

ABSTRACT

The objective of this thesis project is to make ASIMA learning modules accessible online, which will enable students across the country to be able to use and learn the module anywhere as long as there is internet connection. By making a system prototype using IoT-based controller as the bridge

By developing a module from the ASIMA and using CoDeSys to further develop the logic of the system of the module, it will enable a fully well-developed module to be used for the experiment, where the module will be then transferred to the internet as per the way of the IoT. Using the IoT Multiplexer Board, acting as a connector between the data of the module and the internet, the technology used to transfer is the Modbus system.

The IoT Multiplexer Board has an MCU ESP32 included, which has a Wi-Fi function. Thus, the condition as a connector is fulfilled, allowing the IoT Multiplexer Board to connect to the virtual PLC CoDeSys Win V3. The virtual PLC acted as the master controller which established a master and slave connection with the ESP32 as the slave. The Modbus protocol is used in the system to manage the communication between the master's and slave's devices. The IP address of the slave must be adjusted in the Modbus IP protocol in order for the master device to be able to detect the correct IP address to send the corresponding data.

The prototype system was able to function and the connection between ASIMA and the IoT Multiplexer Board was established successfully. The digital twinning of the selected ASIMA modules has been made and experimented properly. There were minor problems occurred during the experimentation, such as blinking LED in the ASIMA Board and inverted output LED of the ASIMA Board. It is suspected, that IoT Multiplexer Board was the cause of the problem.

Those who wish to continue this project should consult with the creator of the Board in order to further investigate the roots of the problem, especially the blinking LED.

Keywords: Internet of Things, Industrial Internet of Things, ASIMA System Simulator, IoT Interface Board, Digital Twinning, Modbus, HMI Designer Studio.