

Explorer51 – Indoor Mapping, Discovery, and Navigation for an
Autonomous Mobile Robot
(Technical Report)

The Gig Economy: a Bridge for Workers in Transition
(STS Research Paper)

An Undergraduate Thesis Portfolio
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Bachelor of Science in Systems Engineering

by

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Preface

With the rise of machine learning and robotics, new classes of automated system are emerging. What effects will automation have on society? Automation offers possibilities of greater speed and reliability at lower costs, but it also introduces new risks, and may displace employment.

How can a robot be taught to autonomously map a space? Robotics, autonomous systems and artificial intelligence (AI) may transform human-guided exploration of indoor and outdoor spaces. Autonomous mobile robots can be useful in logistics and maintenance, intelligence gathering, surveillance, and reconnaissance. The research team built a robot that could assist in such tasks. The prototype has fully functional first-person teleoperation and 2D mapping capabilities. Collision avoidance for frontal collisions was implemented and tested successfully. 3D mapping and autonomous navigation capabilities for the robot were not completely implemented or tested; future research teams may further develop these features.

Although automation disrupts employment, it can introduce desirable new employment opportunities. For workers who at risk of displacement, the gig economy offers bridge employment and can be a full-time career opportunity. Uber, GrubHub, and similar companies have made freelance work more accessible, and have counteracted some kinds of employment bias. Online education platforms such as Coursera and LinkedIn Learning have attracted gig workers with flexible schedules. Employed gig workers can thereby earn credentials online, improving their career opportunities.

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