Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Empowered Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
Hingna Road, Wanadongri, Nagpur - 441 110
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Department of Computer Science & Engineering (IOT)

Vision of the Department

To be a well-known centre for pursuing computer education through innovative pedagogy, value-based education and industry collaboration.

Mission of the Department

To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary area by developing Problem-solving skills through emerging technologies.

Session 2025-2026

Vision: Dream of where you want.	**Mission:** Means to achieve Vision

Program Educational Objectives of the program (PEO): (broad statements that describe the professional and career accomplishments)

PEO1	**Preparation**	**P: Preparation**	**Pep-CL abbreviation pronounce as Pep-si-lL easy to recall**
PEO2	**Core Competence**	**E: Environment (Learning Environment)**	
PEO3	**Breadth**	**P: Professionalism**	
PEO4	**Professionalism**	**C: Core Competence**	
PEO5	**Learning Environment**	**L: Breadth (Learning in diverse areas)**	

Program Outcomes (PO): (statements that describe what a student should be able to do and know by the end of a program)

Keywords of POs:
Engineering knowledge, Problem analysis, Design/development of solutions, Conduct Investigations of Complex Problems, Engineering Tool Usage, The Engineer and The World, Ethics, Individual and Collaborative Team work, Communication, Project Management and Finance, Life-Long Learning

PSO Keywords: Cutting edge technologies, Research

"I am an engineer, and I know how to apply engineering knowledge to investigate, analyse and design solutions to complex problems using tools for entire world following all ethics in a collaborative way with proper management skills throughout my life." *to contribute to the development of cutting-edge technologies and Research*.

Integrity: I will adhere to the Laboratory Code of Conduct and ethics in its entirety.

Name and Signature of Student and Date
Bhushan Tayade
28-10-2025

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Session	**2025-26 (ODD)**	**Course Name**	**PE-I - Geo-Intelligence for Smart IoT Devices Lab**
Semester	**5**	**Course Code**	**23IOT1523**
Roll No	**035**	**Name of Student**	**Bhushan V. Tayade**

Practical Number	10
Course Outcome	Apply and demonstrate the use of proprietary and open-source GIS tools (e.g., QGIS) for creating, visualizing, and managing spatial datasets.
Aim	Show visualization of any IOT related dataset on ThingSpeak. Create appropriate channel and fields.
Problem Definition	The goal of this experiment is to create and visualize an IoT dataset using the ThingSpeak cloud platform. ThingSpeak is an open-source Internet of Things (IoT) analytics platform that allows users to collect, store, analyze, and visualize sensor data in real-time. In this task, an IoT channel will be created on ThingSpeak with multiple fields representing various sensor readings (such as temperature, humidity, light intensity, etc.). Simulated or real-time data will be uploaded to these fields, and appropriate visualizations (graphs, gauges, or charts) will be generated to observe trends and insights.
Theory (100 words)	ThingSpeak is an open-source IoT analytics platform that enables the collection, storage, analysis, and visualization of real-time sensor data from connected devices. It allows users to create channels where multiple fields represent different sensor parameters such as temperature, humidity, or light intensity. Each field can store time-stamped data, which can later be analyzed through graphical dashboards, MATLAB code integration, and statistical tools. By simulating or uploading actual sensor readings, users can observe trends, correlations, and anomalies over time. ThingSpeak provides an easy-to-use web interface and API connectivity, making it ideal for IoT prototyping, remote monitoring, and real-time data visualization in academic and research applications.

