**User manual**

1. Power the analytic process control machine. Connect an ethernet switch adapter to the PLC
2. Have two PCs and a HMI coupled with the ethernet switch to the PLC
3. One one PC, start TIA portal, download the PLC program to the PLc and start the cpu
4. Open a python IDE and navigate to the folder containing all the project files(server code, client code, server security code, chatbot code, face recognizer code, keras face-recognition model, keras chatbot model, classes and words pickle files for the chatbot, plc utils for communication with the PLC
5. Run the server code. It waits for clients to connect
6. Run the client code. Face recognition runs first. The id is sent by the client security(runs next) to a function in the server security for authentication. Response is sent to client security.if authenticated, the set\_PH function from the chatbot runs. The function initiates communication with the user.
7. Give the setpoint in English. Make sure there is any one of the following keywords in your message; PH, setpoint, set
8. On the other PC, launch Siemens NX
9. **Create an external signal configuration to connect the PLC as a client. Connect the NX assembly to the IP address of the PLC. The PLC as the server**
10. **Map the signals of NX to that of the PLC. Match the signals made in NX to the similar tags(signals) in the PLC.**
11. **Run the simulation so that the machine and the CAD design can run concurrently.**