IOT Based Solar Energy Automated Water Feed For Street Animals And Birds

[1]C. Anbazhagan , [2] Krishnakumar, [3] M. Bala Subramaniyan

[1] PG Student, [2] Assistant professor, [3] PG Student

Dept of EEE, Vel Tech Multi Tech Dr. Rangarajan Dr. Sakunthala Engineering College, AVADI, CHENNAI-600062

Abstract:

This paper presents the design and implementation of an IoT-based automated water supply system aimed at addressing the issue of water scarcity for street animals in metropolitan areas during the summer months. With urbanization on the rise, many street animals, including birds and mammals, struggle to find sufficient water sources, leading to dehydration and related health problems. The proposed system utilizes IoT sensors deployed at strategic locations to detect the presence of animals and trigger water dispensers equipped with automatic valves. A central water management system monitors water levels in the dispensers and orchestrates refilling operations as necessary, optimizing water usage and preventing wastage. Remote monitoring and control capabilities allow administrators to oversee the system's status in real-time, receive alerts for maintenance needs, and manually intervene if required. Community engagement is emphasized to foster volunteer participation and raise awareness about the project's importance. By providing a reliable and accessible source of water for street animals, the IoT-based solution aims to improve animal welfare and mitigate the adverse effects of water scarcity in urban environments.

**Index Terms** – ESP32, Ultrasonic sensor,Real Time Clock module,solar panel.

Introduction:
In urban environments, street animals and birds often encounter significant challenges in meeting their basic needs, particularly access to water, which becomes even more critical during the sweltering summer months.It is indeed disheartening to observe the neglect and indifference towards the essential needs of street animals in

many communities. Providing food and water for animals is not only a moral responsibility but also contributes to creating more compassionate and caring societies. Street animals play an important role in our ecosystem, and ensuring their well-being reflects our respect for all living beings. However, the lack of concern for animals in urban areas can stem from various factors, including unawareness, competing priorities, and sometimes cultural attitudes towards animals.

Nevertheless, raising awareness about the plight of street animals and promoting empathy towards them can inspire positive change. Our IoT-based Solar Energy Automated Water Feed system ensure to provide water resource for all animals and birds .
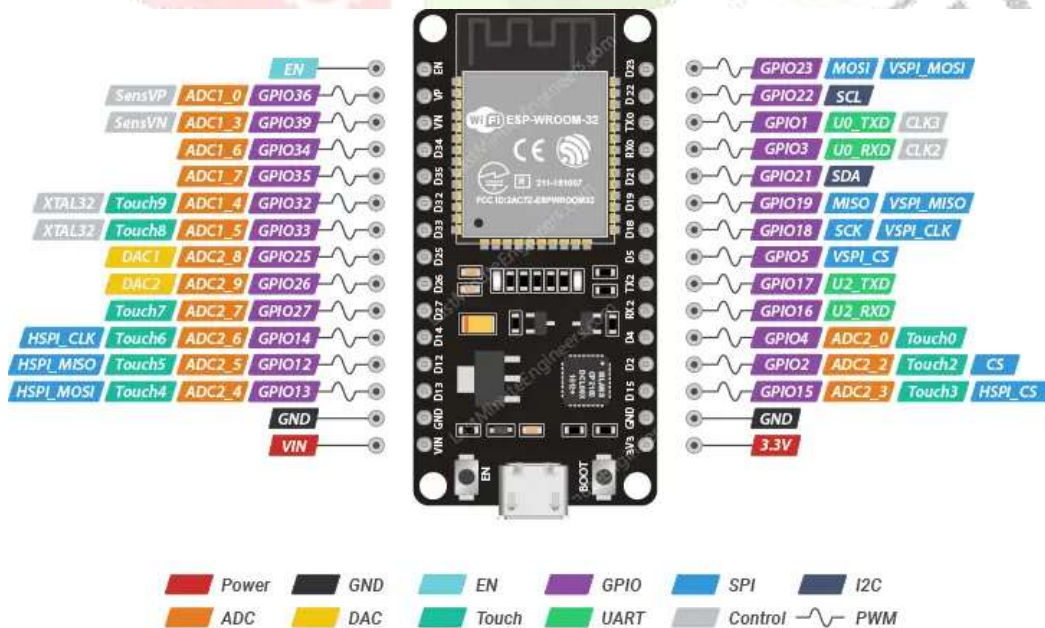
Block Diagram:
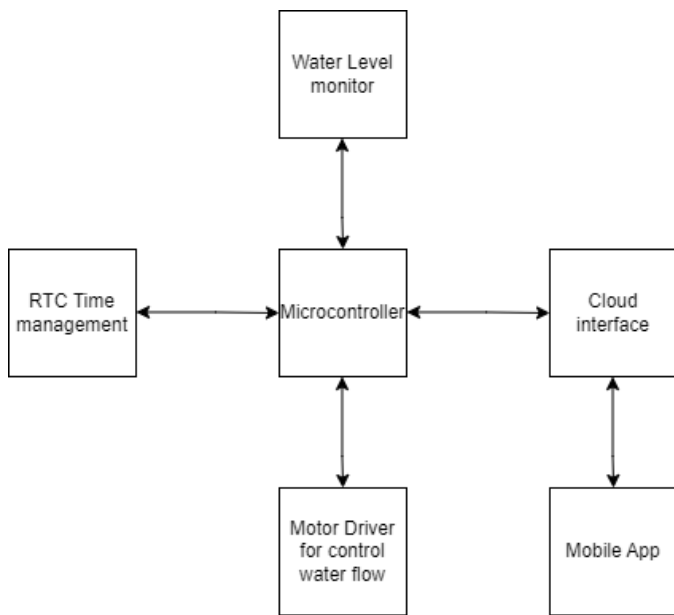
Components:

