SOBUS

Avinya

Beyond Imagination, Ahead with Innovation.

SVKM'S
NMIMS
Deemed to be UNIVERSITY

ISTE
INDIAN SOCIETY FOR TECHNICAL EDUCATION

Workshop on Internet of Things
Venue: VIP Lab, B Wing Ground Floor
Organized By: ISTE Student Chapter, SVKM's NMIMS, MPSTME & Avinya Club

Faculty Coordinator: Dr. Suresh Kurumbanshi & Prof.Mayank Kothari
Conducted By: (Team Technical of Avinya)

Technical lead

1. Harshal Sonawane B.tech 2nd Year(AIML)
2. Chaitanya Rajput B.tech 2nd Year (CE)
3. Saad Nathani B.tech 2nd Year (AIML)

Introduction

The Internet of Things (IoT) has revolutionized the way devices communicate and operate in our increasingly interconnected world. Recognizing the need to impart relevant skills and knowledge in this cutting-edge field, the Avinya Club, under the ISTE student chapter & Avinya Club conducted a two-day IoT workshop. This workshop was designed to cater to individuals keen on exploring the practical and theoretical aspects of IoT, microcontrollers, and sensors. By focusing on Arduino programming, external libraries, and project-based applications, the event aimed to bridge the gap between emerging technology trends and their
Real-world applications. Participants were given a platform to develop and showcase their IoT solutions, fostering a culture of innovation and collaboration.

Executive Summary

Signature

The IoT Workshop organized by Avinya Club aimed to provide hands-on experience and theoretical knowledge on Internet of Things (IoT) concepts and applications. The two-day event, divided into various technical sessions, covered topics ranging from Arduino basics, sensors, code structures, and external libraries to advanced IoT implementations using NodeMCU ESP8266. The workshop culminated with project-based problem-solving sessions, where participants showcased innovative IoT-based solutions. The event was instrumental in enhancing technical skills and fostering a deeper understanding of IoT among attendees.

Objective

The primary objectives of the IoT Workshop were:
- To introduce participants to the basics of IoT and Arduino programming.
- To familiarize participants with microcontrollers, sensors, and IoT frameworks.
- To provide hands-on experience in writing, uploading, and debugging Arduino sketches.
- To demonstrate real-world IoT applications through problem-solving projects.
- To encourage innovation and practical application of IoT technologies.

Participants

The workshop witnessed active participation from students, hobbyists, and tech enthusiasts. The participants were divided into groups for hands-on sessions and project development activities. Key project leaders and contributors included Harshal Patil, Pinak Salunke, Chaitanya Rajput, Pranav Singh, Navya Singh, Kulvansh Rajput, Om Dhangar, Darshan Walhe, Saad Nathani, and Reshma.

Workshop Agenda

- Introduction to IoT: Basics of IoT, real-life applications, and understanding IoT hardware (10% theory).
- Setting Up Environment: Installing and configuring tools (e.g., Arduino IDE, libraries).

- Hands-On with Sensors: Connecting and coding basic sensors (e.g., temperature, motion).
- Wi-Fi Connectivity: Understanding IoT device networking and sending data to the cloud.
- Mini Task: Create a simple IoT project (e.g., monitoring temperature or controlling an LED remotely).

Day 1:

- **Session 1 (10:00 AM – 11:00 AM):**
  Getting Started with Arduino by Harshal Sonawne
    - Introduction to Microcontrollers and Microprocessors
    - Arduino and Microcontrollers
    - Arduino Board Overview

- **Session 2 (11:00 AM – 12:00 PM):** Writing and Uploading Your First Sketch by Harshal Sonawane
    - Program Explanation
    - Hands-on Session

- **Lunch Break (12:00 PM – 1:00 PM)**

- **Session 3 (1:00 PM – 2:00 PM):** Working with Sensors by Chaitanya Rajput

    - Pushbutton Input
    - LDR Input
    - Gas Sensor Input

- **Session 4 (2:00 PM – 3:00 PM):** Code Structures (Advanced) by Chaitanya Rajput
    - Variables, Constants, and Arrays
    - Functions
    - Control Structures
    - Using Arduino Libraries

- **Session 5 (3:00 PM – 4:00 PM):** Working with External Libraries by Chaitanya Rajput
    - Why Use Libraries?
    - Using the DHT Temperature Library
    - Using the OLED Library

Day 2:

- Introduction to IoT: Overview of IoT concepts, applications, and tools in real life.
- Hardware Setup: Hands-on with IoT boards (ESP8266/ESP32), sensors, and actuators.
- Data Communication: Sending sensor data to cloud platforms and building real-time dashboards.
- Project Building: Developing a real-life IoT project like Smart Home Automation or Health Monitoring.
- Project Showcase: Presenting projects, feedback, and tips for future IoT applications.

