Application Of Heat Coffee Passing Tools With Web-Based Monitoring System

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ABSTRACT

Coffee not only offers large quantities, but also comes in a variety of qualities, varieties, and shapes. These include arabica and robusta, baked or green, as well as instant and soluble. Coffee exports are also a major source of foreign exchange and national income for many developing countries. In 2012, a total export of 7 million tons contributed a value of US $ 24 billion. Only 10 years ago, the value was only US $ 5.1 billion with a total of 5.5 million tons [2]. In this study contains several problem formulations which consist of (i) How to make hot coffee using RFID. (ii) How to monitor the pouring of hot coffee through the web. The research objectives consist of (i) Designing a tool that can be used to pour hot coffee. (ii) Monitor the hot coffee pourer by web monitoring. The method used in the hot coffee pouring system consists of several, analysis, design, testing, and implementation. So the conclusion of this research is (i) RFID can be made as a request to control the device approved by Arduino Mega 2560. (ii) Web monitoring can display coffee making data by type and time of manufacture.

Keywords: Coffee, RFID, Web, monitor, Arduino mega

1. Introduction

Coffee is a commodity that is loved all over the world. The demand for coffee from year to year is increasing. As informed by AEKI (Association of Indonesian Coffee Exporters) on the site www.AgroFarm.co.id Friday, 15 Jan 2016 19:39:08, it was reported that "World coffee production is currently being shorted, this is due to the large demand for coffee. In Indonesia began to mushroom coffee shops, and this increasing domestic coffee needs. Coffee consumption in Indonesia continues to increase. "This year, national coffee consumption is estimated at 1.6-1.7 kilograms / capita. [1]. Coffee is not only traded in large quantities, but also comes in a variety of qualities, varieties and shapes. These include arabica and robusta, baked or green, as well as instant and solubles. Coffee exports are also a major source of foreign exchange and national income for many developing countries. In 2012, a total export of 7 million tons contributed a value of US $ 24 billion. Only 10 years ago, the value was only US $ 5.1 billion with a total of 5.5 million tons [2].

The development of technology is currently very active role in everyday life. The development of technology in various fields is able to facilitate human needs with accuracy and very high speed and determination. [5] Where the use of technology in the field of food and beverages is very often used. One example is the fast food beverage machine. Fast food beverage machine is a machine that can work hot in the process of making drinks. Fast food beverage machines are often found in shopping centers and in food and beverage providers and large restaurants. In general, fast food beverage machines that are often encountered still have shortcomings. These shortcomings include the user having to come in direct contact with the machine and wait until the machine is finished to make the drink as ordered. This makes the user takes a long time to make a fast food drink because they have to go to the beverage machine, choose a drink and wait for the machine to make the drink as ordered. Coffee drinks are in demand by almost all groups of people. Along with the high level of community activity, everything is demanded to be instant and efficient. This microcontroller-based coffee machine is designed to address people's needs...
for coffee with an efficient serving process. [3,4] so we need a tool to then be made as a faster-serving coffee maker and can be monitored for making coffee through the web. The formulation of the problem in this study is (i). How to make hot coffee pouring equipment using RFID. (ii). How to monitor hot coffee pouring tools via the web. The purpose of this study is (i) Designing a tool that can be used to pour hot coffee, (ii) Monitoring hot coffee pouring tools with web monitoring.

2. Research Methods

The research method or framework in this research is to carry out a gradual and directed research as shown below

![Research Method Diagram]

Fig 1. Research Method

3. Result

3.1. Analysis

In this stage an analysis of how the system works will be applied in the surrounding environment. Here are some ways the system works:

a. When RFID provides data to Arduino Mega 2560 and from Arduino Mega 2560 gives commands to stepper Motor, DC Motor and Servo Motor and sends them to MySql server to be stored which will then be displayed on the web monitoring then all systems run with their respective provisions.

b. Arduino Mega 2560 sends RFID data to the server via Ethernet Shield and is stored in a database.

c. The web can display data from a database in the form of RFID codes, coffee making times and types of copies made.

