Analysing Path Planning Algorithms for Courier Robots

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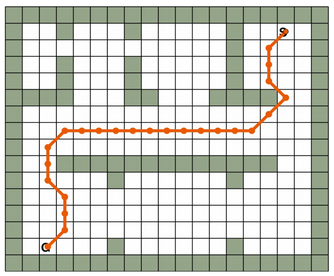
Background

Navigation is all about getting from A to B and for courier robots this is challenging because

- environments are often complex and filled with obstacles
- there can be many paths to a desired goal but only one is optimal

Robots can tackle these difficult problems using grid based path planners which are

- simple and easy to implement
- widely used in robotic navigation



Above: an example of a planned through a path grid based environment

Objective

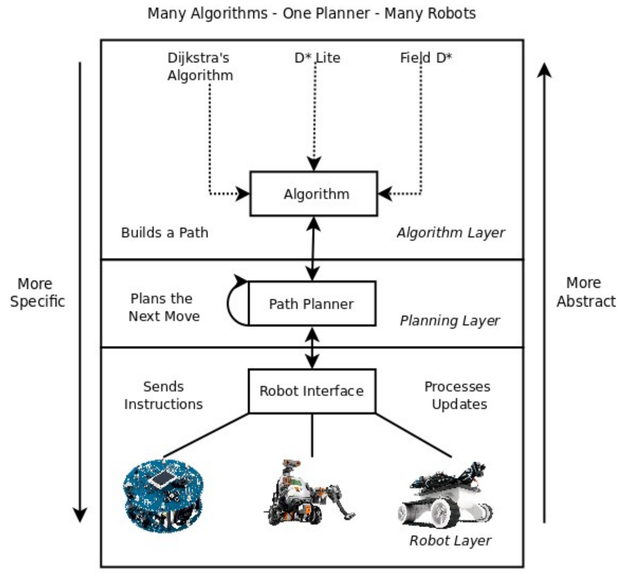
To analyse the effectiveness of current grid path planners for courier robots by comparing

- time taken to produce a path
- number of operations required
- how close it is to the optimal path

Methodology

True analysis involves comprehensive testing and result gathering which requires flexibility

- uses abstract programming techniques to facilitate cross planner testing
- gathers data from both software simulated and physical hardware robots



Overview of the Systems Layered Architecture

Wealth of data gathered will be processed to produce results that describe

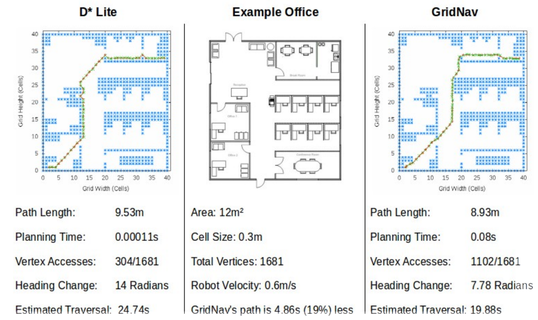
- cost of traversing a planners path compared to the optimal path
- practical effectiveness for real time applications on courier robots

Current Progress

The Rapid Application Development cycle has enabled this project to progress quickly

- application core implemented in *Python* with generic interface to robot platforms
- first path planner based on *Dijkstra's Algorithm* integrated into system
- capable of gathering data results and processing them with the *gnuplot* program

Case Analysis



Above: plot produced from a run using Dijkstra's Algorithm with a simulated robot

Next Steps

More path planners need to be implemented to provide a comparison with Dijkstra's

- implement *D* Lite* and *Field D** algorithms
- test against sample and real environments and analyse the data gathered

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