ABSTRACT

In this rapidly developing era, market needs are also changing dramatically, causing conventional manufacturing systems not able to find a balance point between demand and production, which affects manufacturing profit margins. The topic of FMS (Flexible Manufacturing System) has recently received a lot of attention because it can be a solution to this problem. AMR is a mobile robot that can move independently or autonomously. AMR navigation usually relies on pre-mapped patterns. AMR is an important aspect of a flexible manufacturing system, unlike a conveyor belt which can only deliver goods from point A to point B and will always be like that, we can order AMRs to go from point A to point Z without needing to stop at B or point C and so on. other. Flexible Manufacturing Systems can be used in almost all aspects of manufacturing, from material processing to warehousing systems.

Therefore in this thesis research, the author will create a scenario, that is the implementation of a multi-AMR system on an FMS in a warehouse logistics system. In its application, In this research, we will use the Dijkstra algorithm to navigate and determine the path plan and use CLBF to control the AMR so that it can run according to the specified path plan. so that multiple AMRs can deliver goods from the pick-up point to the drop-off point without crashing and causing deadlocks. Each AMR can determine the path to be taken without needing to communicate with the server, only communicating with the active surrounding AMR. In this implementation, so that AMRs can coordinate smoothly, ROS is used. If suddenly an obstacle is found in the AMR path that is not registered on the map server, the Control Lyapunov Barrier Function (CLBF) can guarantee the safety aspects of the AMR. This method is expected to avoid obstacles that are not registered on the map server but do not run counter to the goal for too long.