Design and Development of Automatic Cooking Device

Akshay G Bhat[1], Channabasava[2], Keerthi C R[3], Utkarsh Anand[4] and Bhanumathi K S[5]

[1234]Final year B.E students, Dept. of E&IE, JSS Academy of Technical Education, Bangalore,

[5]Asst. Professor, Dept. of E&IE, JSS Academy of Technical Education, Bangalore,

bhanuvishwas@gmail.com

Abstract—**Till today, most people still cooks food in the kitchen, due to which they feel exhausted and the air also gets polluted. With the evolution in automation technology, it is necessary to utilize this technology in the field of automatic cooking. The paper, introduces us to the different cooking techniques for different food items. The device mainly consists of four parts: the GSM module: to send different commands through phones to perform different operations, Microcontroller unit: to perform all the required operations related to the cooking process, Feeding Mechanism: to feed the required ingredients and fluids, Stirring and Heating Mechanism: for mixing of ingredients properly and then provide suitable heat to cook the food. Results encourages that this device is first of its kind and will be a major success in the field of automatic cooking.**

Index Terms—**GSM Module, Feeding Mechanism, 8051 Microcontroller.**

I. INTRODUCTION

The automatic cooking device is our attempt to cook food in an intelligent manner. At present where man is able to fly and has discovered the solar system, on an average people still cook their food manually. Millions, waste their time in the kitchen cooking meals. The automatic cooking device seeks at removing this. As the name suggests, it is a device which automatically prepares the food by using GSM module. The objective of this paper is to cook food automatically without the need of man power. This entire machine can be switched ON and it starts preparing food based on the control message through GSM. Cooking utensils and ingredients units are assembled in proper manner and interfaced to the embedded system. Cooking is a time based process in such a way that each ingredient is added at appropriate time. The cooking process continues till the specified time.

II. Materials and Methods

The above block diagram provides a complete details of the proposed automatic cooking system for modern kitchen. The block diagram shown above consists of a GSM module, which is used to send different commands to the system for performing the required operations. The power supply unit provides the power to drive the complete system. Microcontroller unit is loaded with appropriate programs to control different units attached to it. A water and oil pump is provided in the system which extracts the water and oil from the container and feeds it to the main cooking utensil. Pumps and ingredients holder are driven with the help of

dc motors. To drive the motors a motor controlling unit is connected to each motors. For proper mixing and stirring of the ingredients a stirring rod is attached in the main cooking container. As the name suggests a heater coil, provides the appropriate temperature for proper cooking of food. Relay units are used to allow the DC motors to run in the forward and backward directions. LCD display in the system, displays the real time functioning of the system. System Architecture of the proposed system can be dealt with the following hardware and the software.
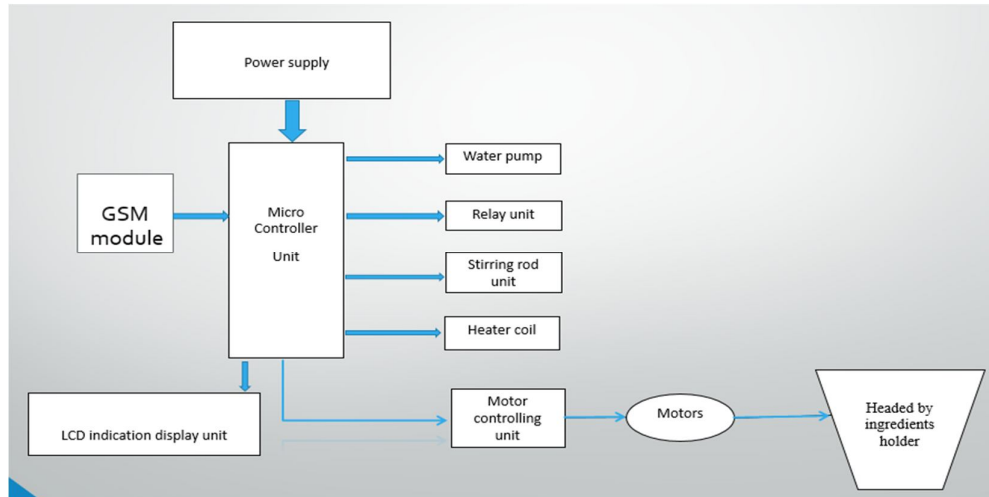

Figure 1. Block diagram of the proposed system

III. HARDWARE REQUIREMENTS

- 7805 Power regulator
- 8051 Microcontroller
- Stirring Rod
- Heating Coil
- Water and Oil pump
- DC Motor
- L298 Motor Driver
- Relay Switch
- GSM Module
- Kiel

A. 7805 Power regulator

A 7805 power regulator is a 3-terminal regulator, which has an output current up to 1.5A. It is provided with internal thermal overload protection. It is capable of high power dissipation and internal short circuit current is also limited.

B. L298 Motor Driver

Motor Driver is a typical L298 Motor Driver which has an operating voltage of 46Volts and direct current is of 4 Amp. The saturation voltage is also very low and is given a protection over temperature rise.

C. DC motor

A dc motor which comprises of brass gears and steel pinions which make certain that motor is long lasting and can be used in tough environment. The gears are mounted on strengthened steel spindles which have a mirror like finishing. The spindles revolve around bronze plates to ensure that motor runs silently. Complete system is enclosed by rings made of plastic. Bearings are provided with lubricants so that it does not require any maintenance.

D. GSM module

It is assembled with a dual band GSM engine SIM900A. Operating frequencies vary from 900 to 1800 Mhz. RS232 interface, helps to link computers and microcontrollers. SMS and voice calling are suitable for this GSM module. The operating voltage for the module is +12V DC.

