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Automated Omelette Making Machine

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Abstract *– Food Automation is one among the fastest growing technology today. People are leaning more towards these automated machines which can prepare their food within minutes without any external help. Omelletes are a staple food in the breakfast of urban working class hence the need of an Automated Omelette making machine arises which can not only prepare their breakfast effectively but can also do it over a single piece of text message. This project work enlightens how a simple low cost circuit and power-driven design can be mainly used as to prepare consumer food invention. This machine is capable of preparing omelletes and serving them in the pan automatically.*

Key words: Induction Cooktop, Arduino Uno, GSM

I. INTRODUCTION

Usually, it is said that breakfast is the most important meal of the day. [1] Eggs are widely enjoyed as breakfast starter in many countries all around the domain. There are many choices of how one would like to have his or her eggs prepared for breakfast. Eggs can be served fully cooked or half-boiled. Some people like them hot and scrambled with vegetable, meat, seafood or in various other combinations. Some even like them sunny side up with a dash of pepper and salt. Being the most eaten food for breakfast, most people do not like or simply do not have the time to prepare the eggs themselves. Even if they cook the eggs themselves, they would not get the evenness in quality, taste, etc. Therefore there is a need to provide a means to mechanize the process of preparing the egg(s) for breakfast, perfectly cooked every time. A market survey was done to examine the reality of such egg-cooking machines. The investigation revealed that some of the machines for egg preparation are already available in the market. These machineries can be divided into two categories; egg cookers and egg processors.

Egg cookers or egg cooking machines refer to the machines that prepare or cook the eggs for eating. In other words, after the eggs have gone through the cooking process, they are ready to be eaten. Through the survey, most egg cookers were meant for preparing the eggs as boiled and poached. One of the mechanisms surveyed was also accomplished of preparing the eggs sunny side-up and in the form of omelette. The capabilities of another mechanism studied were such that it could boil or pilfer up to seven eggs perfectly hard, medium, or soft with boil and keep-warm functions. It also had dual purpose lid that could also be used as a drip tray or serving tray, removable egg holder for easy cooling under tap water and a timer that motioned when cooking was thorough [2]. Another mechanism studied had a built-in timer and programmed shut-off and when the eggs were finished, an alarm sounded [3]. The egg cooker by Oster included [Oster 4716 Egg Cooker, 2006] steam heat to simmer of up to 4 eggs at a time, cooked and cleaned easily with non-stick and non-stain surface. When the eggs were ready, the egg cooker mechanically shut off and perfectly cooked up to 8 hard, medium, or soft eggs.

The other category of egg-related machines surveyed was egg processors. These refer to machines that prepare processed egg products for the retail and institutional market. The term "egg products" refers to eggs that are removed from their shells for processing. The process includes breaking eggs, filtering, mixing, stabilizing, blending, pasteurizing, cooling, freezing or drying, and packaging. Liquid, frozen, and dried egg products such as white or yolk powder, egg yolk granules are widely used by the food service industry. The important feature of such machines is the egg breaking mechanism. Among the egg processors currently available in the market include the machine that has the capability to crack the egg shells and separate the yolk (yellow) from the albumen (white) where the separation process works exactly like a household egg strainer. The machine can process 18,000 eggs per hour.

Since available egg cooking machines surveyed were mostly for cooking hard-boiled, soft-boiled and poached eggs, it could be concluded that there is a market potential for an automatic omellete making machine which is fully automated and good for personal uses only. This project is mainly targeted to fulfill the needs of people who are currently living the busy lifestyle of metro cities. The young working people in these cities have very little time to spare so that they can prepare their food. The main objective of this project is to satisfy those needs so that it can make a mark for itself in market place. The customizations and home automations features present in this project are truly the ones that set it apart. The ease of preparing a home-made breakfast/dinner just by sending a text message from your phone is the most oozing point of this whole venture.

The Automated Omelette Making Machine will gather the data concerning the number of omelletes and performs step by step process to prepare the same.

Step 1: Pouring of oil on the frying pan.

Step 2: Breaking of eggs and throwing of the egg shells.

Step 3: Collecting the liquid in a container.

Step 4: Adding of ingredients like onion, spices, etc. as per the choice.

Step 5: Mixing of the ingredients with the help of blender.

Step 6: Pouring of this mixture on the frying pan.

Step 7: Baking the egg for a certain amount of time.

