Obstacle Avoidance of Mobile Robots Using External Camera Information

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The increasing popularity and affordability of mobile robots result in the development of technologies and have improved them to perform in a better, efficient manner. Mobile robots are helpful in solving much complex tasks that humans are not even aware to provide solutions, while technology has developed in such a manner where this generation of robots have new capabilities without having new hardware. As an example, when it comes to the navigation of autonomous mobile robots, they require multiple sets of sensors such as sonar, laser or visual based sensors in order to navigate autonomously avoiding obstacles, which leads complex calculations locally. Having a collection of such robots will complicate the navigation and require high costs. That kind of on-board sensor setups cannot avoid blind-spots as they have a very limited range and positioned only to see specific directions. This research proposes a cloud-based platform with a network of external camera infrastructure for efficient, up-to-date path planning. The autonomous robots can request platform aid for navigation and platform will send the best possible navigation route according to the priority and the location of the robot in each situation. This enables the robots to take decisions in real time avoiding live obstacles and navigate from point A to point B with minimum delay. This will reduce the extra clutter, the amount of local data that is needed to be sent to the centralized platform for navigation and will simplify robot further development and implementation. The simulation results and implementation show the successfulness of the proposed method. This newly opened pathways will not limit the capabilities as everything is dependent on the platform itself and critical changes such as improving efficiency can be done in a robust manner instead of each and individual mobile robot.

Keywords: Mobile robot navigation, Path planning, Obstacle avoidance, External camera network, Robot communication platform