**Smart Home Monitoring**

**Student Name: Florian Poppinger Student ID: W20108867**

Design and implement a comprehensive Smart Home Monitoring System using a Raspberry Pi, incorporating environmental sensors, a camera for motion detection, MQTT for message communication, Firebase for data storage, and real-time alerting through email integration. This project aims to enhance home security and environmental monitoring, providing real-time alerts and image captures during events.

**Tools, Technologies, and Equipment**

* Raspberry Pi 3B+:
  + Acts as the central control unit for data collection, image capture, data processing, and communication.
* Sense HAT:
  + Measures temperature, humidity, and pressure for environmental monitoring.
* Camera:
  + Used for visual monitoring and capturing images upon detecting motion.
* MQTT Broker (EMQX Cloud):
  + Facilitates message-based communication between devices and the controller for efficient real-time updates.
  + Subscribes and publishes data to topics for environmental updates and motion detection alerts.
* Firebase Storage:
  + Stores captured images from motion detection events and provides URLs for accessed images.
* Email Integration:
  + Sends emails with attached images and environmental data upon detection of motion or on-demand through system controls.
* Blynk Integration:
  + Utilizes a virtual pin board for real-time data visualization and control interface.
  + Allows real-time visual feedback and remote monitoring via Blynk mobile app.
* Python Scripting:
  + Develops Python scripts to handle sensor data readings, motion detection, image capture, data publishing via MQTT, and email notifications.
* User Interface:
  + Uses Blynk for creating a dynamic and user-friendly interface to monitor real-time data and system status.
  + Displays alerts and allows user interactions directly from a smartphone.Create a web-based dashboard for users to monitor real-time and historical data.
  + Display camera snapshots, sensor readings.

**Project Repository**

[Github Repo](https://github.com/FloberPoP/IoT-Repo)