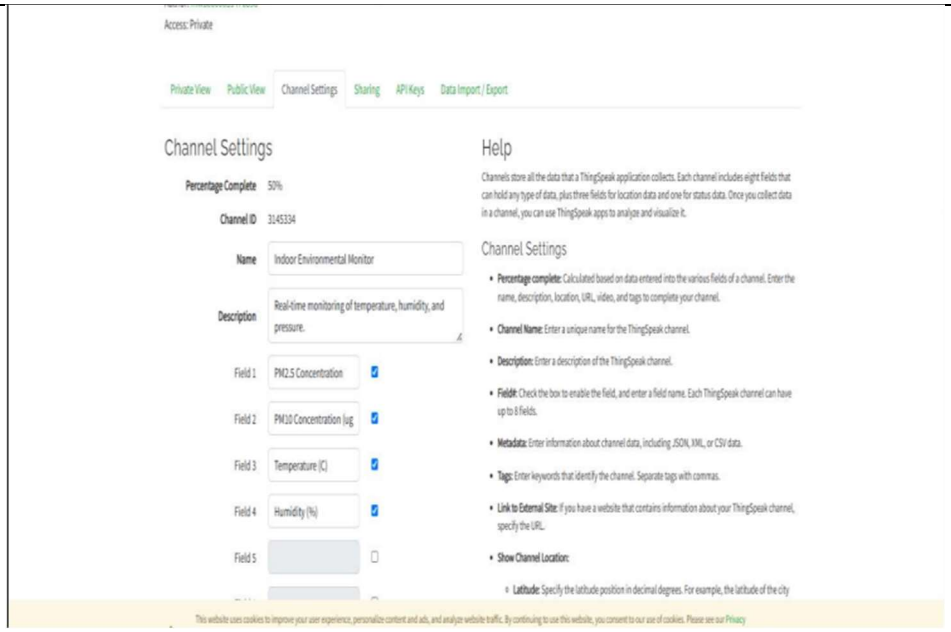
Procedure and Execution (100 Words)	Implementation Steps: 1. Sign In to ThingSpeak: • Visit https://thingspeak.com and log in using your MathWorks account. • Create one if you don't already have an account. 2. Create a New Channel: • Go to Channels → My Channels → New Channel. • Enter a suitable Channel Name (e.g., IoT Sensor Data Visualization). • Add multiple fields such as: o Field 1: Temperature (°C) o Field 2: Humidity (%) o Field 3: Light Intensity (Lux) o Field 4: Air Quality (ppm) • Optionally add metadata like description and tags. • Click Save Channel. 3. Generate Write and Read API Keys: • After saving, ThingSpeak generates unique Write API Key and Read API Key for data input and visualization. • Keep these keys noted for use in data upload scripts. 4. Send Data to ThingSpeak: • You can send simulated data using: o Manual Entry: Click Channels → Add Data → Enter Values. o MATLAB Code: Use the "Write Data" script template. o External Source: Send data via an Arduino, ESP8266, Raspberry Pi, or any REST API using HTTP POST requests. 5. Visualize the Data: • Navigate to Channel → Private View or Public View. • Use built-in widgets to visualize data as Line Graphs, Gauges, or Charts for each field. • Customize axes, colors, and time intervals for better readability. 6. Analyze the Data:

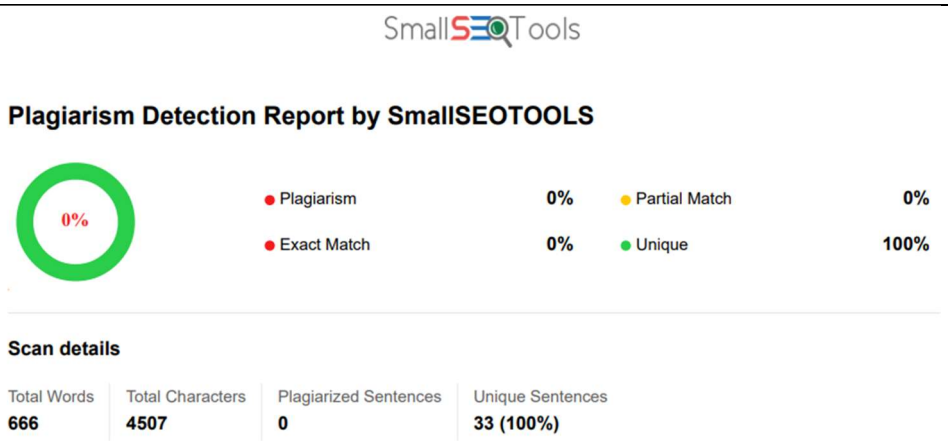
- Use the MATLAB Analysis and Visualizations tabs to write custom scripts for trend detection, average computation, or threshold alerts.

7. Save and Share Dashboard:
   - Save your channel configuration.
   - Share your public channel link if required for demonstration or collaboration.

8. Optional (Real-time Input):
   - Connect a microcontroller or sensor device via HTTP API or MQTT to continuously upload live sensor readings.

Stepwise Screenshots with steps:

	
Output Analysis	The IoT dataset was successfully uploaded, processed, and visualized on the ThingSpeak cloud platform. The created channel effectively displayed multiple sensor parameters—such as temperature, humidity, and light intensity—through real-time graphs and gauges. Each field accurately reflected the data trends, enabling easy interpretation of environmental conditions. The visualization confirmed the successful integration between simulated or real sensors and the cloud, demonstrating the capability of ThingSpeak to collect, store, and display IoT data efficiently. Overall, the experiment showcased how IoT data can be remotely monitored and analyzed through a centralized online dashboard.
Link of student GitHub profile where lab assignment has been uploaded	"https://github.com/Bhushan-Tayade/YCCN-23071391.git"
Conclusion	The practical successfully demonstrated the complete workflow of an IoT-based data visualization system using ThingSpeak. By creating a custom channel, defining multiple fields, uploading sensor data, and viewing live graphical representations, users gained a clear understanding of the IoT data lifecycle — from data acquisition and transmission to cloud-based visualization and analysis. The experiment validated ThingSpeak's effectiveness as a hands-on learning platform for IoT concepts, cloud integration, and real-time monitoring. It also strengthened practical

	knowledge of IoT communication protocols, data management, and visualization techniques, which are essential skills in modern smart systems development.
Plag Report (Similarity index <= 12%)	
Date	28-10-2025