A NAVIGATION SYSTEM FOR SERVICE ROBOT IN DYNAMIC ENVIRONMENT WITH BAYESIAN APPROACH

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ABSTRACT

Robotic field is growing rapidly and various types of robots have become the main tools in manufacturing industry, entertainment and research. The progress of robot technology is certainly expected to be applied according to the needs of mankind, such as service robot that able to identified and interacted with people and accomplished specific task given by the user.

Navigation and dynamic obstacle avoidance using vision are important features in service robot. Development of vision-based service robot in dynamic environment is a complex task and need reliable method and advanced technology. With the optimal movement of robot and free collision, the ability to identify multiple moving obstacles and navigation to a correct customer will shorten the time needed for the robot to accomplished the task. Realizing service robots with such capabilities is very complicated and complex, since it involves high-speed image processing, obstacle detection, distance measurement accuracy and suitability of hardwares and programs.

In this study, we proposed method of navigation and obstacle avoidance for service robots using geometric analysis and improvement of performance prediction using Bayesian approach. With the ability to predict the existence of obstacle on the basis of previously collected information, including information from stereo vision and distance sensors, it will make the service robot more reliable in carrying out specific tasks given.

The expected outcomes of this study was (1) Development of new methods of multiple moving obstacles avoidance and maneuvers are useful for vision-based service robot in general, (2) Detection and improved face recognition system for service robot are fast and adequate will be obtained; (3) With the use of Bayesian approach, increased performance of detection and identification of obstacle’s direction will be obtained, (4) The newly developed of general systems and architecture of vision-based service robot that can be applied in Indonesia.

Keywords: Service robot, obstacle avoidance, navigasi, stereo vision, bayesian approach