BREASTMILK MONITORING WITH ANDROID BASED ON IOT

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Abstract

Provision of breast milk (breast milk) in infants is vital for growth and infant health. Once the importance of breastfeeding benefits make the government also make the rules about exclusive breastfeeding for 6 months contained in Government Regulation no. 33 of 2012. In the PP, getting breast milk is the right of a baby. At this time many breastfeeding mothers who work outdoors so needed milk stored in the cooler. To monitor the milk consumption needed by babies in a day, even per month is rather difficult to do manually.To solve the problem, designed a breastmilk monitoring tool with android-based IOT. This tool works by using an NFC sticker affixed to a bottle of milk, when the baby's milk will be consumed, the NFC on the bottle is tapped to the NFC reader that is connected to Wemos then processed and displayed the results in android application. Breastfeeding mothers who work can monitor or monitor the amount of milk consumed baby whenever and wherever so that the nutritional adequacy of the baby can be met properly. The result of the design is the communication between NFC and android there is an average delay of 2 seconds.

Keywords: Breast Milk Monitoring, IoT, Android

1. INTRODUCTION

Provision of breast milk (breast milk) in infants is vital for growth and infant health. Once the importance of breastfeeding benefits make the government also make the rules about exclusive breastfeeding for 6 months contained in Government Regulation no. 33 of 2012. In the PP, getting breast milk is the right of a baby. At this time many breastfeeding mothers who work outdoors so needed asi stored in the cooler. To monitor the consumption of breast milk needed per day, even perga month is difficult to do manually.

To solve the problem, it is necessary to design a breastmilk monitoring tool with android based on IOT. This tool works by using an NFC sticker affixed to a bottle of milk, when the baby's milk will be consumed, the NFC on the bottle in the tap to the NFC reader connected to Wemos is processed and will display the results in android application. Breastfeeding mothers who work can monitor or monitor the amount of milk consumed by the baby and when given so that the nutritional adequacy of the baby can be met properly. Previous research is the following:

This paper describes the development of an application that can overcome the problems of milk management dairy called the Breastmilk Management Application based on android. This application has been successfully built, the next expectation of this application can be used by mothers and breastfeeding workers so as to manage milk feeding and increase knowledge about milk milk (Sonanta, 2017)

This paper presents reviews from Bluetooth Low Energy (BLE), Near Field Communication (NFC) and Visible Light Communication (VLC) and its use and influence in smart city development areas. this paper also presents a review of Big Data Solutions for information management and knowledge extraction in an environment where everything is connected by the "Internet of Things" (IoT) network. Furthermore, how this technology can be combined together for the benefit of smart city development [Cerruela García, 2016]

From these researches using the development of IOT-based service concept then designed a breastmilk monitoring tool with android-based IOT. The advantages of this tool from the previous one was just a breastmilk management application without being able to monitor. Tools that will be designed and made can be monitored wirelessly and connected with android.

2. LITERATURE REVIEW

This section describes the theoretical basics used to support research on the design and implementation of systems outline including design. The subjects covered are:

State of The art
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Internet of Things (IoT)

IoT is also called Internet Everything or Internet Industry, is a new paradigm of technology that is envisioned as an engine in a global network of devices that can interact with each other. Internet of Things is where the objects around us can communicate between each other through a network like the internet. IoT is recognized as one of the most important areas of technology of the future and is beginning to expand widely which is the concern of various industries. Five IoT technologies are widely used for successful IoT-based product and service deployment (I Lee & K.Lee, 2012).

Figure 1 Internet of Things
(weedezign / Shutterstock)

Describing operative prototypes for Internet Things (IoT) is used to consistently monitor various low cost environmental sensors (R.Vithlani, S.Fultariya, MN Jivani & HN Pandya, 2017)

WeMosD1 Microcontroller
Microcontroller Wemos is a microcontroller based microcontroller module development ESP 8266. Wemos microcontroller is made as a solution of expensive microcontroller-based wireless systems. By using Microcontroller Wemos, the cost incurred to build a microcontroller-based WiFi system is very cheap, only a tenth of the cost incurred when building a WiFi system using Arduino Uno Microcontroller and WiFi Shield.

