I. Introduction

By collaboration within multiple robots which can assist in duties of food delivery and guest hosting. First, we use the robot to set up the restaurant map with the SLAM method, and render the map construction in the grid map mode. On the grid map, we decompose the restaurant into a grid, and determine if the area corresponding to the grid is free space or occupied, use the Particle Swarm Optimization (PSO) to calculate the optimal obstacle-free path to the destination, and convert the path as a robot task. Finally, the task will be assigned to the robot by the system.

II. Methods and Results

The robots perform many tasks in the restaurant, each task execution needs to redefine each target point, since the mobile robot will replace the work of the waiter, assuming that each robot can automatically complete the food order, guest hosting, food delivery and desk cleaning. In this study, we use the results of particle swarm optimization as an optimal path. By searching the optimal path function for each path, we can get a path equal to one particle.

III. Decision System

First define the guests entering the restaurant every time as a table unit which represents 1 to 4 guests. So we assign five different tasks to the robot, the corresponding number of robots will be assigned. Task fifth mission is When the guests finish, two robots are assigned to clean up and prepare new tableware.

IV. Particle Swarm Optimization for Path Planning

In this study, we use the result of the Particle Swarm Optimization algorithm as the optimal path. The blue circles represent the robots and movement speed during 0~1.5m/s. The reds indicate the path, and the purples indicate the target points. In the figure, the coordinate unit is 10 cm/grid.

V. Conclusion

We plan the tasks which belong to the waiters in the restaurant and assign the tasks through the decision system of the multiple mobile robots. Finally, the particle swarm optimization is used for the path planning.

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References