
Abstract

The project aims to upgrade a brownfield machine currently operating under a conventional control system to a Fourth Industrial Revolution-compliant system, using devices such as a Programmable Logic Control (PLC) system. This transformation will be implemented at Al-Quds Pharmaceuticals Company, located in Ramallah, Palestine. The primary objective is to enhance the efficiency of the company's manufacturing operations by utilizing an integrated system to collect and analyze real-time data from the equipment. This will lead to improved production quality, minimized operational errors, and optimized periodic maintenance, thereby reducing machine downtime.

Key factors to be considered for the project's implementation include:

- Conduct a thorough feasibility study to assess the potential of upgrading the brownfield machine from a conventional control system to a PLC-based system, considering the specific operational requirements.
- Develop a detailed system design by identifying and selecting the necessary components, such as sensors, actuators, and emergency stop buttons, ensuring compatibility with the PLC system and the machine's existing infrastructure.
- Implement the designed PLC system, integrating it with the machine to achieve full automation, ensuring precision and control over various operational processes.
- Test and evaluate the upgraded machine under real-time operational scenarios to verify performance improvements, reliability, and compliance with Fourth Industrial Revolution standards.

The project's main objective is to advance the pharmaceutical sector in Palestine by addressing the specific needs of Al-Quds Pharmaceuticals. PLC systems offer significant flexibility in handling various industrial processes, making them widely applicable to industries like food production and cosmetics manufacturing, where precision and speed are essential. Applying this technology in the pharmaceutical sector provides a unique opportunity for Al-Quds Pharmaceuticals to stand out among competitors by enhancing production efficiency, ensuring adherence to quality standards, and reducing human error. Furthermore, this transformation allows for seamless future upgrades and expansion, empowering the company to adapt to evolving market challenges.