Ayurvedic Decoction Vending Machine

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Abstract: Today’s modern business is about simplifying the process to safe time, work and money. This can be done simply by integrating softwares and machines, it is the strategy geared towards better profit, effortlessness in management and varied multitasking. The vending machine is the one which can vend various products, which are more likely an automated process. This project involves the development and implementation of vending machine for ayurvedic decoctions that can vend or offer different products which are normally installed in public places which is useful to treat disorders for human beings. Normally decoctions in Ayurveda are made manually which is quite difficult. The recent development of vending machines is for coffee decoction. The vending machine for toys, chocolates and beverages are also available. The project begins with the short analysis of pre-existings prepare normally installed in public places which is useful to treat disorders.

1 INTRODUCTION

The traditional vending machine includes cash payment (including paper money and coin) and smartcard payment. The vending machine has been growing significantly in recent years and is accepted gradually by more and more consumers. The Vending machine is simply a machine, which works automatically and can sell out canned soups, packed eatables, chocolates, candies, snacks, even hot drinks such as coffee, tea, hot chocolate and also drinks like juices, soda water, plain water, and even sometimes some sort of stationery. These machines are more reliable, easily accessible and much more practical than the conventional method of purchase. Nowadays these machines are found almost everywhere like at schools, offices, small restaurants for selling snacks and drinks, even found at railway stations for selling tickets and thus avoiding the queue and in turn saves time. This project is to manufacture a vending machine for ayurvedic decoctions using medicinal herbs. The hardware used here is simple and cost effective. It mainly consists of microcontroller, relay, electrical water heater and solenoid valve. In this project heater is used to heat the ayurvedic herbs along with water to deduce decoctions. The temperature of the decoction is monitored using temperature sensor which passes the pulse to the microcontroller to actuate the solenoid valve to dispense the decoction on basis of user's selection.

2 LITERATURE REVIEW

Coffee Vending Machine

The coffee vending machine is a vending machine that dispenses hot coffee and other coffee beverages. Older models used instant coffee or concentrated liquid coffee and hot or boiling water, and provided condiments such as cream and sugar. The figure 2.1 indicates the model of coffee vending machine. Some modern machines prepare various coffee styles such as mochas and lattes and use ground drip coffee, and some fresh-grind the coffee to order using a grinder in the machine.

Milk Vending Machine

There are two types of milk vending machines. One is a carton vender. There are not many of them around. The other is a bottle vender. This is the vender that most companies are using today. This machine can be found decorated to look like a dairy cow. The figure 2.2 shows the model of milk vending machine. It has 45 selections and a glass front so the customer can see what they are buying. The big thing that one must remember with this machine is to keep the slides clean. The slides are talking about what the milk bottle sits on. When they get a small amount of dirt on them the milk stops sliding forward. When this machine is filled it will become rotating product. Every time it have an empty column take 2 seconds to wipe the slide. This effort can be put into keeping the slides clean eliminates 95% of all the problems in this machine will burst out.

Cold Food Vending Machine

The cold food vending machine is the machine that will be selling items such as salads, sandwiches, breakfast items, or meals. These types of items are precooked and only need to be reheated. There are two major types of cold food vendors. One is called a glass front similar to a snack machine in appearance. The glass front machine operates the same as a snack machine. The only difference is that the unit is refrigerated. These are fairly new in our industry. Some vendors are experimenting with them. The turret style rotates on the inside of the machine. The customer can rotate the turret allowing them to see the selections that are available. There are two types of food that most vendors carry. One is normally referred to as fresh food the other frozen food. Fresh food is sandwiches, salads, burritos or any type of cold food that has never been frozen. It is prepared fresh and goes to the consumer without ever being frozen. The cold food is perceived as being fresher than the frozen, which may help it to sell better. The down side to fresh food is the shorter life expectancy. There are some large vendors that produce their own cold food but for the most part there are companies that will prepare it. The other type of food is what is referred to as frozen food. This type of food is prepared in the same manner as fresh food. The only difference is it is frozen immediately after it is prepared. The perfect situation is when it carry a blend of both fresh and
frozen. The vendor needs to educate the consumer on what is a fair price for food from a cold food machine.

3 METHODOLOGY
The below figure 1 shows the components needed for the working of Ayurvedic decoction vending machine.

![Block Diagram of Ayurvedic decoction vending machine](image)

Figure Block Diagram of Ayurvedic decoction vending machine
A 230V power supply is derived from the power source which is stepped down to 12V and 24V by using two stepdown transformer. The rectifier circuit is used to convert AC to DC, in order to attain pure DC a filter circuit is also added. Since 5V acts as the power source to microcontroller, selection switch, LCD display the 12V DC is converted into 5V using IC7805. The 24V DC is used to actuate the relay driver circuits which is given along the relays. As the user selects the type of decoction the corresponding relay actuates the corresponding heater module. The decoction mixture along with required substrates are added previously. Once the heater module gets actuated the mixer in the boiler starts boil, the boiling temperature is measured using a temperature sensor LM35 and the value is displayed in the LCD module. Once the temperature reaches 50˚C the heater goes off and the corresponding solenoid valve gets actuated. Thus in few seconds the decoction is dispensed.

4 POWER SUPPLY UNIT
In this project a 230V AC is converted into 12V and 12V DC using a power supply circuit. The power supply unit used in this project consists of transformer, rectifier and capacitor. The 230V AC supply is stepped down using a transformer. The stepped down AC voltage is given to the full-wave rectifier, that provides full-wave rectified voltage which has ripples. This is filtered using capacitors. The smooth filtered 12V DC and 12V DC is given to microcontroller and relay driver circuit.

