean} = 4.39$$

The result of the test using the reusability got the average value is 4.2, based on the criteria in Table 5, it is obtained that the monitoring system is very easy to be used by POSYANDU cadres or PUSKESMAS officers. The average calculation for usefulness is 4.58, which means that the system is very helpful in providing health information to users of the system. Point ease of user obtained an average value of 3.91, this means the system easy to use by the user. Display system with user interface that is easy to use make user feel comfortable in using system. Point ease of learning shows the average value obtained is 3.59, it shows that the

system easy to learn by the user. System users argue that the system is very fast to learn and instruction is easy to remember so that officer performance becomes faster. Point satisfaction shows an average value of 4.47, this explain that users feel very satisfied because the system can work in accordance with user needs.

## V. CONCLUSION

The conclusion obtained in this research is by testing the reusability of the results obtained that the system has been built meets the elements of usefulness, ease of use, ease of learning, and satisfaction. The average result of a reusability test with a value of 4.2 indicates that the system is very easy to use. Requirements required by users of the system have also been met, so the system works according to user expectations..

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