Smart Coffee Machine

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***Abstract*—The Fourth Industrial Revolution, 4IR, or Industry 4.0,conceptualizes rapid change to technology, industries, and societal patterns and processes in the 21st century due to increasing inter-connectivity and smart automation. The goal of Industry 4.0 is to introduce automated decision-making, interconnected machinery, data analytics, and more to increase productivity across the value chain and enable the efficient production of goods. Using the automation it'll reduce the cost of all machine , device will be very cost effective. Now it's the era of 4IR, Every machine , device are going to be automated and these machines and devices do not need human to run them . After reducing human , the production cost will be minimized, it'll be very beneficial to industry. Hence , using automated devices it will reduce the human efforts greatly. Using automated device greatly reduce the human efforts as well as saving a huge portion of time. If you have a automated machine which can make you tea, coffee in the morning or noon or night or whenever you want to drink coffee or tea, just press button add your adjustments and here you go .. you get an awesome cup of refreshment to start your day. It'll save your time and efforts more than ever compare to doing it yourself. So automation is the new key element for your everyday life . Most importantly human empowered work are lessening day by after using automation.**

***Index Terms*—component, formatting, style, styling, insert**

I. Introduction

Coffee is a drink prepared from roasted coffee beans. Darkly colored, bitter, and slightly acidic, coffee has a stimulating effect on humans, primarily due to its caffeine content.In today's world almost everyone kicks up their day after drinking a mug of coffee. As Coffee is a beloved beverage known for its ability to fine-tune your focus and boost your energy levels. In fact, many people depend on their daily cup of joe right when they wake up to get their day started on the right foot. In addition to its energizing effects, coffee has been linked to a long list of potential health benefits, giving you all the more reason to get brewing.Coffee is loved by people of all ages, Students, businessman, engineers, doctors, teacher and people from all other backgrounds.

Receiving a cup of coffee instant is more time saving and effortless compare to making a cup of coffee by yourself.Minding the benefits of coffee, we have decided to make an automation device which will produce coffee for you by following your instruction and we named it "Smart Coffee Machine".

If a device like "Smart Coffee Machine" is placed in places like office, school,college,university and many more important places which will make the people of those places very much attentive, time-effective,energetic. Suppose, "Smart Coffee Machine" is in the UIU campus, here the faculty and student can have instant coffee at any time, it'll will break their monotony of regular leisure routine, everyone will be super attentive and so on. Moreover, in campus faculty can have free coffee using their respective id cards ,however students have to pay a small amount of money to have coffee from Smart Coffee Machine via bkash or any other mobile banking system. Using this Smart Coffee Machine, will save time of students by providing instantly instead of gathering in a queue. Moreover it'll have the correct account management without any third party's corrupted management. And also it ensured the quality of Coffee . We can't manage a coffee shop/ tea shop 24/7 but we can run a coffee machine 24/7 to provide service.

II. Project Overview

A. Features at a glance

Implementation of automation to ease our daily activities which reduce effort and save our time.

- User Choice Tracking
- Wifi Server base
- Online Payment / RF Card Payment
- SMS
- User Website
- Pre set-up Clients Choice
- Qr Code Scanning Registration
- Unauthorized Person Can't Access

B. Component List

1) Esp32
2) Esp32 cam
3) 12V 5A Pump
4) 5V Relay * 3
5) 5V DC Pump
6) 128*64 graphic lcd display
7) 12V Power Adepter
8) 230V Water hitter
9) 12V Lithium Ion Battery pack
10) 4 Key Button Board
11) POWER Module DC to DC Step Down Buck Converter
12) Temperature Sensor
13) IR Sensor
14) Rf Card Scanner Module
15) 12V Relay
16) Bc548 Transistors

17) 10K Registotor
18) 1K Registotor
19) 5.5K Registotor

and others are deliberate, using specifications that anticipate your paper

as one part of the entire proceedings, and not as an independent document.

Please do not revise any of the current designations.

C. Flow Chart

III. Component Description

A. Esp32

Fig. 1. ESP-32 38PIN

ESP32-WROOM-32 has Wi-Fi + BT + BLE MCU modules that target a wide variety of applications, from low-power sensor networks to voice encoding, music streaming, and MP3 decoding. The CPU clock frequency is adjustable. It can change from 80 MHz to 240 MHz. The chip also has a low-power co-processor that can be used instead of a CPU. This will save electricity when performing tasks that do not require too much computing power, such as monitoring peripherals. ESP 32 integrates a rich set of peripherals starting from capacitive touch sensors, Hall sensors, SD card interface, Ethernet, high-speed SPI. It has Integrated SPI flash memory which is 4MB (32mb). Also, it has RTC and Low Power Management system. Minimum Power supply voltage is -0.3 and maximum Power supply voltage is 3.6V. Cumulative IO output current maximum 1100 mA. When used as a battery power supply for ESP32 series chips and modules, a supply voltage supervisor is recommended to avoid boot failure due to low voltage. Users are recommended to pull CHIP-PU low if the power supply for ESP32 is below 2.3 V.