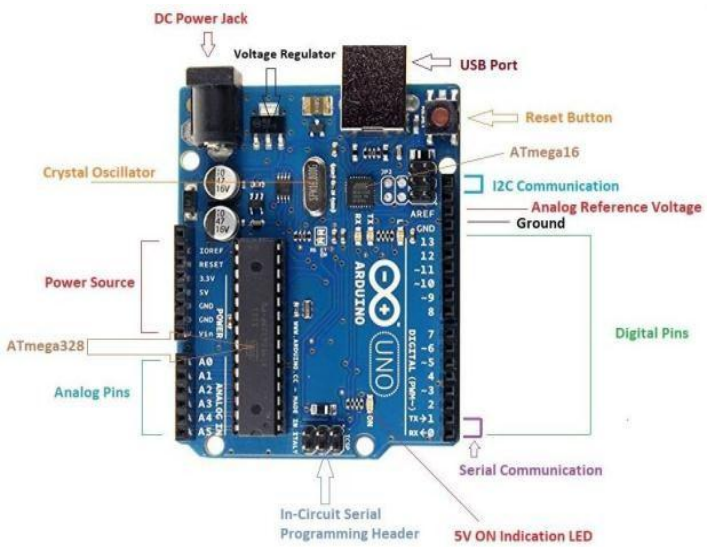
Step 8: Cover the baked omelette with a lid.

II. Component Description

A. Arduino Uno

First, Arduino Uno is a microcontroller board based on the ATmega328P. The board consists of 14 Digital pins, 6 Analog pins, and is programmable with the Arduino IDE via a USB Type-B cable. It can be driven by an external 9-12V battery using DC power jack port and USB cable present on board. It can be easily automated using C or C++ language. In this project, it acts as the control unit for all the activities of the project.

Fig 1: Arduino Uno



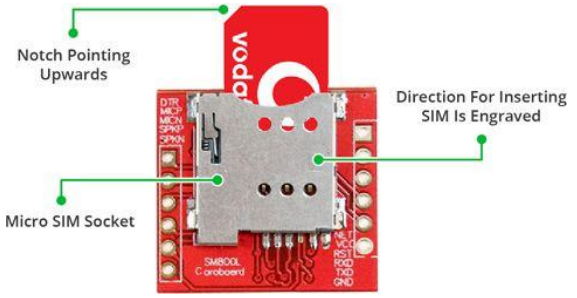
B. GSM Module

The SIM800L GSM/GPRS module is a miniscule GSM modem, which can be easily combined into a great number of IoT projects. You can use this module to accomplish almost anything a normal cell phone can; SMS text messages, Make or receive phone calls, connecting to internet through GPRS, TCP/IP, and more. To top it off, the module supports quad-band GSM/GPRS network, meaning it works pretty much anywhere in the world.

Fig 2: GSM Module

The operating voltage of the chip is from 3.4V to 4.4V, which makes it an ideal candidate for direct LiPo battery supply. This makes it a good choice for implanting into projects without a lot of space.

The module needs an external antenna to connect to a network. The module usually comes with a Helical Antenna and solders directly to NET pin on PCB. The board also has a U.FL connector facility in case you want to keep the antenna away from the board. There's a SIM socket on the back. Any activated, 2G micro SIM card would work perfectly. Correct direction for inserting SIM card is normally etched on the surface of the SIM socket.



There is an LED on the top right side of the SIM800L Cellular Module which indicates the status of your cellular network. It will blink at various rates to show what state it's in. If the LED blinks every 1second, it means that the module is running but hasn't made connection to the cellular network yet. If the LED blinks every 2second, the GPRS data connection is active. If the LED blinks every 3second, the module has made contact with the cellular network and can send or receive the voice and SMS.

C. 2-Channel Relay Module

The relay module is a separate hardware device used for remote device switching which is an electromagnetic switch operated by a relatively small current that can control much larger current. 2-Channel 5V Relay Module is a relay interface board which can be controlled directly by a wide

range of microcontrollers such as Arduino, AVR, PIC, ARM, etc. It uses a low level triggered control signal (3.3-5VDC) to control the relay. If the relay is triggered, then the normally open or normally closed contacts are operated. It is often used in an automatic control circuit. In other words, it is an automatic switch which can control a high-current circuit with a low-current signal. 5V relay signal input voltage ranges from 0-5V.

