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Degree : M.Tech. Embedded Control and Software, ATDC, IIT Kharagpur.

Project Name: An Embedded Control System for Automating Control and Measurement of an Optoelectronics Characterization Rig

Role : System Design and Implementation (Individual Application Laboratory Project).

Brief: Complete system modelling and development(hardware selection,connection,User Interface, Backend Software) from scratch,to automate the delicate rotation of Monochromator device to provide precise wavelength of various light signal to a lock-in-amplifier for measuring signal intensity.

A user interface was developed with python(frontend and backend) as a stand alone desktop(mobile) application to insert user's selection of monochromator intensity and the frequency of light signal which is transmitted to a motor driver to rotate the physical monochromator as per given user input. Data transmission(wireless) done using MQTT protocol over local or global (intranet or internet) connection. Also there were provision for wired connection too. Motor control performed using commercially available controllers(Arduino, TI CC2650 Launchpad).

Difficulties : Faced few difficulties while making wireless connection between the server and the monochromator and lock-in-amplifier(as both of them are old machines). Faced some issue while communicating between the machines through well known message passing protocols(e.g. MQTT etc.). Finally overcome with the problem and project was completed successfully.

Learning/Reflection : I was a perfect embedded system, doing specific task and nice combination of hardware and software. I used commercial controllers(TI Launchpad, Arduino Mega etc), python for frontend and backend of User Interface, C++ for hardware controller development and in the process learned lots of new things.