5 ATMega8 MICROCONTROLLER
ATmega8 belongs to a class of 8-bit single chip microcontrollers of RISC architecture. It has 8kb flash memory for storing a written program. Since memory made in FLASH technology can be programmed and cleared more than once, it makes this microcontroller suitable for device development. It has data memory that needs to be saved when there is no supply. It is usually used for storing important data that must not be lost if power supply suddenly stops.

LCD DISPLAY
LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 2X16 LCD display is very basic module and is very commonly used in various devices and circuits

SOLENOID VALVE
A solenoid valve is an electromechanical device in which the solenoid uses an electric current to generate a magnetic field and thereby operate a mechanism which regulates the opening of fluid flow in a valve

RELAY
A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch

ELECTRIC WATER HEATER
Electric water heater used in ayurvedic vending machine is a domestic water heater appliance that uses a storage tank to maximize the heating capacity and provide instantaneous delivery of hot water.

6 RESULT
After completing the project, the design is checked for logical correctness and implementation was done successfully. Here the microcontroller acts as the heart of the project. From the 230V, AC power supply a 5V DC is used to powerup the microcontroller, LCD display and the selector switch, thus they are stepped down using the stepdown transformer to 12V and 24V AC, then they are converted to DC by using rectifiers. One to power up microcontroller, LCD display and selector switch by regulating 12V to 5V DC using voltage regulator and another one to powerup the relays. The power is given to 7th and 8th pin. The information from pin 2nd, 3rd and 4th actuates the relay of the heater and 12th, 13th and 14th actuates the relay of the solenoid valve. Input from selector switch is given to the pin 2,3 and 4 which in turn actuates the relay of the heater. The temperature is given as input to the pin 12,13 and 14 which in turn actuates the relay of solenoid valve. The range of temperature is fixed as 50˚C. The relay is employed here since the power out from microcontroller is not sufficient to actuate the heater and solenoid valve. The relays are driven by relay driver circuit. The output 5V from microcontroller is given to the VCC pin of the relay and they are normally open. The relay power up the devices at its input range of 230V for heater and 24V for solenoid valve. The solenoid valve used here is of normally closed type. Whenever the supply voltage is given the valve gets actuated and opens to dispense the decoction for three seconds. This time is sufficient to dispense the decoction quantity of 20 ml. The quantity is
limited because of its strength of decoction. Four buttons are used to select three different decoctions made of tulasi, ginger, and mint and one button is used for reset option. The temperature is prefixed as 50°C as the set value in which the hot beverages are usually served. The supply water for all three heaters are provided initially along with the medicinal mixture products. The medicinal herbs used are tulasi, ginger and mint. The decoction is selected by the user using selector switch this information is passes to the microcontroller which in turn actuates the relay module of the corresponding decoction slot heater. It boils until the temperature reaches 50°C, this temperature range is measured using temperature sensor. Once the set temperature value is reached, this information is passed to the microcontroller as per the programming which in turn actuates the relay module of the solenoid valve through which the solenoid valve gets actuated and it releases the decoction for next three seconds. Thus the Ayurvedic decoction vending machine has been designed to make and dispense the decoctions derived from the medicinal herbs. The herbs includes ginger, tulasi and mint and they are given as the input to the corresponding heaters. All these process takes the time of about 3 to 4 minutes depending on the environmental conditions. This process does not require any manual operators; it can provide the decoction needed to the user. When the decoction is selected by the user, microcontroller transfers the signal to heater when it reaches temperature range the microcontroller passes the signal to the microcontroller to open and close the solenoid valve to dispense the decoction. Every stage of the process is indicated on the LCD display. Decoction 1 represents Tulasi syrup, decoction 2 represents Ginger syrup and decoction 3 represents Mint syrup that can cure cold, fever, indigestion respectively. The user can also select multiple decoction one after the other i.e. after completion of 1 process. Stages in process are listed below

- Asks to select decoction
- Indicate the type of decoction selected
  - Decoction 1
  - Decoction 2
  - Decoction 3
- Indicates increasing Temperature range in degree C

![Figure 2 Initial stage of process](image1)

![Figure 3 Selection of Decoction types](image2)

![Figure 4 Increasing in temperature level](image3)

![Figure 5 Reaching of set value](image4)

![Figure 6 Set temperature reached](image5)
Figure 7 Decoction Dispensing

- Indicates when set temperature is reached

Then it goes back to initial stage. In case to change the type of decoction selected or to abort the process reset button is used. Every stages in the process are represented in the real time process images of the project. Figure 2 to figure 7 represent the corresponding stage of working of the decoction vending machine.

7 CONCLUSION
Compared to different vending machines and all are designed with different aspects like area, Power and delay because of time, switching speed, etc. In ayurvedic decoction vending machines more optimized system with customer preferences. Because according to customer choice they can also select types of decoction as tulasi, ginger and mint. This ayurvedic decoction vending machine gives varieties of decoctions as per the requirement to the satisfy the need of the user. The main aim is to reduce time consumption and to make work easier, since it could take nearly 2 minutes to boil and reach 50˚C and the quantity is limited to 20ml by actuating solenoid valve only for 3 seconds to remain in open state once the fixed temperature value is reached. The goal is to help the manual workers to make work easier with accurate measurement. If ayurvedic decoction vending machine could be integrated successfully, there could be a striking improvement in the preparation and dispensing of ayurvedic decoctions.

6.2 FUTURE SCOPE
The Ayurvedic decoction vending machine can also provide the future society with time consumption, reduce manual work, and even a way to live a healthy life. The future systems include more number of slots and increased speed.

REFERENCES