**Requirement Specifications**

(documentation of required functionality (scope) of the system including quality attributes)

**OBJECTIVES**

To create a Digital Twin for the gauging station using Siemens NX software and TIA portal both integrated so as to create a real time control of the physical model and the CAD model

**Specific Requirements**

* To design a CAD model of the gauging station in Siemens NX
* To program the gauging station in Siemens TIA portal to operate in Manual and automatic mode
* To integrate the CAD model in Siemens NX with the PLC S7 1200
* To simulate the program in TIA portal and the model in Siemens NX
* To interface the physical station and the Siemens NX model
* To operate and control the physical station and the Siemens NX model in real time
* To add a face recognition component to allow only authorized users to access it
* To incorporate a chatbot that allow users to communicate to the machine through voice command.

**Quality Attributes**

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| **Category** | **Quality Attribute** | **Description** |
| Design Qualities | Maintainability | The system is easy to maintain since the parts can be easily accessed on the setup |
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| Reusability | The components of the station such as the PC can be used for other systems and setups if needed. |
| Run Time Qualities | Availability | The station both in CAD and the physical system worked as expected whenever needed. The chatbot was responsive |
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| Responsiveness | The system responds when operated from the Siemens NX and also from the physical station. It can also recognize authorized users and receive voice commands for operation |
| Reliability | The system remains functional and operational over time with little or no maintenance. |
| System Qualities | Testability | The test criteria of the system can be easily created |
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| User Quantities | Usability | The system meets all the user requirements thus can be used by any individual after a short introduction to its functionality |
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