![System Works Diagram]

Fig 2. How the system works
Figure 2 explains how the system works in this study. After planning the system, then proceed with preliminary research of the tools to be made. At the research stage an initial mechanical circuit design and components of this hot coffee maker are carried out to ensure that all components can run well. This tool uses Arduino Mega 2560 mega 2560 which functions as the main microcontroller of the whole system or can be called the brain of this drive system, the input system uses the TAG RFID as an RFID pin reader, then the stepper motor is used to run the coffee glass and stop in a place that has been determined, the DC motor issues hot coffee according to the specified amount and the servo functions as an output that will release sugar, if the coffee is sweet the servo containing sugar will open, and if black coffee (bitter coffee) then the servo containing the sugar was not open and Data will be sent to the server to be stored in a database and then displayed on the web monitoring.

3.2. Design

a. Block Diagram

Based on the block diagram contained in Figure 3 the overall system is divided into several sections. RFID as input, Arduino Mega 2560 as a receiver and sender of instructions and from Arduino Mega 2560 to Stepper Motor, DC Motor and Servo Motor. And ethernet shield as a link to web monitoring to send data to be displayed on web monitoring.

![Fig 3. Block Diagram](image)

b. Network Design

At this stage that is making a network design that will be built on the application of a hot coffee maker with a web-based monitoring system. This network design is made for monitoring. This network is created using a local area network (LAN) network.

![Fig 4. Network Design](image)

In Figure 4 is a network design that has been made on a hot coffee maker with a web-based monitoring system. From the hot coffee maker circuit connected to SF90-24 switch to port 13 with IP address 192.168.xx.xx with subnet mask 255.255.255.0 using UTP cable with straight type, and from the switch using straight cable to connect to server with IP address 192.168.xx.xx with the subnet mask 255.255.255.0 and finally from the server to the monitor to display the coffee making data in the database.

3.3. Implementation

At the implementation stage, namely the assembly or installation of all components that were carried out previously implemented on the system in full. The implementation of the program aims to ensure that the system that was designed before is running well or not. This research is generally described using a flowchart as follows.
3.4. Testing

At this stage, testing all features that have been made. The system is the application of a hot coffee maker with a web-based monitoring system.

a. Servo motor testing

Show pouring sugar on an empty glass then the stepper motor will walk carrying an empty glass and stop under the sugar container.

b. Testing the calculation of time

After the application of this hot coffee pourer with the results of the calculation of pouring sugar coffee and bitter coffee as follows

### Table 1
Results of calculation of total time on sugar coffee

<table>
<thead>
<tr>
<th>Trial</th>
<th>Motor DC (Hot Coffee) Delay 7000 = 7 seconds</th>
<th>Motor Servo 2 (Sugar) Delay 4000 = 4 seconds</th>
<th>Stepper Motor (Glass Trip) Delay 7000 = 7 seconds dan step 30000 = 30 seconds</th>
<th>Total 48000 = 48 seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFID 1</td>
<td>Sugar Coffee</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 2
Results of calculation of total time on bitter coffee

<table>
<thead>
<tr>
<th>Trial</th>
<th>Motor DC (Hot Coffee) Delay 7000 = 7 seconds</th>
<th>Motor Servo 2 (Sugar) Delay 4000 = 4 seconds dan step 30000 = 30 seconds</th>
<th>Stepper Motor (Glass Trip) 41000 = 41 seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFID 2</td>
<td>Hot Coffee</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig 5. Flowchart System

Fig 6. Servo motor testing
4. Conclusion

Based on the research that has been done, the following conclusions can be drawn: (i) RFID can be used as an order to control the devices concerned with the Arduino Mega 2560. (ii) Web monitoring can display coffee making data with the type and time of manufacture.

5. References