IoT Sensor Data Logger - C++ Project Report

Abstract:

This project simulates an Internet of Things (IoT) environment where a virtual sensor collects temperature and humidity data. The readings are automatically logged into a CSV file with timestamps for later analysis. The program is implemented entirely in C++ and demonstrates skills in file handling, data structures, random number generation, and system time operations.

Objective:

To develop a C++ program that generates simulated environmental sensor data, logs it into a file, and provides analytical insights such as average, maximum, and minimum values.

Technologies Used:

• C++ programming language
• File Handling
• Structures
• Random number generation
• CSV data format

System Design:

The system follows a modular design, consisting of three main modules:
1. Data Generation – simulates temperature and humidity values.
2. Data Logging – appends readings with timestamps to 'sensor_log.csv'.
3. Data Analysis – calculates and displays average, minimum, and maximum readings from stored data.

Features:

• Simulates IoT sensor data.
• Logs readings with timestamps.
• Stores data in CSV format.
• Provides analytical insights.
• Menu-driven user interface.

Sample Output:

Timestamp, Temperature (C), Humidity (%)
02-11-2025 18:43:05, 23.40, 52.88
02-11-2025 18:43:08, 28.77, 44.35
02-11-2025 18:43:11, 21.54, 62.09

Conclusion:

This project demonstrates a practical simulation of an IoT-based data logger using C++. It highlights important programming concepts and can be further enhanced to interface with real sensors using microcontrollers or networking libraries.