ISSN No:-2456-2165

Smart Coffee Vending Machine

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Abstract:- The existing coffee vending machines are studied with their applications. Now a days coffee vending machines are installed at common places like railway stations, airports, restaurants even in companies. Dispense coffee is an automated process without man power and it is easy to save time. The main purpose of our project is to provide several cup of coffee with one press.

Keywords:- *Solenoid valves, Motor driver IC, DC Motor, Relay, PIC 16F877, IR sensor, LCD display.*

I. INTRODUCTION

Coffee is a part of daily routine of people around the world. Everyone want to cup of coffee with their preference. Some people depend on a road side stall to fulfill their requirements. The quality of coffee from these road side stalls is questionable. The cleanliness of utensils used in making coffee cannot be trusted. There is one thing that is virtually impossible to consider are the individual preferences. It is difficult from the road side stalls to fulfill different preferences of different customer. Some would like with sugar and some would like sugar free coffee. Time that required to dispense the coffee is very less. It save time.

II. RELATED WORK

In this system PIC 16F877A microcontroller is used because this is faster, more reliable and code generated and given to the microcontroller. 16*2 LCD display is interfaced to microcontroller. IR sensor is used at the outlet of the machine. In this system there are two options with or without sugar. After choosing option quantity is entered through the keypad. Then status of IR sensor is checked. After that ingredients and hot water is dispense in the mixing tank and this is mixed through dc motor. After mixing it is dispensed through the solenoid valve. This procedure is repeated till the quantity entered gets over.

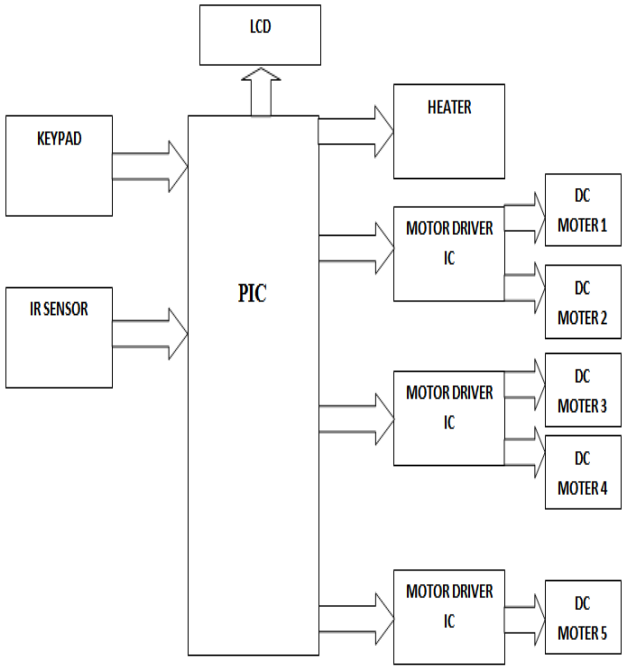

Fig 1:- Block Diagram of Smart Coffee Vending Machine

A. Relay

Fig 2:- Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on/off So relays can have two switch positions and most have double throw (changeover). Relays

allow one circuit to switch a second circuit which can be completely separated from the first.

The coil of a relay passes a relatively large current typically 30mA for a 12V relay but it can be as much as 100mA for relays designed to operate from lower voltages. Most ICs cannot provide this current and a transistor is usually used to amplify the small IC current to the larger value required for the relay coil.

Relays are usually SPDT or DPDT but they can have many more sets of switch contacts. They produce a brief high voltage (spikes) when they are switched off and this can destroy transistors and ICs in the circuit. To prevent damage, you must connect a protection diode across the relay coil.

➢ *Features*

- The ULN2003 is known for its high current, high voltage capacity.
- The drivers can be paralleled for even higher current output. Even further, stacking one chip on top of another, both electrically and physically, has been done.
- Generally it can also be used for interfacing with a stepper motor.

B. DC Motor

DC motors convert electrical into mechanical energy. They use permanent magnets and loops of wire inside DC motor. When current is applied, the wire loops generate a magnetic field, which reacts against the outside field of the static magnets. The interaction of the fields creates the movement of the shaft/armature. Thus, electromagnetic energy becomes motion.

