**Project Proposal - Development of an ultralow-power battery-operated data logger**

M.A. Pathiraja (2024AE17)

2025.07.26

# Introduction

A data logger is an electronic device designed to record measurements over time, storing them for later analysis. This project focuses on the **Development of an Ultralow-Power, Battery-Operated Data Logger**, specifically tailored for long-term outdoor temperature monitoring in field experiments. By leveraging energy-efficient microcontrollers, precision temperature sensors, and optimized power-management techniques such as deep-sleep modes, lower clock speeds, and low-leakage voltage regulators, the system achieves exceptionally low quiescent currents. Powered by a compact rechargeable or non-rechargeable battery pack and enhanced with a smart power-budget algorithm, the logger can operate autonomously for months without human intervention. Its rugged enclosure, waterproof sealing, and minimal maintenance requirements make it ideal for remote deployments in harsh environments.

# Targets

The main targets to be achieved to complete the project are,

 Accurately measure and record ambient temperature.

 Measure and record relative humidity.

 Operate autonomously for at least one month on a single battery charge.

 Buffer and organize time-stamped data in non-volatile local storage.

 Monitor battery voltage and gracefully shut down before depletion.

 Withstand outdoor conditions with a waterproof, rugged enclosure.

# Methodology

DS 18S20 temperature sensor will be used as the sensor to monitor the temperature since it does not affect due to the battery draining. Secure Digital (SD) card will be used as the storage medium and data will be written in FAT32 format, so, the card can be directly read from the computer. ATmega 8 microcontroller running at 1 MHz internal oscillator will be used as the main control circuitry. A real time clock with a battery backup will be used for generating time stamp. Several switches together with some LEDs will be interfaced to provide user with more functionalities such as battery level monitoring. USART will be used to allow user to interact with the firmware to change certain settings such as system time.

[Your proposal must be longer than the above example. It should include a clear introduction, giving the background and justification of the work you are going to do. Under methodology you should describe your design in detail using suitable block diagrams, circuit diagrams flow charts etc as necessary. However, the proposal should not exceed 2 pages.]