- **Section 1 (10:00 AM – 11:00 AM**): What is NodeMCU ESP8266? by Saad Nathani
    - o Introduction
    - o Specifications
    - o Features
    - o Applications

- **Doubt Solving (11:00 AM – 12:00 PM):** Overview of Previous Sessions

- **Lunch Break (12:00 PM – 1:00 PM)**

- **Section 2 (1:00 PM – 4:00 PM**): Problem-Solving Projects by Team Avinya

Led Control usige mobile app
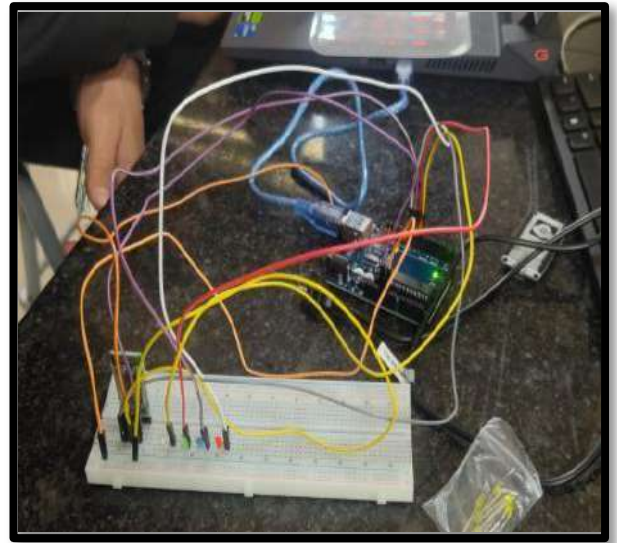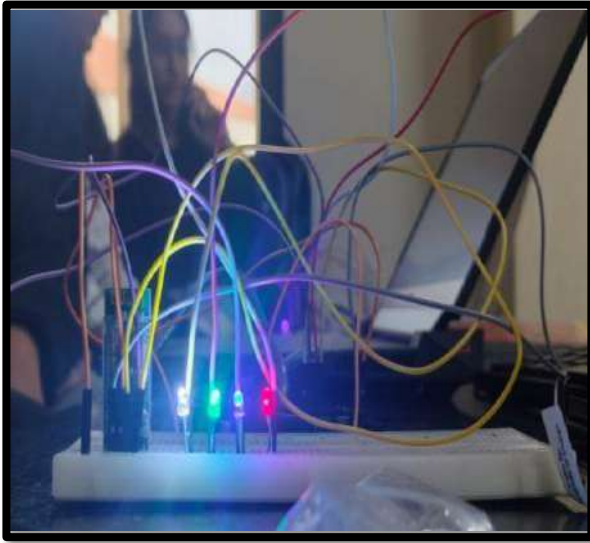
- RFID-Based Entry Systems
- Arduino Vision - Visitor Counter
- Object Detection Using Arduino Vision
- Gesture-controlled car Using Arduino Vision
- Automatic Gardening System
- Heart Rate Pulse Detection and Monitoring Using IoT
- Smart Weather System Using IoT
- Radar System Using Arduino
- IoT-Based Fire Detection and Alarm System
- Smart Attendance System Using Raspberry Pi

Content Overview

1. Getting Started with Arduino: Provided a foundational understanding of Arduino boards, microcontrollers, and microprocessors, along with an introduction to programming and hands-on experience.

2. Writing and Uploading Sketches: Focused on programming basics, uploading code to Arduino, and debugging errors.

3. Working with Sensors: Covered sensor integration with Arduino, including pushbutton, LDR, and gas sensors.

4. Advanced Code Structures: Explored advanced programming concepts such as variables, functions, control structures, and library integration.

5. NodeMCU ESP8266: Introduced NodeMCU for IoT applications, highlighting its specifications, features, and real-world use cases.

6. Problem-Solving Projects: Practical application of IoT concepts in projects

like RFID systems, object detection, smart gardening, fire alarms, and attendance systems.

Day 3:

- **Felicitation of Dignitaries (4:00 - 4:05 pm)**
  -Welcomed the dignitaries and thank them for their presence
  -We briefed about the workshop and its purpose.

-

  - **Video Showcase of Two Days' Activities (4:05- 4:20 pm)**
    -A short video presentation summarizing the activities of the first two days. This video can include highlights from the hands-on sessions, team work, challenges faced, and progress made.

  - **Project Presentation in Front of HODs and Dignitaries (4:20- 4:40 Pm)**
    -Each team presents their projects to the HODs and dignitaries.
    -Each team will have 2-3 minutes to explain their project, its objectives, challenges, and solutions they implemented.
    -After each presentation, allow for 1-2 minutes of feedback from the HODs or dignitaries.

  - **Discussion with faculty members for solutions and Outputs (4:40 - 4:47 PM)**
    - After the presentations, open the floor for a group discussion with the faculty members, where each team can ask for advice or solutions regarding any challenges they face.
    -The faculty members have provided feedback, discussed possible improvements, or suggested ways to enhance the output.
    -This segment encourages a problem-solving environment where students can gain valuable insights and ideas.

- **Sum-Up (5:50 - 5:10 pm)**
  -Thank the dignitaries, HODs, and all participants for their hard work and involvement

Organizing Community (Team of Avinya)

1. Roshani Rajput B.tech 2ⁿᵈ Year (CE)
2. Mayuri Pawar B.tech 2ⁿᵈ Year (CE)
3. Chaitanya Patil B.tech 2ⁿᵈ Year (CE)