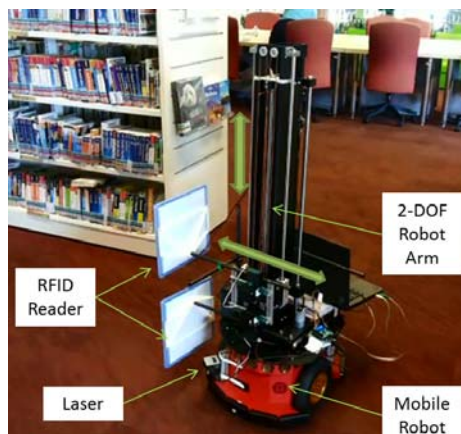


Robot-assisted Scanning and Analytics

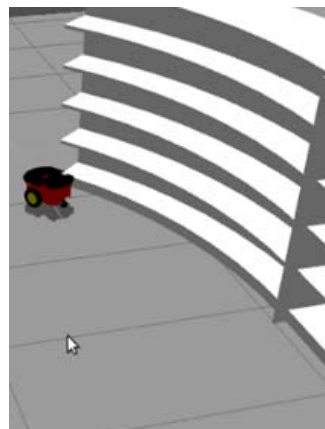


This project automates the manpower-intensive task of inventory tracking and analytics. We design a robot that moves autonomously without user intervention to perform scanning or sensing, such as on RFID-tagged items. Data analysis is performed seamlessly, e.g. report misplaced items, locate items, perform stock taking.

The robotic system improves productivity and provides real-time monitoring. We have applied and optimized the technology for checking and verifying shelf book order, which is manpower-intensive, repetitive and menial. Automated robots are developed to read shelves at night. The robot will detect misplaced/missing books and provide instructions on where to place them correctly.



System optimized for library application. Can be extended to other type of scanning and sensing.



Centimeter-accurate navigation allows highly accurate localization of items on shelf. Even in curved shelves.



Autonomous navigation without user intervention.



Analytics used to highlight in GUI books that are wrongly placed. Location of books are highlighted with respect to actual shelf configuration (tier and bay position).



Alternative view in GUI shows actual photograph images taken during scanning.

Technology Features

- **Autonomous navigation and scanning overnight**

Continuous operation without user intervention allows system to be easily scaled to a large areas over a long period of operation.

- **Analytics using multi-mode scanning and sensing**

Performs analytics from different sensors. Easily incorporate different sensors, such as RFID, camera, Bluetooth, WiFi sensors, etc.

- **Antenna optimized for different tag orientation**

Antenna can be optimized to suit different applications. For example, tags on books are perpendicular to antenna, resulting in worst possible antenna position.

Potential Applications

- **Internet-of-Everything**

Application to various environment such as libraries, warehouse and retail

- **Monitoring of Tightly-Controlled Items**

Application to industries such as MedTech, Aerospace and Automobile where items are tightly controlled



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