UNIVERSITI TEKNOLOGI MARA

RANGE SENSOR BASED LOCAL PATH PLANNING ALGORITHM FOR MOBILE ROBOT IN UNKNOWN STATIC ENVIRONMENT WITH BEACON

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ABSTRACT

The Bug algorithm is a local path planning methodology for mobile robot which detects the nearest obstacle as the robot moves towards a target with no or very limited information about the environment. It uses obstacle border as guidance toward the target and at the same time uses sensors to implement obstacle avoidance. During circumnavigating an obstacle, Bug algorithm needs to detect a situation that triggers to leave the current circumnavigating obstacle toward target point. Implementation of Bug algorithm also requires assumption that the localisation for mobile robot is ideal causes the need for ideal sensor and unrealistic for real mobile robots to be implemented in real world. The new approach called PointsBug was developed to avoid the requirement of ideal localisation and try to minimize the use of outer perimeter of obstacle (obstacle border) by looking for a few points on the outer perimeter of an obstacle area as turning point toward target point and as a result reducing duration and distance of mobile robot navigation. PointsBug also avoids the necessity to store any information about previous positions of navigation such as hit point, leaving point and previous position in Bug algorithms family developed by past researches. This causes accuracy in mobile robot localisation is not an important factor for a successful navigation. PointsBug is then compared with TangentBug because it is the best among The Bug Algorithm family using the range sensor for distance, duration, speed and reachability.

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