

Azmyin Md. Kamal

Baton Rouge, Louisiana - Portfolio: <https://mechazo11.github.io/>

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Skills

Programming	C++, Python, MATLAB, \LaTeX
Software Development	Git, Docker, Ruff
Computer Vision	2D & 3D Object Detection
Robotics	Visual CSLAM, Model Predictive Control, ROS, Gazebo Harmonic
Scientific Computing & Visualization Libraries	SciPy, Numpy, Numba, Eigen, Matplotlib

Education

Doctor of Philosophy (Ph.D.) in Mechanical Engineering LOUISIANA STATE UNIVERSITY (LSU) <ul style="list-style-type: none">CGPA - 3.86 (as of Spring 2024)	<i>Baton Rouge, Louisiana, U.S.A</i> <i>Fall 21 - Present</i>
Master of Science in Mechanical Engineering THE UNIVERSITY OF LOUISIANA AT LAFAYETTE (ULL) <ul style="list-style-type: none">CGPA - 4.0	<i>Lafayette, Louisiana, U.S.A</i> <i>Fall 19 - Fall 21</i>
Bachelor of Science in Mechanical Engineering AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY (AUST) <ul style="list-style-type: none">CGPA - 3.86	<i>Dhaka, Bangladesh</i> <i>Fall 11 - Spring 15</i>

Work Experience

Graduate Research & Teaching Assistant LOUISIANA STATE UNIVERSITY <ul style="list-style-type: none">Developing a novel fault-tolerant, collaborative metric-semantic CSLAM framework in ROS 2 utilizing 3D object semantics and camera pose.Developing a new implementation of <i>Deep3D</i> bounding box regressor using EfficientNetV2. This work will also introduce a new pipeline for generating training data for bounding box regressors.Developed a new Keyframe descriptor and a Place recognition algorithm to rapidly recover global pose during sudden tracking loss in Monocular VSLAM system using 2D object semantics and camera pose data.Developed a ROS 2 package to natively integrate ORB-SLAM3 into ROS 2 ecosystem.Responsible for the maintenance and upkeep of two RBKAIROS mobile manipulators, each valued at \$90K.Conducted laboratory sessions for Machine Design II and Control Engineering courses.	<i>Baton Rouge, Louisiana, U.S.A</i> <i>Fall 21 - Present</i>
Graduate Research Assistant THE UNIVERSITY OF LOUISIANA AT LAFAYETTE <ul style="list-style-type: none">Developed a Python-based data analysis tool for COVID-19 infection phases, facilitating collaboration with computer scientists and contributing to publications in a Nature and a BMC journal papers.Developed a privacy-aware, multi-user indoor positioning system, deployed IoT occupancy monitoring systems and advised undergraduate RAs in IoT projects.	<i>Lafayette, Louisiana, U.S.A</i> <i>Fall 19 - Summer 2021</i>

Projects (curated)

Solving Short-Term Relocalization Problems In MKVSLAM Using Spatial And Semantic Data ROS 2, Python <ul style="list-style-type: none">Developed a novel global pose recovery (relocalization) method for VSLAM frameworks using a new Keyframe descriptor and Keyframe place recognition method using object semantics and camera spatial data.About 2x speedup and 39% reduction in ATE in comparison to bag-of-words baseline method in ground and aerial vehicle datasets. Paper presented in IEEE/ASME AIM 2024. Code, Paper
ROS2 ORB-SLAM3 package ROS 2, C++ <ul style="list-style-type: none">Developed a package that natively implements ORB-SLAM3 V1.0 in ROS 2 ecosystem. Code.
Clearpath Simulator comes to Gazebo Harmonic ROS 2, C++, Python, Gazebo <ul style="list-style-type: none">Modified Clearpath Simulator to make it compatible with ROS 2 Jazzy and Gazebo Harmonic. Also introduced a number of new features. Code
Python-MPPI Python, Numpy, Numba <ul style="list-style-type: none">Developed a Numba-accelerated Model Predictive Path Integral controller for a 2D Differential Drive Robot Code
Mobile Robot Path Planning Using Genetic Algorithm MATLAB <ul style="list-style-type: none">Wrote a Genetic Algorithm from scratch that can solve complex 2D path planning problem for robot navigation. Code
Anonymous Multi-User Tracking in Indoor Environment Using Computer Vision and Bluetooth Python, PyTorch <ul style="list-style-type: none">Developed a novel privacy-aware Multimodal Indoor Positioning System (MIPS) utilizing overhead RGB images and Bluetooth RSSI data. Thesis report.Project lead to a collaborative patent: US20240292188A1.
Deep Learning Projects Python, PyTorch <ul style="list-style-type: none">Developed a piano music generator using two Critic-Composer LSTMS. CodeImplemented AlphaZero's Monte Carlo Tree Search algorithm in an 11x11 Gomoku game. Code

Honors & Awards

Jan 23	Graduate Teaching Assistantship (LSU) , Dept. of MIE	<i>Baton Rouge, U.S.A</i>
Aug 21	Graduate Research Assistantship (LSU) , NSF:NRI #2024795	<i>Baton Rouge, U.S.A</i>
Aug 21	Graduate Research Assistantship (ULL) , NSF:RAPIDS #2027688	<i>Lafayette, U.S.A</i>