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An Autonomous Robot Navigation System Based on Optical Flow

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Abstract

A simulation and a pilot scale implementation of a vision based robot navigation system was carried out to determine the feasibility and the efficiency of using optical flow based algorithms on autonomous robot navigation. For the simulation work, VRML 97 was used to create the virtual world and the robot. Simulink was used to implement the algorithm and optical flow calculations. The video stream captured through a virtual camera as seen by the robot was used to calculate the optical flow to determine the direction and the speed of the robot for the next step. A mathematical model was used to solve the problem analytically. The same algorithm was implemented and tested in real-time in a controlled environment. Data gathered with the simulation and actual implementation showed that it is possible to use optical flow based algorithms on robot navigation.