

# KOUNDINYA VINNAKOTA

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Current graduate student pursuing MEng in Robotics with strong fundamentals in data structures, algorithms & programming skills and internship/project work experience in automotive manufacturing and product development

## EDUCATION & CERTIFICATIONS

- **M. Eng. in Robotics, UMD College Park** **Aug 2021 – Present; Current GPA: 3.9/4**
- **B. Tech in Mechanical Eng., Jawaharlal Nehru Tech Univ., India** **Jun 2021; GPA 8/10**
- **Dassault Systems-Certified SolidWorks Design Associate**

## RELEVANT COURSEWORK

Robot Modeling, Control of Robotics Systems, Planning for Autonomous Robots, Perception for Autonomous Robots, Autonomous Robotics, Statistical Pattern Recognition, Deep Learning, Rehabilitation Robotics

## TECHNICAL SKILLS

<b>Coding Skills</b>	C++, Python, Core Java, C, Data Structures & Algorithms, Selenium
<b>Robotics Frameworks</b>	OpenCV, ROS
<b>Simulation Skills</b>	MATLAB, Gazebo, Arduino, Ansys-Workbench, Ansys-Fluent
<b>Web Designing Skills</b>	JavaScript & Bootstrap, HTML5 and CSS3
<b>CAD Skills</b>	SolidWorks, AutoCAD

## INTERNSHIP EXPERIENCE

<b>NIST, Maryland;</b>	<b>Developer Intern</b>	<b>Sep 2021 – Present</b>
Developing GUI using Python and TkInter for ARIAC scenarios allowing fast prototyping of Gazebo simulation environments. <ul style="list-style-type: none"><li>• GUI will help developers and competitors generate scenarios for the Agile Robotics for Industrial Automation.</li></ul>		
<b>Cognizant, Hyderabad, India;</b>	<b>Software Intern</b>	<b>Jan 2021 – Jun 2021</b>
Quality and Programmer Intern using Java, Agile, Selenium and API framework. <ul style="list-style-type: none"><li>• Programming in Java in Agile framework; Quality Assurance using Selenium Framework, APIs, and SQL.</li></ul>		
<b>Ashok Leyland Ltd., Hyderabad, India;</b>	<b>Manufacturing Intern</b>	<b>Aug 2020 – Sep 2020</b>
Conducted research in the market trends of Heavy-duty vehicles. <ul style="list-style-type: none"><li>• Familiarized with the construction of trailers and tippers. Worked on the load parameters of vehicles.</li></ul>		

## ACADEMIC PROJECTS

<b>Monocular Visual SLAM;</b>	<b>Python, OpenCV, Computer Vision</b>	<b>Spring 2022</b>
Achieved Simultaneous Localization and Mapping using Monocular vSLAM. <ul style="list-style-type: none"><li>• Calibrated a camera using Zhang's Calibration technique.</li><li>• Used ORB feature detection techniques to detect features.</li><li>• Estimated camera pose and performed bundle adjustment to decrease camera location noise.</li></ul>		
<b>8 x 3 Puzzle solver using BFS algorithm;</b>	<b>Python, Path Planning</b>	<b>Spring 2022</b>
Programmed Breadth first search algorithm for an achieving required state in the puzzle. <ul style="list-style-type: none"><li>• Developed a backtracking algorithm using parent and child relationship.</li><li>• Utilized concepts in NumPy to visualize the solution path generated.</li><li>• Used Action sets to perform actions in each state.</li></ul>		
<b>Implementation of Dijkstra Algorithm;</b>	<b>Python, OpenCV, Planning</b>	<b>Spring 2022</b>
Programmed Dijkstra algorithm for planning robot path from start node to goal node. <ul style="list-style-type: none"><li>• Defined the obstacle space using half planes and semi algebraic models.</li><li>• Computed backtracking using parent - child node relation.</li><li>• Robot movement and compute path was visualized using computer vision techniques.</li></ul>		
<b>AR Tag detection;</b>	<b>OpenCV, Computer Vision</b>	<b>Spring 2022</b>
Developed an algorithm to detect April tags. <ul style="list-style-type: none"><li>• Used least significant bit to detect the orientation of the AR tag and homography to extract AR tag from frame.</li><li>• Performed different image filtration operations like morphing, dilation for efficient corner detection.</li><li>• Warped a custom image onto the detected AR tag based on the orientation.</li></ul>		
<b>Mouse solving a maze using DFS algorithm;</b>	<b>Python, Path Planning</b>	<b>Fall 2021</b>
Leveraged Depth First Search (DFS) algorithm to compute the path to the goal. <ul style="list-style-type: none"><li>• Programmed using C++ &amp; OOPS concepts.</li><li>• Used data structures like Stacks, Vectors, Pairs to for data computation.</li><li>• Used API simulator for visualization.</li></ul>		
<b>Urban search &amp; Rescue model using turtle Bot;</b>	<b>C++, RViz, ROS</b>	<b>Fall 2021</b>
Developed algorithms for multiple turtlebots to simulate the search and rescue operation. <ul style="list-style-type: none"><li>• One bot explores and maps the locations of the victims, and the second bot is used for rescuing.</li><li>• Map and dictionaries were used for the data handling.</li><li>• Move Base package was used for navigation.</li></ul>		