**Southern New Hampshire University CS 350Module Six Project six**

**Selva. P**

An integrated digital thermometer and hygrometer project entails total and optimized integration of a temperature and humidity monitoring system using a Raspberry Pi, AHT20 sensor, 16x2 LCD display, and push-button interface. The system was built mainly to efficiently and real-time satisfy the five specific functional requirements.

The display consists of two logical rows: the first row will continuously show the current date and time, employing Python datetime module. The second row will show dynamically the temperature and humidity readings. Temperature reading may be given in Celsius or in Fahrenheit, while humidity will always be given in percentage. The readings are fetched from the AHT20 sensor via the I2C protocol with the help of the adafruit\_ahtx0 library.

A state machine architecture based on the state machine library manages changes between Celsius and Fahrenheit mode. The user is able to switch scales with a push button on GPIO pin 24. The code here is modular and maintainable-the hardware interfacing is separated from the state transition logic. Another thread provides real-time display updates without blocking the main execution thread.

The LCD is interfaced through GPIO using the adafruit\_character\_lcd library but with custom GPIO pin mappings for compatibility. Clean-up routines ensure graceful shutdown and resource management. Overall, this project would demonstrate application prowess with embedded systems, sensor integration, state machine design, and user interaction with a Raspberry Pi.