

## CHAPTER 1 - INTRODUCTION

### 1.1 Background

In recent years, automation has been the focus of many industries aiming to increase their production efficiency. One such automation is the usage of mobile robots in factories or warehouses to transport items. There are several different types of automation that exist, such as a line-following robot, a human-following robot, and an autonomous robot. Because of the tasks and resources provided by such as lifting large items, tracking, and search and rescue operations, the need for mobile robots has grown rapidly. Automation Mobile Robot (AMR) has been widely used in many applications and has relevance around the world due to the ability of AMR to maneuver in a situation without the use of electro-mechanical guidance or physical devices. AMR is a system that integrates sensors to produce a dynamic decision-making and motion control to reach its objective. AMR has capability to adapt with the environments and detect changes continuously by being equipped with sensors that are integrated with on-board computers. These changes play a role in determining the path and movement of the robot. The main concept of mobile robotics consists of locomotion, perception and navigation (Alatise & Hancke, 2020). The locomotion system is an essential feature of mobile robot design that takes into account not only the medium in which the robot runs, but also other factors including maneuverability, controllability, terrain conditions, performance, and stability. In the study of mobile robots, perception is also crucial. It is critical for an autonomous mobile robot to gather information from its surroundings, detect objects in its vicinity, and determine its relative location. The ability to navigate is the most significant feature in designing a mobile robot. The goal for the robot is to navigate from one location to another in an uncontrolled or recognized environment.

Therefore, the application of this topic is very beneficial for industries to improve and maximize the AMR design to gain marketplace acceptance. This means that the Autonomous Mobile Robot will be much better at doing and getting the job done.

## **1.2 Research Problems**

In this study there are several issues that may be problematic.

1. Is it plausible a more compact design Autonomous mobile robot for field tests?
2. Is the locking mechanism efficient enough for this system?

## **1.3 Research Objectives**

1. Improving a new design that is suitable and compatible for work in big space, factories or public places.
2. Implementing a locking mechanism system for autonomous mobile robots.

## **1.4 Significance of Study**

1. To improve efficiency of the workflow inside the warehouse.
2. To reduce human contact for safety measures.

## **1.5 Research Questions**

1. How to improve the autonomous mobile robot to be more compact?
2. How does the mechanism work for the locking system?

## **1.6 Hypothesis**

1. With the cover around the body of the autonomous mobile robot will be accepted for industrial use and can protect the electrical component inside the robot and is expected to be quite compact in design. By adding the cart carrier, the robot will have the ability to receive more load than before.
2. Locking mechanism works by using a motor to push the platform that used to lock the cart.