

## **ABSTRACT**

DEVELOPING A PICK AND PLACE PATH PLANNING SYSTEM SIMULATION FOR A 7 DEGREE OF FREEDOM ROBOT, FROM 1 INPUT TO 5 OUTPUT CONVEYOR BASED ON OBJECT COLOR CODE IN COPPELIASIM

By

Michael Leandro Hartono

Many industries are advancing to be autonomous industries, which they are now moving towards the use of robots. This then makes the robotic industry become a fast-growing industry in the world at present. Given that, there are now many advanced types of robots, such robots are Automated Guided vehicles (AGVs) or Autonomous Mobile Robots (AMRs), Humanoid Robots, and Articulated Robots which are also known as robotic arms. Robot arms are mainly used by industries for picking and placing purposes, where they move or transport the products from one place to another within the robot arm's radius of work.

The purpose of this research is to develop a path planning system for a 6 degree of freedom (DoF) robot arm that is integrated with a single axis robot to sort products by picking and placing, using the kinematics formulation provided by the CoppeliaSim software which is based on Ruckig method for the system. CoppeliaSim software is used in this research to carry out the design and simulation of the path planning system, as the software provides features to do and simulate the sorting process of the robot and the environment. This thesis paper provides fundamental basics of robot arm simulation and operation and therefore can be used as a reference for individuals who are interested in this field of study.

**Keywords: Universal Robot (UR) robot arm UR10, integrated single-axis robot, path planning, Ruckig method, sorting system, CoppeliaSim, simulation software**