Fig 3: 2-Channel Relay Module

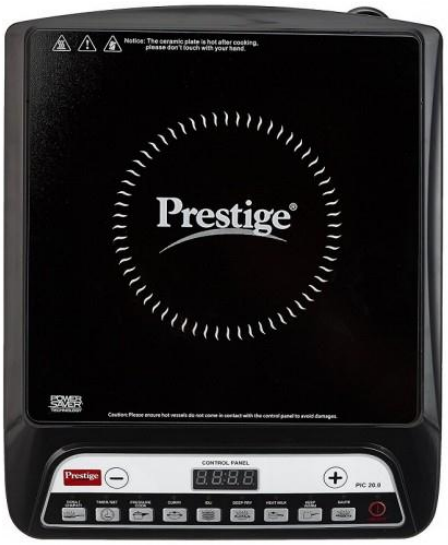
This module is designed for switching two high powered devices from the Arduino. It has two relays rated up to 10A per channel at 250VAC or 30VDC. There are two LEDs on the relay module indicating the position of the relay. Whenever a relay is triggered, the respective LED will light up. One of the best things about these modules is that they come with two Optocoupler ICs which provide good isolation between relay and Arduino.

D. Induction Cooktop

Cooking has never been an easy task. This is where Prestige Induction cook-tops come in a wide variety of choices so that it can perfectly fulfill the needs. Packed with powerful features like Indian menu, dual heat sensors, anti-magnetic wall, unique design to prevent the entry of insects, they are the perfect combination of stylish looks and easy performance.

The Prestige Induction Cook-Top offers quick and reliable heating at high efficiency. Add to this its anti-magnetic wall, soft touch buttons, durability, safety and stylishness make cooking a fair and enjoyable experience. Due its large varieties of options it is very useful in this research work. The dosa/chapatti option is very much suitable for making an omellete. This option provides suitable temperature and the perfect timing which helps to get a perfect and delicious omellete.

Fig 4: Induction Cooktop



III. SYSTEM ARCHITECTURE

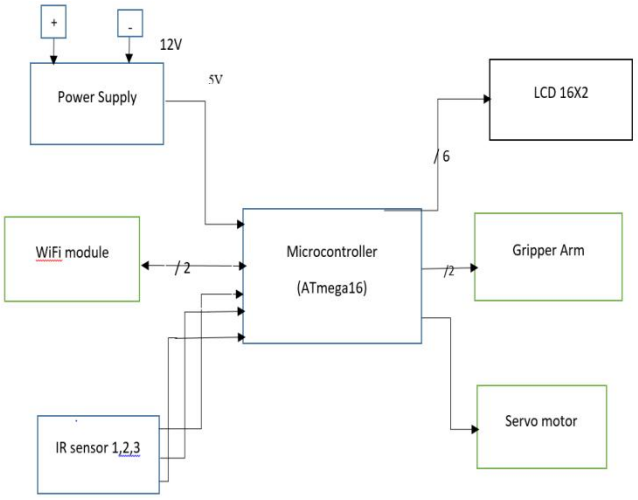
The research work can be categorized into two different parts. The first part consists the mechanism of breaking the egg, collecting its fluid into a bowl and blend it with the rightful ingredients of our choice. The second part consist of spraying of oil on the pan, spreading this mixture all over the pan, flip it so as to cook the omellete from both the sides and then cover it with a lid so as to prevent it from external interference.

Part 1: Egg Breaking Mechanism

Figure 4 gives the block representation of the egg breaking mechanism. The mechanism follows with breaking of egg in the first step which is then poured in to the bowl which is placed just below the breaking table. The egg is broken using a gripper arm and the gripper arm is guided using two pairs of IR sensors. First to know the home position, i.e. the position where the arm will rest when it is not working. It will also limit the opening of the arm, which is the maximum allotted distance to which the arm can be opened. Second is the limiting position which limits the closing of the arm. It is used to hold the egg in the position. The egg is broken using a blade which is attached to a servo motor which moves the blade up and down vertically twice to ensure that the blade hits the egg and it gets broken.

After the egg is broken the arms are opened to the maximum allotted distance and then we transfer the egg white and the yolk to a container placed below the table. The mixture of spices and salt is added to the liquid. The container has a DC motor which mixes the spices, salt, egg white and the egg yolk into a smooth mixture which be further poured into the heating plate to make the omellete.