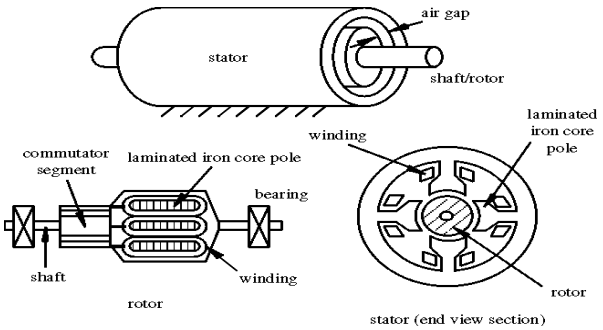

Fig 3:- DC motor

Mostly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current flow in part of the motor. A DC motors speed can be controlled by using either a variable supply voltage or by changing the strength of current in its field windings. DC motors are used in tools, toys, and appliances. Larger DC motors are used in propulsion of electrical vehicles, elevator and hoists, or in drives for steel rolling mills.

D. LCD Display

Fig 4:- LCD Display

LCD indicates different mode settings & set point adjustment. Also 16 characters are divided to indicate speed output. The LCD Display used here is 16 characters by 2 line display. The 16 characters in both lines are equally divided to indicate commands and speed. In sub routines 'Enter Speed' and 'Current Speed' message, set Speed value is indicated on screen.

In our project LCD is interfaced with the port-B (RB0-RB7) i.e. from pin number 34 to pin number 40. Pin RS is directly connected to Pin 34 of pic and one more another important pin EN (LCD enable) is directly connected to pin 35 of the controller. On the other hand pin R/W of LCD is connected to ground. The LCD interfacing is done here for indicating various display messages for the user.

a) The interfacing is given in detail which is as follows:-+

In this equipment the LCD which is used is 16X2 type i.e. 16 characters per rows and two rows. The function of LCD is to display the status of events performed by the respective circuit or to display those resulting parameters which have to be displayed on the screen as per user requirement.

16x2LCD - it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD.

E. Motor Driver IC Controller

This IC are designed to control two DC motors simultaneously. It is used for controlling a low current rated motors. L293D IC receives signals from PIC and transmit relative signal to the motors. It has two voltage pins one of which is used to draw current for the working of the L293D and other is used to apply voltage to the motors.

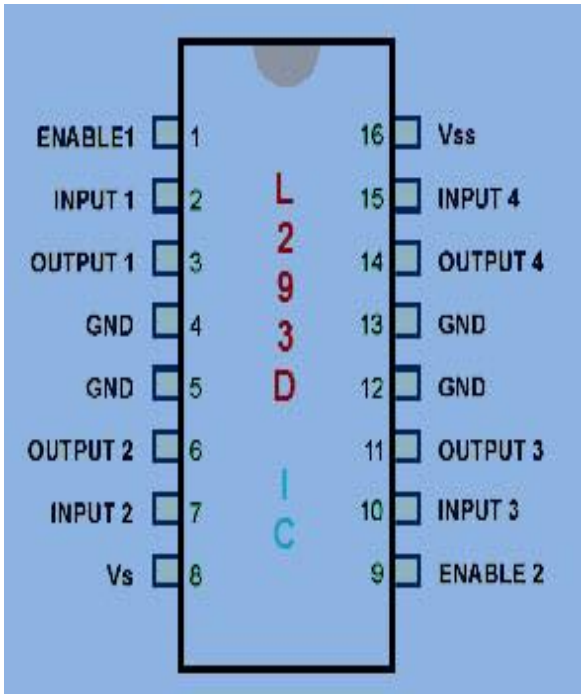

Fig 5:- Motor Driver IC Controller

F. Solenoid Valve

The valve is controlled by electric current through a solenoid. Their task is shut off, distribute or mixed fluids. Two way valve if the valve is open then the two ports are connected and fluid may flow between the ports. If the valve is closed then ports are isolated.

III. ACKNOWLEDGMENT

We are thankful for giving us the opportunity for carrying out this work under the guidance of Prof. S. C. Deshmukh. Her encouragement have helped us to grow intellectually in a truly efficient manner. We are really grateful to her for the time she has spent in helping us accomplishing this work.

We express our sincere gratitude to our institute Sanjay Ghodawat Group of Institutions, Atigre.

IV. CONCLUSION

In this project we have designed a machine which provide number of cup of coffee which is entered through keypad. Which also provide with and without sugar options.

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