E. 8051 Microcontroller

8051 is an 8-bit compatible microcontroller with embedded super flash memory. It operates at frequencies ranging from 0 to 40 MHz at a voltage of 5V. It has a 1 Kbyte internal RAM with 3 16-bit Timers/Counters. The working temperature ranges for market use from 0°C to +75°C and for industries from -30°C to +80°C.

F. Relay

Relay is a power miniature HRS4-S DC5V relay with plastic sealed enclosure. The standard coil power is of 450mW. The life of this type of relays is 100000 electrical operations and the operating temperature ranges from -40 to 85°C.

IV. ALGORITHMIC STEPS OF THE PROPOSED SYSTEM

To understand the process flow of the cooking process, the following algorithmic steps are given..

  Step 1: START
  Step 2: Heater coil, water and oil pumps, tray 1 and tray 2 are ON.
  Step 3: If heater relay is ON.
  Step 4: Oil pump gets ON for 1 second.
  Step 5: Oil pump OFF.
  Step 6: Tray 1 gets tilted.
  Step 7: Water pump gets ON for 1 second.
  Step 8: Tray 2 gets tilted.
  Step 9:   Heater gets OFF.
  Step 10: END.

V. FLOW CHART

The flow chart of the proposed system illustrates the different levels of the automatic cooking. It is programmed in such way that, the system performs the cooking accurately. This flow chart will provide clear picture about the sequence of the processes which are going to happen while execution of this work. Any lay man can understand and follow the cooking knowledge and that is the special of this system.
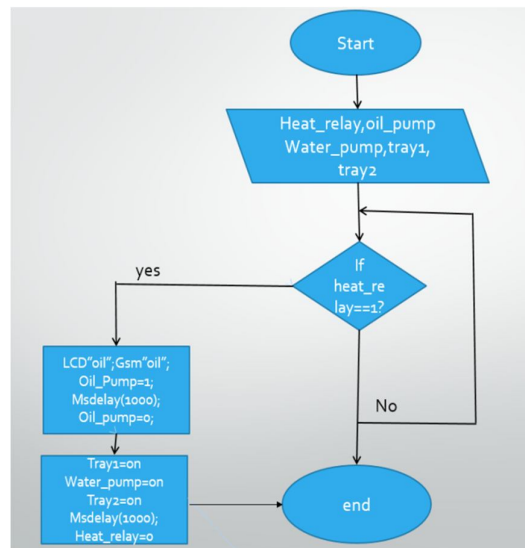

Figure 2. Flow Chart of the proposed system.

VI. IMPLEMENTATION

The proposed system was implemented using suitable programming language. Initially different commands are passed through GSM module for specific operations. The following commands are used as part of the program for the automatic control of the cooking process.

- Heater gets turned on as soon as it receives message.
- Oil is pumped to the container.
- Tilting of ingredient holder 1 takes place.
- Water is pumped to the container.
- Tilting of ingredient holder 2 takes place.
- Heater is turned off.

Commands used for the system operation and respective response to each commands are shown in the following table.

TABLE I. DIFFERENT COMMANDS AND THEIR RESPECTIVE RESPONSE.

Commands	Response
A	Holder 1 tilt
B	Holder 2 tilt
C	Oil pump on
D	water pump on
E	Stove on
F	Stove off

VII. RESULT AND DISCUSSION

The proposed automatic cooking system was designed and developed. The hardware and software requirements are described. The system is tested on real time and it is found that the cooking process is very accurate in terms of taste of the food and time taken for the cooking. These parameters are compared with the manual cooking and found to be satisfactory.

The cooking control can also be controlled remotely and the procedure is displayed using LED screen. This in turn helps the user for easy cooking. The figure 3 and figure 4 shows the commands are sent through smartphone according to the need of the cooking procedure. After receiving the appropriate command the output is displayed on the LCD, which gives an idea to the user which part of the device is running. Similarly all the commands shown in the table Iare sent accordingly to prepare a particular dish and hence the food is prepared.
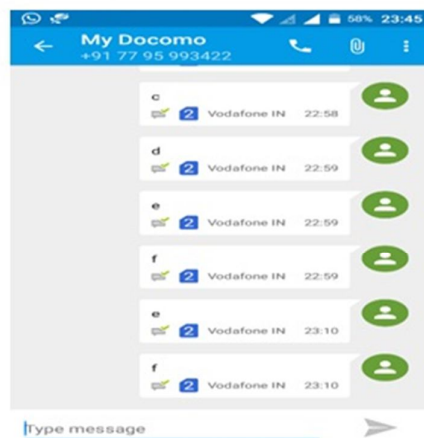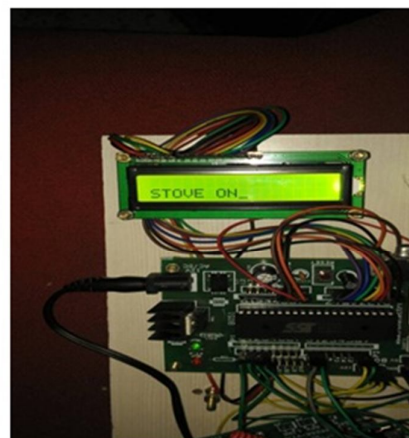

Figure 3. Command sent through the mobile phone

Figure 4. Required output displayed on LED display

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VIII. CONCLUSION

An automatic cooking system was designed and developed to prepare food automatically. The system was successfully tested by cooking on real time. The system can also works through different commands which are sent through a GSM module. The commands are processed in the microcontroller and then the microcontroller performs different operations which are necessary to prepare a particular food and control remotely. Results proves that, this system is having novel idea and it will become major success in the field of automatic cooking.

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