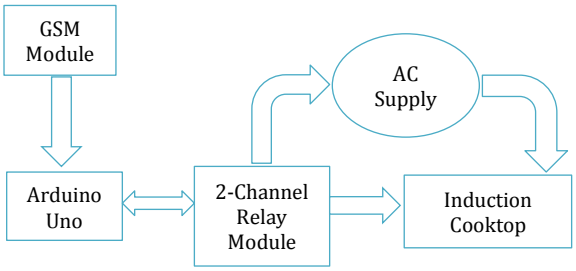
Fig 4: Block Representation of the mechanism



Part 2: Cooking the omelette

After the first part is successfully completed, the second part implementation is ready to begin. Figure 5 is the block representation of this mechanism. Initially the oil is spread evenly all over the pan so as to avoid the omelette from sticking on the pan. After the oil is spread, the fluid collected in the bowl is then spread all over the pan.

Fig 5: Block representation of *part 2* mechanism

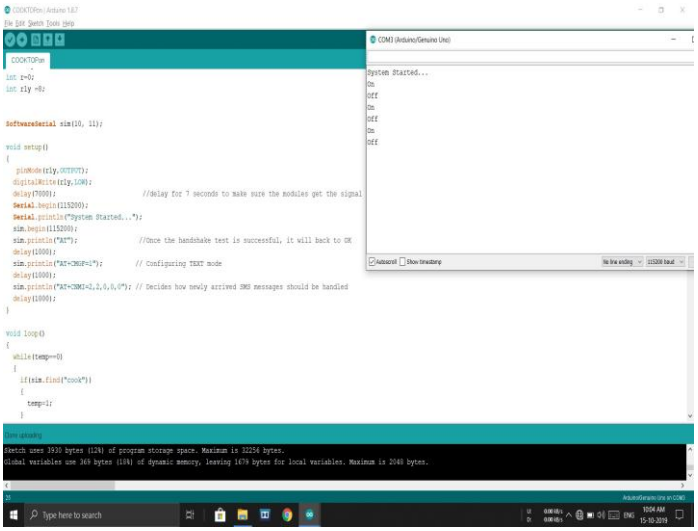


After the omellete is cooked from one side, the omellete needs to be flipped, so that it can be evenly cooked from both the sides. Since the system is fully automatic, the flipping of the omellete is also automatic. This mechanism is done with the help of the servo motor to which a spatula is connected which can easily sustain the weight of the omellete, lift it and easily flip it. After the omellete is fully cooked, the induction is automatically switched off through relay network. This is done after a particular time is setup in the induction cooktop suitable for cooking the omellete. After this the pan is covered with the lid so as to keep the omelette fresh and save it from the external interference. This mechanism of covering the omellete with the lid is also done with the help of the servo motor. With the proper command, the lid is slowly brought upon the pan and the omellete gets covered.

IV. IMPLEMENTATION AND WORKING

The software implementation of the research work includes coding of Microcontroller using Arduino IDE .

Fig 6: Arduino IDE Sketch of Coding Proposed System



The induction cooktop is by default set on the pressure cooker option which is not suitable for cooking the omellete. The dosa/chapatti option is the best option to cook the omellete. So before starting the system the first task is to set the induction cooktop on the dosa/chapatti option. This is done by disabling the microcontroller used in the cooktop and to do so coding of Microcontroller using Arduino IDE is done so as to set the cooktop on dosa/chapatti option permanently.

The system starts with a text message being send to the system from the remote location. The GSM module SIM800L consist of a sim card. The module excepts any activated 2G micro sim card. When the message is received by the module, the 2-channel relay module plays its part i.e. it will make a loud click sound and the induction is turned ON. When the induction is switched ON, a suitable amount of delay is given so as to provide the sufficient time to the omellete so that it is fully prepared. After the omellete is prepared, the relay module trips and the induction is turned OFF.

In the middle of this whole process, there is a small mechanism which plays an important role in the whole process. This mechanism is the flipping of the omellete so as to cook it perfectly from both the sides. To do so a spatula is attached to a servo motor which helps the spatula to lift the omellete and flip it in such a manner that the omellete doesn't gets damaged in the whole process. The servo motor is programmed in such a manner that it can easily sustain the weight of the omellete and flip it. After the omellete is prepared, again a servo motor is used to cover the omellete with a lid.

We first included all the libraries are required to program the system. We have also used SoftwareSerial library which has been used to enable serial communication on other digital pins of the Arduino board as it uses software to replicate the functionality. The SIM card present in the GSM module is checked by using AT commands. The function SendMessage() is used to send the SMS to carry this out we should set the GSM module to text mode first which is again carried out using AT commands. To achieve this we use the mySerial.println() function mySerial.println writes data to software serial port and this is recognized by GSM module.