B. Esp32 cam

ESP32-CAM can be widely used in various IoT applications. It is suitable for home smart devices, industrial wireless control, wireless monitoring, QR wireless identification, wireless positioning system signals and other IoT applications. It is an ideal solution for IoT applications.

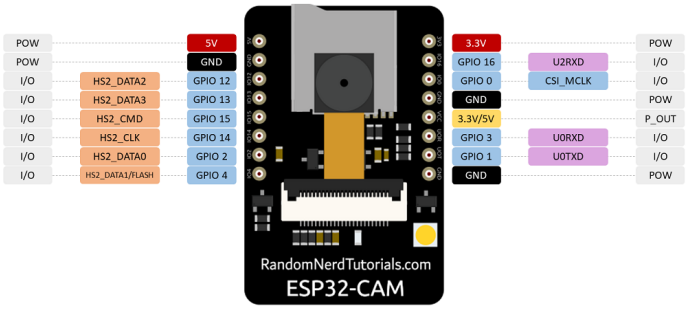

Fig. 2. ESP32 CAM

C. 5v Relay

A 5v relay is an automatic switch that is commonly used in an automatic control circuit and to control a high-current using a low-current signal. The input voltage of the relay signal ranges from 0 to 5V.

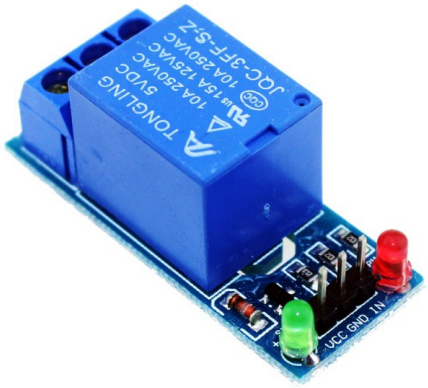

Fig. 3. 5v-Relay

D. 12V 5A Pump

What is 5A power supply? 12V 5A Switching Power Supply - UL Approved. This 5A power supply is a beefy enough for your high-power applications. The fact that it is a switching supply means it's a lot smaller and much lighter weight than a linear supply that uses a transformer. It can supply 12V DC up to 5 Amps, running from 110V or 220V power.

Fig. 4. 12v 5A Pump

E. 5V DC Pump

5V DC water pump is a miniature water pump use 5V DC power supply, battery, solar panel, or USB power supply to power it. Mainly used in different applications such as fish tanks, cat water fountain, desktop fountains and so on.

Fig. 5. 5v Dc pump

F. Graphic LCD display

In this tutorial I am going to teach you the working and pin out of 128×64 graphical lcd. There are lot of graphical lcds available in the market. Each perform exactly the same function with some variations. Some are small in size and some bigger. Some are black and white and some multicolored. Some perform few numbers of operations and some can perform many functions. For example the graphical lcd you see on your mobile phone is different from the one in your car.

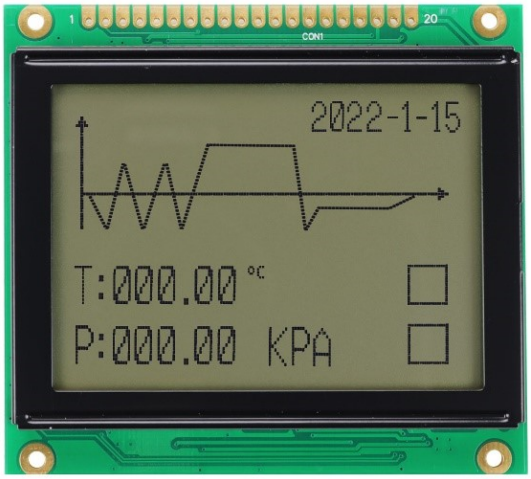

Fig. 6. Graphic LCD display

G. 12V Power Adepter

What is a 12V DC Power Supply? A 12V DC power supply is an adapter designed to supply precisely 12 Volts of direct current to a device. The voltage supplied must precisely match the requirements of the equipment.

Fig. 7. 12v power adeptar

H. 230V Water hitter

The 230V electric element it designed to keep the internal cylinder water at 70degC. If you are circulating the engine water (which can be around 92degC) through the heat exchange coils, the cycliner water temperature can get up to 85degC.

Fig. 8. 230V Water hitterr

I. 12V Lithium Ion Battery pack

Lithium-ion batteries have the highest storage capacity of all RV 12V battery types and have the fastest and most efficient charging. They also last the longest before needing to be replaced, sometimes 3-5 times longer than traditional batteries.

Fig. 9. 12V Lithium Ion Battery pack

Fig. 10. Temperature Sensor

J. Temperature Sensor

A temperature sensor is an electronic device that measures the temperature of its environment and converts the input data into electronic data to record, monitor, or signal temperature changes.

