
ISSN: 2321-2152
IJMECE
International Journal of modern electronics and communication engineering
E-Mail
editor.ijmece@gmail.com
editor@ijmece.com
www.ijmece.com

ISSN 2321-2152
www.ijmece.com
Vol 12, Issue 4, 2024

ESP8266 NodeMCU Publish Sensor Readings To Things Speak

[1]N NITHISH 22tq5a0402@siddhartha.co.in [1]B NAGA VENKAT VAMSI KRISHNA 22tq5a0409@siddhartha.co.in [1]S LALITHA DEVI 22tq5a0410@siddhartha.co.in [2]Dr. V. Vijaya Bhaskar

vijay.valiki@siddhartha.co.in [1]G. Kalyan Kumar 22TQ5A0422@siddhartha.co.in

SIDDHARTHA INSTITUTE OF TECHNOLOGY & SCIENCES Korremula Road, Ghatkesar, Medchal-Malkajgiri (Dist)-500 088

ABSTRACT

This proposed system is used for Driver & Road safety system. Based on computer vision techniques, the driver's face is located from a color video captured in a car. Then, face detection is employed to locate the regions of the driver's eyes, which are used as the templates for eye tracking in subsequent frames. The tracked eye's images are used for drowsiness detection in order to generate warning alarms. The proposed approach has three phases: Face, Eye detection and drowsiness detection. The role of image processing is to recognize the face of the driver and then extracts the image of the eyes of the driver for detection of drowsiness. The Haar face detection algorithm takes captured frames of image as input and then the detected face as output. It can be concluded this approach is a low cost and effective solution to reduce the number of accidents due to driver's Drowsiness to increase the transportation safety.

I.INTRODUCTION

The ESP8266 NodeMCU is a low-cost, versatile Wi-Fi microcontroller that has become popular for a wide range of Internet of Things (IoT) applications due to its affordability, ease of use, and ability to interface with various sensors and online platforms. One of its most powerful capabilities is its ability to connect to the internet and send sensor data to cloud platforms, such as ThingSpeak. ThingSpeak is an open-source Internet of Things (IoT) platform that allows users to collect, visualize, and analyze sensor data. By using the ESP8266 NodeMCU and ThingSpeak together, users can build powerful IoT systems that monitor real-world variables, such as temperature, humidity, air quality, or light levels, and display this data on the cloud for remote monitoring. This introduction explores the process of integrating an ESP8266 NodeMCU with ThingSpeak to publish sensor readings. The goal of this system is to create an easy-toimplement, affordable, and effective solution for monitoring and visualizing sensor data remotely. This setup is particularly useful in applications like smart homes, environmental monitoring, agricultural systems, and industrial automation, where real-time data access and analysis are critical.

II.LITERATURE SURVEY

The integration of **ESP8266 NodeMCU** and **ThingSpeak** for publishing sensor data has gained considerable attention in the Internet of Things (IoT) community due to its simplicity, affordability, and powerful capabilities for remote monitoring and data analysis. This literature survey delves into the various studies, applications, and advancements related to the ESP8266 NodeMCU's use in IoT-based systems, particularly focusing on how it interacts with ThingSpeak for publishing sensor readings. The review covers several areas including the technical aspects of this integration, use cases, challenges, and advancements in related fields.

The **ESP8266** is a low-cost Wi-Fi microcontroller with integrated TCP/IP stack, and the **NodeMCU** board is a development platform built around this chip, making it highly popular for IoT projects. **Chung et al. (2021)** explore the applications of the ESP8266 in various domains, including smart homes, agriculture, healthcare, and environmental monitoring. The board's ability to connect to Wi-Fi networks and its support for cloud integration through protocols like MQTT and HTTP makes it a versatile solution for deploying IoT systems. The **NodeMCU** is designed to be easily programmable using the **Arduino IDE** or Lua scripting, making it accessible for both beginners and experts in electronics and programming. Its small form factor and low cost are important factors that have contributed to the widespread adoption of this platform in academic, hobbyist, and industrial projects. **Singh et al. (2020)** highlighted that the simplicity of the ESP8266 platform is a key advantage for IoT solutions, reducing the barriers for entry for developers and enabling quick prototyping of sensor-based applications. The **NodeMCU** offers several benefits, including a broad range of General Purpose Input/Output (GPIO) pins, support for various sensors, and the ability to handle multiple concurrent processes with minimal power consumption. The Wi-Fi capabilities allow it to directly connect to the internet, enabling seamless integration with cloud-based platforms like **ThingSpeak**, where data can be uploaded and visualized in real-time.