V. RESULTS

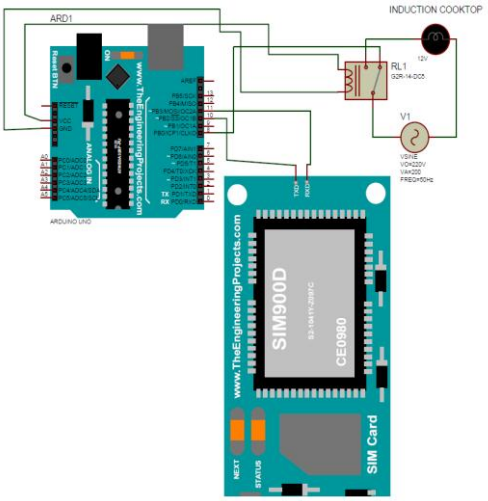
The proposed system is designed in such a way that an omellete can be easily cooked without any external help.

Fig 7: Designed System

Initially the eggs are broken and the fluid is collected in a bowl. The fluid is then blended and at the same time ingredients are added to the same. After the fluid is blended perfectly, it is ready to be cooked into an omellete.

The system starts with a message send to the sim card inserted in the GSM module. When the GSM module receives the message, the relay trips and the induction is ON. It takes around 5-6 minutes to cook an omellete. So even amount of time is needed to be given to both the sides of the omellete so that it can be cooked properly. The pan starts to heat up and at the same time oil is sprayed on the pan. After the pan is heated, the fluid is poured all over the pan. After some time the omellete is flipped and is cooked from the other side. After the omellete is prepared, the relay module again trips and the induction is switched OFF. As soon as the cooktop is switched OFF, the omelette is covered with the lid so as to save it from the external interference.

Fig 8: Final Simulation Circuit



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VI. CONCLUSIONS

This research work clarifies how a simple low cost circuit and automated design can be mainly used as to prepare consumer food product. This machine is accomplished of preparing omelets and serving them in the pan inevitably.

The importance of the project is that it can make an omelette within short span of time with simple technology. Omelette can be prepared easily and human efforts are reduced simultaneously it can reduce time consumption.

The proposed scheme is adaptable in nature. This project can be used to prepare a large number of thing expanding its scope from one simple food to a whole array of food products just by using some simple lines of code or hardware designed in such a manner that its architecture consists of a well-designed robotic arm which can perform various functions with ease.

REFERENCES

[1] https://www.eatright.org/food/resources/national-nutrition-month/registered-dietitian-nutritionist-day

[2] https://www.krupsusa.com/instructions-for-use/KITCHEN-APPLIANCES/EGG-COOKER-F230/csp/8000035574

[3] https://www.target.com/s/west%20bend%20egg%20cooker?ref=tgt_adv_XS000000&AFID=msn&CPNG=Kitchen_Cookware%2BOpen+Stock%2BSets&adgroup=Egg+Poacher_West+Bend&LID=700000001175652p8714338766&LNM=west+bend+egg+cooker&MT=b&network=s&device=c&querystring=West%20Bend%20Automatic%20Egg%20Cooker,%202004&fndsrc=tgtao&msclkid=b856cabef49a1c7b02ff941d3ac86eca&gclid=CLD9_6XxgukCFQmijgodwZACMw&gclsrc=ds

[4] https://www.researchgate.net/publication/260990800_Design_of_an_automatic_egg_cooker_for_boiled_and_poached_eggs

[5] Patel Reema1 , Kunwar Jay Kumar D, "Automated Cooking Machine using PLC and HMI", International Journal of Latest Technology in Engineering, Management & Applied Science, Volume V, Issue V, May 2016

[6] Tushar Gaikwad, Gaurav Kamble , Rahul Sutar , S.P. Nalavde,"Design Analysis and Performance evaluation of Automated Omlette making machine", International Journal of Advance Research and Innovative Ideas in Education, Volume-5 Issue-3 2019

[7] http://www.kscst.iisc.ernet.in/spp/37_series/spp37s/synopsis_exhibition/164_37S0150.pdf

[8] https://patents.google.com/patent/US20040173103A1/en

[9] https://link.springer.com/chapter/10.1007/978-1-4302-6838-3_11

[10] https://www.irjet.net/archives/V6/i6/IRJET-V6I6513.pdf

[11] https://www.manualslib.com/download/1150257/Prestige-Pic-20-0.html

[12] https://lastminuteengineers.com/two-channel-relay-module-arduino-tutorial/

[13] https://lastminuteengineers.com/sim800l-gsm-module-arduino-tutorial/