**ROBOTICS WITH NIRYO NED2**

**TEAM: TECH TINKERERS**

PES1UG21CS065 – AKSHAY PRASAD

PES1UG21CS741 – GAUTAM SARAF

PES1UG21CS073 – AMRITHA GK

PES1UG21CS924 – NAVYA P

**PROJECT REPORT**

This project report presents the development of a robotic sorting system utilizing the Niryo NED2 Robot to automate the sorting of colored test tubes into their respective colored bowls. The system integrates a vision system for color detection and a pick-and-place algorithm for accurate and efficient sorting. It utilizes the capabilities of the Niryo NED2 Robot, a versatile robotic arm with advanced control and vision features, to achieve accurate and automated sorting based on color detection.

The vision features of the robot are used for detecting the colors of the test tubes and placing them in their respective containers, using a pick-and-place method. The robot's kinematic model guides it to approach the target test tube while avoiding potential collisions. The end-effector's gripper gently grasps the test tube, and the robot lifts and transports it to the designated bowl before releasing it with precision. The system is tested with a variety of test tubes containing red, green, and blue caps.

The sorting system of the robot is implemented using Python and ROS (Robot Operating System). The robot's control is achieved through the ROS wrapper API.

This project can be enhanced in a variety of ways in the future. These include increasing the system's capacity to handle a larger number of test tubes and bowls simultaneously, implementing adaptive color detection algorithms to account for variations in lighting conditions, developing a user-friendly interface for ease of setup and monitoring, and exploring the integration of the robot with conveyor systems for continuous sorting tasks.

In summary, The Niryo NED2 Robot Sorting System proves to be an effective and reliable solution for sorting colored test tubes. With its advanced robotic capabilities, it can accurately identify and sort test tubes into designated colored bowls efficiently. The system's versatility allows it to be adapted for other sorting tasks in various industries, demonstrating its potential for automation in similar applications.

**GITHUB REPOSITORY LINK** - <https://github.com/amrithagk/Lab-Alchemist>