Figure 2 Microcontroller Wemos

NFC (Near Field Communication)
NFC, or Near-Field Communication is one of the latest communication technologies among gadgets that use RFID (Radio Frequency Identification) system to exchange data at close range, about 4 inches. This NFC technology allows the exchange of data between gadgets and tools with just a close touch, and takes less than a tenth of a second. No more manual settings such as connections when the user is still using Bluetooth signal,

NFC is automatically connect both devices quickly as needed. After knowing what it is NFC, of course the reader began to guess how this technology works. NFC technology works with short-range radio signal transmission system. Devices with NFC do not require large electrical energy. There are two types of NFC devices, one passive tag device and one NFC tag device on the phone. When making contact, the two devices will be interconnected and exchange data with ISM 12.56 MHz radio frequency with a maximum transfer rate of 424 Kbps. When the reader already knows what the NFC is and how the NFC works, let's jump into whether the NFC application is possible now and in the future.

Android app

Understanding Android is a mobile operating system that is open-source and developed by Google. The Android OS is used for tablet computers and smartphones. But based on the meaning of the word and its form, Android is a smart robot that is made to resemble a human. Android is a mobile device operating system for mobile phones based on linux and is the OS (Operating System) Mobile is growing in the middle of other OS growing today. Other OS like Windows Mobile, i-Phone OS, Symbian, and many more.

Figure 3 Android app

Research Methodology

This research is conducted based on the problem of the objectives to be achieved, as described in the previous section. The implementation of this research consists of several methods, such as literature review, modeling, tool design, software and hardware. while the research flow is shown in Figure 4

Figure 4 Flow Research
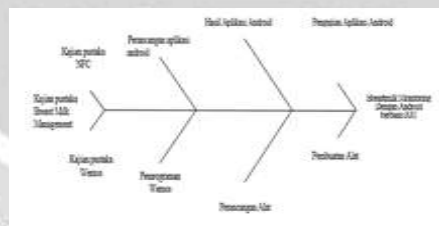
NFC stands for Near Field Communication, a technology that is the development of Radio Frequency Identification   (RFID)   card.   All   NFC

devices allow to read and write data information at high speed (424 kbps). NFC connections occur when there is a connection between Bluetooth-compatible devices and WiFi, because of the very limited way and functionality that will ensure the communication between devices safe from data loss. Utilization of NFC as reader with working frequency 12,56 MHZ. The process of working this system by reading UID (Unique ID) and then registered and stored data UIDnya on Wemos and displayed on Android Applications. After designing each hardware and software then integrated and tested so as to obtain maximum results.

1. Problem Identification and Library Studies, prepare the system design both software and hardware.
2. Create a list of programs for the software
2. Conducting tests.
4. Scientific Publication
 Near Field Communication (NFC) technology can be used as a medium for this system input.

System Chart Block

Block diagram is the block of system work sequence, where on the input box system NFC, the measurement results will be processed through wemos Arduino. and will generate display output on android via the internet network. The system diagram block is shown in Figure 5.
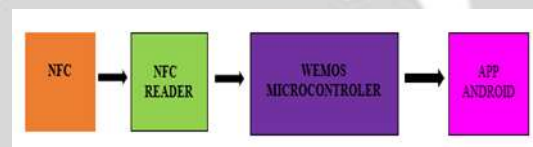

Figure 5 Block system diagram

In the design of this tool can be simplified in several groups, namely:
1. Input: NFC
2. Main control: WEMOS microcontroller
3. Output: Android

3. TEST AND RESULTS

The prototype of breastmilk monitoring system using NFC is shown in Figure 6.