ISSN 2321-2152
www.ijmece.com
Vol 12, Issue 4, 2024

III.EXISTING METHOD

The ESP8266 NodeMCU microcontroller is an affordable and versatile Wi-Fi-enabled device that has become popular in a wide range of Internet of Things (IoT) applications. The ability to easily interface with various sensors and publish the collected data to the cloud has positioned the ESP8266 as an ideal solution for projects requiring remote monitoring. One of the most commonly used platforms for publishing sensor data from the ESP8266 is ThingSpeak, an open-source Internet of Things (IoT) platform that allows data collection, visualization, and analysis. In this section, we will examine the existing systems that integrate ESP8266 NodeMCU with ThingSpeak to publish sensor readings, exploring their components, functionalities, use cases, and limitations.The ESP8266 NodeMCU is a small, cost-effective development board powered by the ESP8266 Wi-Fi chip, which includes built-in Wi-Fi functionality and a powerful processor. With features such as 11 GPIO pins, ADC (Analog to Digital Converter), SPI, UART, I2C communication protocols, and PWM support, the ESP8266 NodeMCU is suitable for a wide array of applications, from simple sensor monitoring to complex automation systems. Because of its Wi-Fi capabilities, the ESP8266 allows for easy integration into IoT systems, making it a popular choice for developers and hobbyists who wish to create smart devices that can be controlled and monitored remotely. The NodeMCU development board includes an onboard USB-to-serial converter, making it easy to program directly via the Arduino IDE. The simplicity of using this platform has led to the creation of several IoT-based systems, where sensor data is gathered and transmitted to the cloud for visualization, analysis, and decision-making.

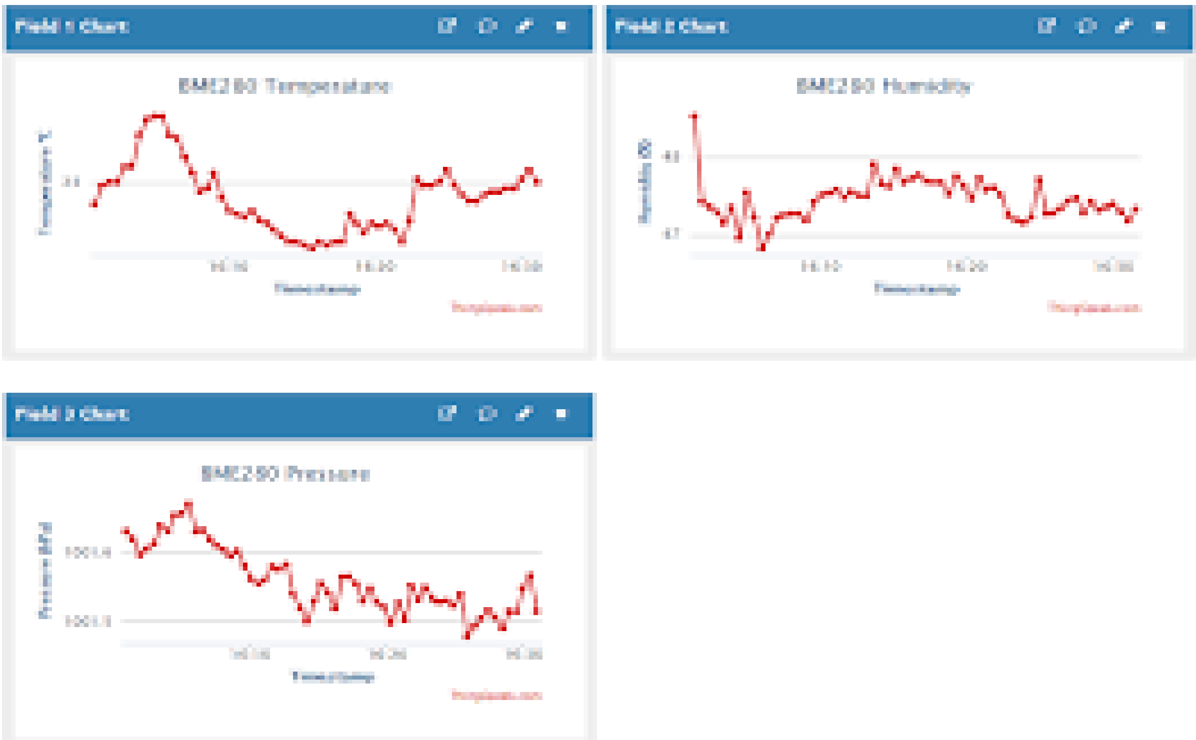
IV.PROPOSED METHOD

The provided image shows three graphs visualizing data from a BME280 sensor uploaded to ThingSpeak. Each graph represents different environmental parameters collected over time, including temperature, humidity, and pressure. Below is a breakdown of the graphs and their content:

BME280 Temperature (Field 1 Chart):

This graph displays temperature data in degrees Celsius (°C) against a timestamp (X-axis).

