Optical Navigation System for All-Terrain Robot

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Robots are starting to interact more frequently with a dynamic environment, outside limited manufacturing sites, encounter a difficulty when needed to navigate from one location to another. Avoiding dangerous situations, such as collisions with objects or organisms, is the priority, but if the robot has a purpose that relates to specific destinations in the environment; it must navigate to those places. In order to do this, it must make decisions along its path to decide which path is the safest but still effective to the task. Even with all the factors of hazards, the robot must still decide in what direction it must drive to avoid obstacles. This research area focuses on the combination of localization and mapping methods, obstacle detection, and situation awareness; translating all these aspects into operational and useful platforms that can increase productivity, safety, and efficiency in robotic industry. This process included acquiring a highly sensitive optical sensor and implementing it to acquire the needed data. A mobile platform was used in order to provide movement for the motion test. This data was then recorded and analyzed to determine what changes could be made to advance the navigation system. This process was repeated until the prototype functioned as desired.

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