K. IR Sensor

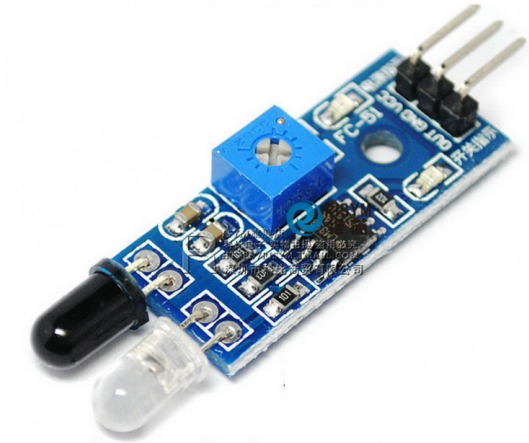

Fig. 11. IR Sensor

An infrared sensor is a device that detects infrared radiation in its environment and outputs an electric signal. An infrared sensor can detect movement as well as to measure the heat of an object. The Infrared Sensor can detect infrared radiation, which is invisible to our eyes.

L. Rf Card Scanner Module

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. RFID is a technology similar in theory to bar codes. The RC522 RFID module based on the MFRC522 IC from NXP is one of the cheapest RFID options you can get online for less than four dollars. It usually comes with an RFID card tag and a key fob tag with 1KB of memory. And the best part is that it can write a tag that means you can store any message in it

Fig. 12. Rf CARD scanner

M. POWER Module DC to DC Step Down Buck Converter

In DC/DC switching circuits, appropriately driven electronic switches and components are used to store energy, allowing it to be converted. A step-down, or buck, converter is a DC/DC power converter that reduces the input voltage and provides a lower output voltage.

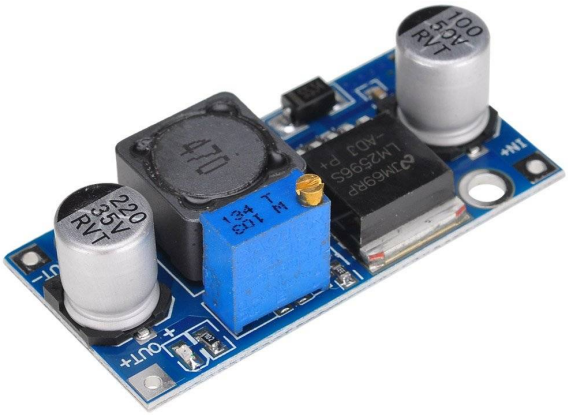

Fig. 13. POWER Module DC to DC Step Down Buck Converter

N. 12V Relay

An electrical relay is a type of heavy-duty, remote-control switch able to handle high-current accessories, yet capable of being actuated by substantially less current. Relays install between the power source and the electrical accessory requiring on/off power.

Fig. 14. 12V Relay

O. Bc548 Transistors

The BC548 is an NPN bipolar junction transistor that can be used in many general purpose applications. It can handle maximum current of 500mA which is enough to drive many other components such as ICS, other transistors, portion of a circuits, relays, LEDs etc.

Fig. 15. Bc548 Transistors

P. 10K Registor

Commonly used in breadboards and other prototyping applications, these 10K ohm resistors make excellent pull-ups, pull-downs and current limiters. These thick-lead versions of the resistors fit snugly into a breadboard with very little movement, so you should have few to no issues using them in your next project!

Fig. 16. 10k Registor

Q. 4 Key Button Board

- 2x2 keyboard board, the main resources: 4 buttons, control interface
- Materials include: test program (AVR, STM8, STM32), the principle diagram of the circuit
- Made of high quality with material, durable for long time using
- The 4 push buttons module provides 8 single push buttons in a small board
- Function description: eight key, can be used as input device, or I/O test

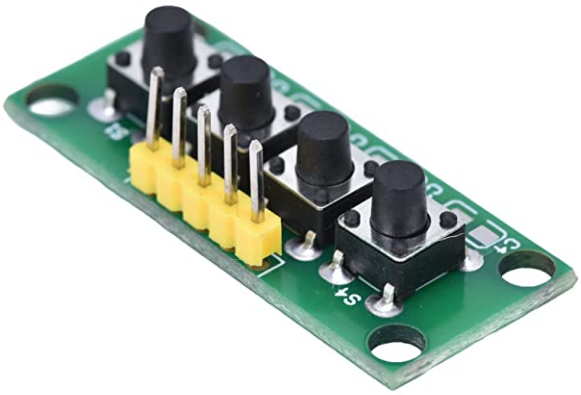

Fig. 17. 4 key button board

IV. Future Work

Until now, we were doing it for our varsity. But we're thinking to take this project to the industry level. We'll do more custom design to make it more attractive. We'll add some hardware stuffs and try to minimize all the lackings.

V. IMPORTANT LINK

- **YouTube**
- **GitHub**