Guangping Liu

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CONTACT INFORMATION

Malden, MA, USA Tel: (+1)7814989879

Linkedln, GitHub, liubaobao92@gmail.com

SKILLS

- Simulation Skills: SolidWorks, AutoCAD, Arduino IDE.
- Programming Skills: Python (Numpy, SciPy, PyTorch), C/C++.
- MATLAB Skills: App Designer, Simulink, Simscape.
- Operating Systems: Windows, Linux, Robot Operating System (ROS).

RESEARCH EXPERIENCE

MATLAB App for treadmills: COM tracking and self-pacing control

Northeastern University, Boston, MA May 2022 – May 2023

- Established a communication between an instrumented treadmill sensors and **MATLAB** with a **C++** based software development kit (**SDK**).
- Developed a **Human Machine Interface (HMI)** in MATLAB for controlling the treadmill, **processing sensor data**, simplifying access to walking data.
- Applied **Kalman Filter** to estimate statements of a subject in a walking test and adjusted the speed of the treadmill using a speed **controller**.
- Developing a **kinetic model** to estimate the lateral movement during steady walking and validating the accuracy of the model using a **motion capture system**.

PROJECT EXPERIENCE

Turtlebot-based SLAM and April Tag Detection(Python/ROS/SLAM/Rviz)

Northeastern University, Boston, MA March – April 2023

- Established communication between a Turtlebot equipped with an inertial measurement unit (IMU), a **Raspberry Pi** to a remote PC, transmitting and receiving sensor data in **Robot Operating System** (ROS).
- Implemented **simultaneous localization and mapping (SLAM)** using multiple packages, such as **GMapping**, **move_base**, and **explore_lite**, on a Turtlebot to efficiently navigate through environments, **avoiding obstacles**, and generating an occupancy map, with real-time updates visualized in **Rviz**.
- Developed a **Python script** to receive the **AprilTags** messages from the camera frame, and subsequently transformed them into the map frame, detecting 7/7 tags.

Feature Attribution in Predicting Survival on the Titanic(Python/Pytorch)

Northeastern University, Boston, MA November – December 2022

- Implemented **a neural network model** to predict survival on the Titanic.
- Implemented integrated gradients, with **PyTorch** to estimate the importance of each feature in the model, finding the most important feature related to survival rate.

DC Motor Control by Simulink and Arduino IDE(Python/Arduino)

Northeastern University, Boston, MA October – November 2022

- Constructed **Simulink** code with a **feedback control system** to adjust the position of a DC motor, and compared experimental results with **Simscape** simulations.
- Developed and implemented an **embedded code** using **Arduino UNO** to regulate the speed of a motor, reducing the error rate, and significantly enhancing overall performance.

A Multi-functional Stroller(SolidWorks/AutoCAD)

Nanchang Institute of Technology, Jiangxi, China February 2021 – June 2021

- Designed a functional prototype of a stroller independently, employed **SolidWorks** to generate an assembly drawing, and simulate the stroller movement by Motion Simulation.
- Completed a document including structural strength computation, transmission speeds, and simulation analysis.

EDUCATION

Northeastern University, Boston, MA, USA September 2021 – May 2023

Master, Mechanical Engineering, GPA:3.76/4.0

Nanchang Institute of Technology, Jiangxi, China September 2017 – July 2021

Bachelor, Mechanical Design, Manufacture and Automation