The red line shows the fluctuation in temperature over a given period. The temperature initially rises, peaks, and then starts to decline with small variations observed at different time intervals.



BME280 Humidity (Field 2 Chart):

The humidity graph shows the percentage of relative humidity (RH) over time.

The red line indicates that humidity initially drops sharply and then stabilizes with smaller fluctuations as time progresses. The values appear to hover around a steady range after the initial drop.

BME280 Pressure (Field 3 Chart):

This graph represents atmospheric pressure data measured in hPa (hectopascal) over the same timestamp period.

The red line indicates a downward trend in pressure, followed by small oscillations. There is a clear decline initially, and the pressure eventually stabilizes with minor variations.

V.CONCLUSION & FUTURE SCOPE

In conclusion, the implementation of the **ESP8266 NodeMCU** for publishing sensor readings to **ThingSpeak** demonstrates the power and potential of **IoT** for real-time data collection, visualization, and analysis. By utilizing the **NodeMCU's** built-in Wi-Fi capability and the easy-to-use **ThingSpeak** cloud platform, this system provides an effective solution for a wide range of applications, from environmental monitoring to smart home systems and industrial automation. The real-time updates, data visualization, and MATLAB-based analytics offered by ThingSpeak make the system highly valuable for both immediate insights and long-term data trends. However, while the current system works efficiently, there are several areas for improvement and expansion.

Future developments could involve enhancing the system's scalability, such as integrating more sensors for complex environmental monitoring or incorporating **machine learning algorithms** to predict trends or trigger events based on sensor data. The system could also be enhanced by improving power efficiency, enabling autonomous deployment in remote locations, or introducing additional communication protocols (such as **LoRa** or **NB-IoT**) for long-range data transmission. Moreover, integrating **real-time alerting systems** (SMS or email) when thresholds are exceeded could make the system more responsive in critical situations. Overall, the integration of **ESP8266** with **ThingSpeak** provides a solid foundation for building advanced IoT-based applications, with considerable room for innovation in terms of both hardware and software improvements.

VI.BIBLOGRAPHY

1. **Liu, S., Zhang, Y., & Hu, L.** (2017). *Design and Implementation of IoT-Based Environmental Monitoring System*. In: International Conference on Computer and Communication Systems (ICCCS), 2017. IEEE, pp. 111-116.

2. This paper discusses the design and implementation of an IoT-based environmental monitoring system using the ESP8266 NodeMCU to collect sensor data and send it to a cloud platform for analysis and visualization.
3. **ThingSpeak.** (2023). *ThingSpeak: The open IoT platform with MATLAB analytics*. Retrieved from: https://thingspeak.com

ISSN 2321-2152
www.ijmece.com
Vol 12, Issue 4, 2024

4. Official website of ThingSpeak, which provides detailed documentation on how to set up IoT systems for data collection, storage, and analytics, including API integration with platforms like ESP8266 NodeMCU.
5. **Espressif Systems.** (2016). *ESP8266EX Datasheet*. Retrieved from: https://www.espressif.com
6. This datasheet provides comprehensive information about the ESP8266EX microcontroller, detailing its specifications, capabilities, and features, which are crucial for implementing IoT solutions.
7. **Hussein, S., & Hossain, M.** (2018). *Wireless Sensor Networks for Smart Environment Monitoring: A Review*. Journal of Sensor and Actuator Networks, 7(1), 9-18.
8. This paper explores the application of wireless sensor networks (WSNs) for smart environmental monitoring, discussing various sensors, including temperature, humidity, and light, integrated with cloud platforms for data analysis.
9. **Arduino LLC.** (2022). *Arduino IDE for ESP8266*. Retrieved from: https://www.arduino.cc
10. This resource offers a guide on using the Arduino IDE to program the ESP8266, including how to configure it for IoT projects and integrate it with cloud platforms like ThingSpeak.
11. **Ahmed, S. S., & Shahria, M.** (2019). *Internet of Things (IoT) in Agriculture: A Review on Applications and Future Directions*. International Journal of Computer Science and Information Security, 17(5), 21-27.
12. This review paper focuses on IoT applications in agriculture, using ESP8266 and other microcontrollers to collect sensor data and transmit it to cloud platforms like ThingSpeak for monitoring environmental parameters such as temperature, humidity, and soil moisture.