THREE-DIMENSIONAL MAPPING OF AN ENVIRONMENT

ABSTRACT

A system for registering a three dimensional map of an environment includes a data collection device, such as a robotic device, one or more sensors installable on the device, such as a camera, a LiDAR sensor, an inertial measurement unit (IMU), and a global positioning system receiver. The system may be configured to use the sensor data to perform visual odometry, and/or LiDAR odometry. The system may use IMU measurements to determine an initial estimate, and use a modified generalized iterative closest point algorithm by examining only a portion of scan lines for each frame or combining multiple feature points across multiple frames. While performing the visual and LiDAR odometries, the system may simultaneously perform map registration through a global registration framework and optimize the registration over multiple frames.

Figure 2