- ESP32
- RTC Module
- Ultrasonic Sensor
- Solar panel
- LCD 16X2

ESP32 :

The ESP32 is a powerful microcontroller and Wi-Fi/Bluetooth module that is commonly used in IoT (Internet of Things) projects. It's developed by Espressif Systems and is known for its versatility, low cost, and low power consumption. Here are some key features and uses of the ESP32:

Dual-Core Processor: The ESP32 features a dual-core processor, which allows it to handle more complex tasks and multitasking compared to its predecessor, the ESP8266.

Wi-Fi and Bluetooth Connectivity: One of the standout features of the ESP32 is its built-in Wi-Fi and Bluetooth capabilities. This allows it to connect to the internet and communicate wirelessly with other devices, making it ideal for IoT applications.

Low Power Consumption: The ESP32 is designed to be energy-efficient, making it suitable for battery-powered applications where power consumption is a concern.

Rich Set of Peripherals: The ESP32 comes with a wide range of built-in peripherals, including GPIO pins, SPI, I2C, UART, ADC, DAC, and more, making it highly versatile and adaptable to various projects.

Support for Arduino IDE and MicroPython: The ESP32 can be programmed using popular development platforms like the Arduino IDE and MicroPython, making it accessible to a wide range of developers and hobbyists.

Wide Range of Applications: Due to its capabilities and versatility, the ESP32 is used in a variety of applications, including home automation, industrial automation, wearable devices, smart agriculture, and of course, IoT-based projects like the one you mentioned, such as the Solar Energy Automated Water Feed for Street Animals and Birds project.

Overall, the ESP32 is a popular choice for IoT projects due to its powerful features, connectivity options, and low cost, making it well-suited for both hobbyist and professional applications.

Ultrasonic Sensor :

An Ultrasonic Sensor is a device that measures distance to an object using Sound Waves

works by sending out a sound wave at ultrasonic frequency and waits for it to bounce back from the object

the time delay between transmission of sound and receiving of the sound is used to calculate the distance.

Distance = (Speed of sound * Time delay) / 2Stop Condition (P)
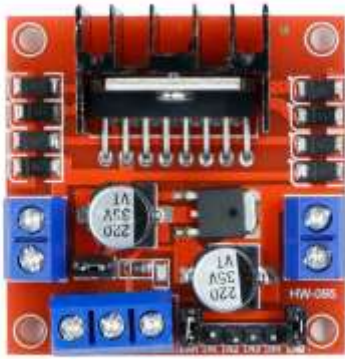
Motor Driver:

L298 Motor Driver Module, 2A Dual Channel total 4A.PWM Control for motors variable speed Heatsink for better performance.Operates up to 35V DC

Logical part of the terminal power supply range Vss :4.5V-5.5V

RTC:

The DS3231 is a low-cost, highly accurate Real Time Clock which can maintain hours, minutes and seconds, as well as, day, month and year information.

The module can work on either 3.3 or 5 V which makes it suitable for many development platforms or microcontrollers

The battery input is 3V and a typical CR2032 3V battery can power the module and maintain the information for more than a year.