Figure 6. Breastmilk monitoring system using NFC

This Prototype using NFC/RFID RC522, Wemos and NFC sticker, when NFC sticker tap to NFC reader then the application on android (ThingSpeak app) will receive notification, it shown on Figure 8.
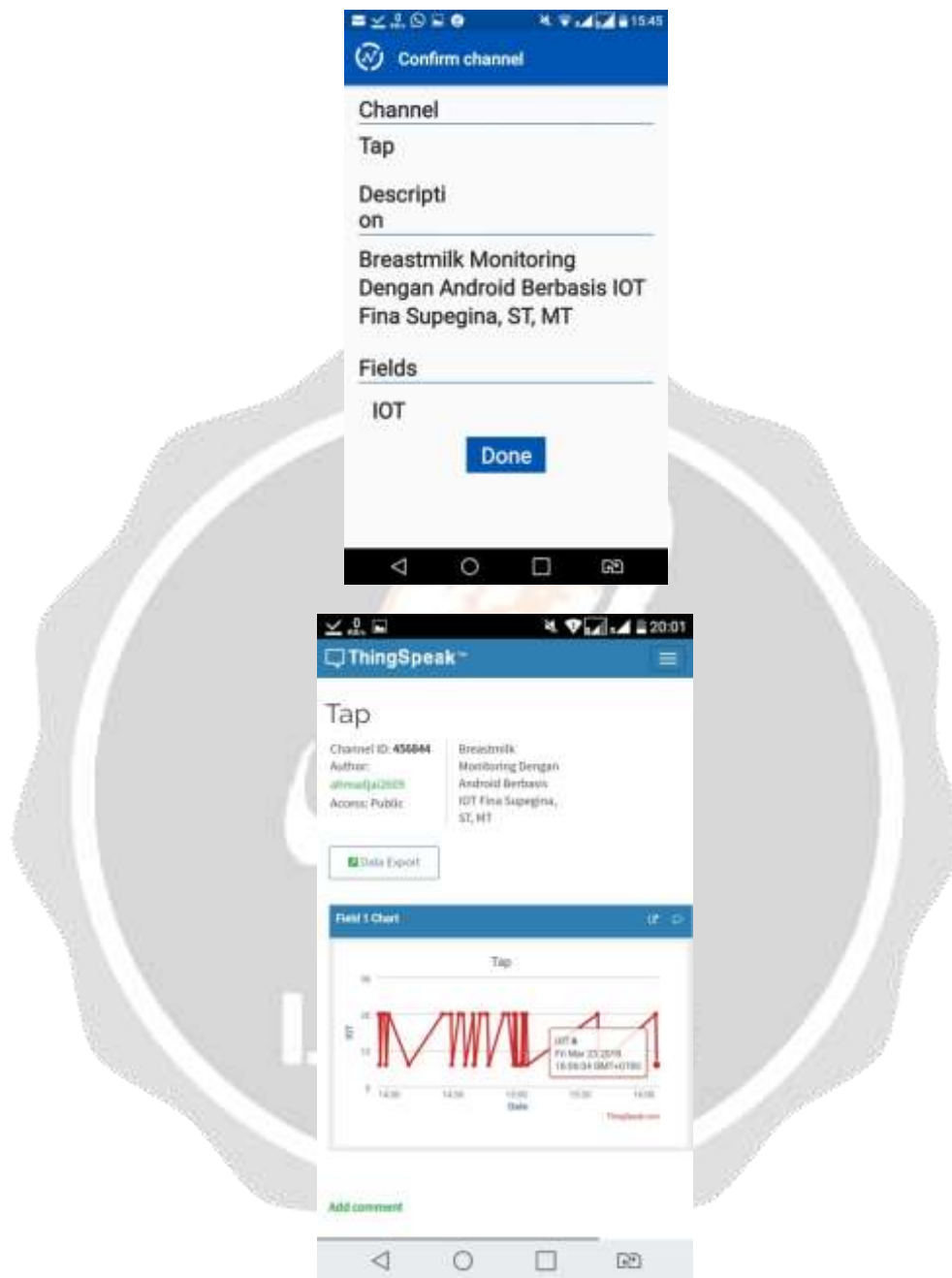

Figure 8. Thing Speak Application Simulation

Figure 7 shown the process of thing speak application process. After application activated then we able to do the simulation between protype and the application. Figure 8 show the breastmilk monitoring system using NFC is work and have average delay of 2 seconds.

CONCLUSION
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The result of the design is the communication between NFC and android there is an average delay of 2 seconds.

ACKNOWLEDGMENT

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