Autonomous Vehicle

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At present, robotics and automation systems become increasingly important in human life. The mobile robot is an alternative tool for exploring topography and dangerous zone. The almost problem of mobile robotic is obstacle collision avoidance. We develop the navigation system for solving this problem.

Our navigation system consists of two parts. This first part is dealing with the crosstalk problem. The second part is dealing with the obstacle avoidance. This research use ultrasonic sensors for measuring distance between the robot and obstacles. This sensor utilize the time of flight as a mean for measuring distance from the sensor to the obstacle. Thus the neighboring ultrasonic sensors will also receive echo signal and cause error in measured distance. (Figure 1 shows the reflection pattern of ultrasonic wave). We solve this problem by the method of ultrasonic wave sequential reception. We also use distance information from nearby ultrasonic sensors to confirm exact distance.

The environment can change when the mobile robot moves to do work Moreover, in real world many types of obstacle can move. The mobile robot may collide with the obstacle if the navigation system does not take into account dynamic obstacle. Thus, we propose the approach for dynamic obstacle avoidance by using fuzzy logic. The condition for dynamic obstacle avoidance is "The collision happens when more than one object move to the same location at the same time". If we change any parameters such that the previously stated condition is false then the collision with any obstacles will never happen. (Figure 2 shows the mobile robot testbed).
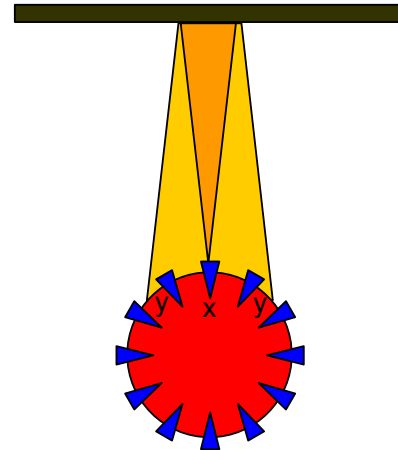

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