The module uses the I2C Communication Protocol which makes the connection to the

LCD 16x2:

The LCD 16x2, a commonly used alphanumeric liquid crystal display, consists of a 16-column by 2-row grid, allowing it to display up to 32 characters simultaneously. Equipped with a built-in controller, such as the HD44780, it simplifies interfacing with microcontrollers, making it a popular choice in electronics projects. Its versatility allows the display of letters, numbers, symbols, or custom characters. Frequently employed in conjunction with microcontrollers like Arduino, the LCD 16x2 is prized for its simplicity, readability, and ease of integration. Its applications span various projects, including digital thermometers, clocks, and information display systems, where a compact and clear visual output is essential.
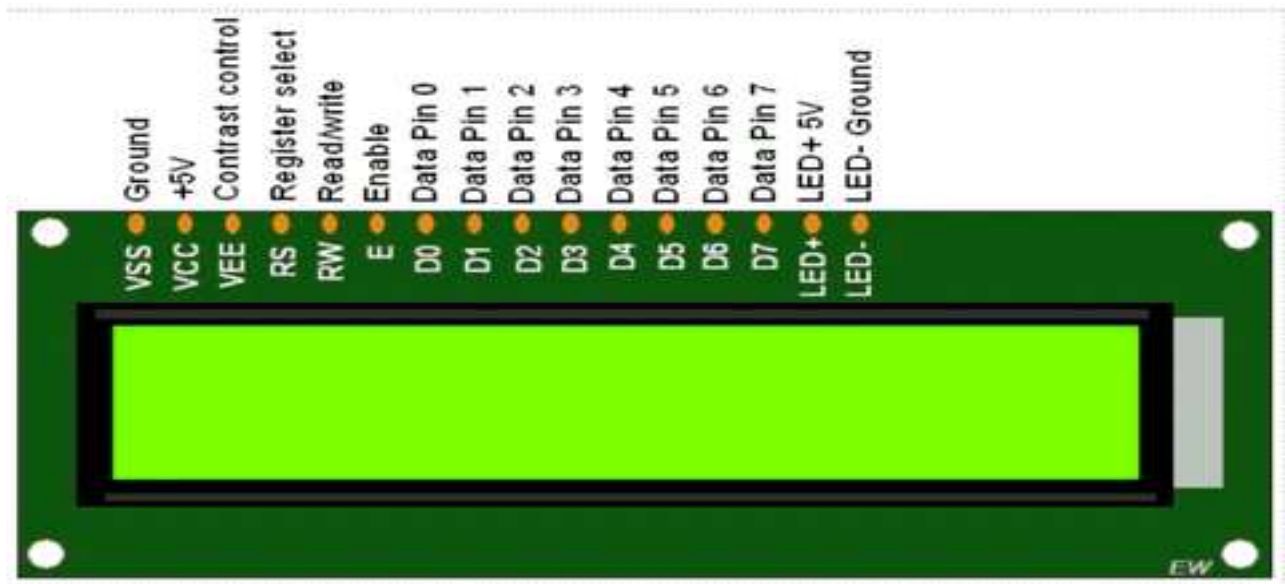
Blynk IOT:

Blynk is an Internet of Things (IoT) platform that allows users to create custom mobile applications to control and monitor IoT devices. It simplifies the process of building IoT projects by providing a user-friendly interface and a range of features to connect and interact with connected devices.

Here are some key details about Blynk IoT:

Mobile App Development :Blynk provides a mobile app development platform that allows users to create custom interfaces for controlling and monitoring their IoT devices. The Blynk app is availableforiOSandAndroidandcanbeeasilycustomizedwithvarioususerinterfaceelements like buttons, sliders, graphs, and notifications.

Device Connectivity: Blynk supports a wide range of popular hardware platforms and communication protocols, making it easy to connect IoT devices to the platform. It supports popular development boards like Arduino, Raspberry Pi, ESP8266, and ESP32, as well as communication protocols such as Wi-Fi, Bluetooth, Ethernet, and cellular data.

Cloud Connectivity: Blynk offers cloud connectivity, enabling users to securely store and transmit data between their IoT devices and the Blynk servers. This allows for remote monitoring and control of IoT devices from anywhere with an internet connection.

Widgets and Functionality: Blynk provides a library of pre-built widgets and functionality that can be easily added to the mobile app interface. These widgets include buttons, sliders, gauges, graphs, LED displays, and more, allowing users to create intuitive interfaces for their IoT projects.

Circuit design: