Gunjan Khut

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Education:

University of Maryland, College Park	**M. Eng. in Robotics** (GPA – 3.77/4.0)	Dec 2019
NMIMS (NGA-SCE), Mumbai	**PG Diploma in Business Management**	Dec 2017
SMEC Automation Pvt. Ltd., Mumbai	**PG Diploma in Industrial Automation**	Oct 2015
North Maharashtra University, India	**B.Eng. in Electronics & Telecom** (72.60% - Class rank 25/174)	Jun 2014
K J Somaiya Polytechnic, Mumbai	**Diploma in Industrial Electronics** (58.25%)	Jun 2011

Skills:

Tools and Software: C++, Python, MATLAB, ROS, Keras, PyTorch, OpenCV, TensorFlow, Algorithms, Arduino, Ladder Programming, Git, Latex, Solidworks, PVsyst, AutoCAD, and Microsoft Office (Word, Excel, Powerpoint)

Robotic Frameworks: ROS, Gazebo, URDF, Rviz, MoveIt, OMPL and Vrep.

Industrial Automation expertise: PLC Hardware (Allen Bradley, Siemens, ABB, GE-Fanuc, Delta), SCADA (ifix, WinCC, Vijeo Citect & Wonderware Intouch), HMI and VFDs (for motor control)

Communication Buses: Ethernet, Modbus/TCP, EtherCAT, SPI, I2C, RS232, USB

Solar expertise: Plant designing, Installing, commissioning, troubleshooting, setting up system monitoring.

Work Experience:

Research Assistant, University of Maryland, College Park **May 2018 - Dec 2019**

- Used Pandas, NumPy, SciPy, Matplotlib, and Sci-kit learn for developing various Machine learning algorithms.
- Participated in phases of Data-Mining, Data-Collection, Data-Cleaning, Developing-Models, Validation, and Visualization.
- Worked independently and collaboratively throughout the complete project lifecycle including data extraction/preparation, design, and implementation of scalable machine learning analysis and solutions, and documentation of results.
- Interactive in providing change requests, trouble reports and requirements collection.
- Implemented and modified various SQL queries and Functions, Cursors and Triggers as per the requirements.
- Implemented Supervised and Unsupervised Machine Learning algorithms using Microsoft Azure cloud services to perform detailed analytics and building Web Services models.
- Updated Python scripts to match training data with our database stored in AWS cloud Search, so that we would be able to assign each document a response label for further classification.
- Implemented Reinforcement Learning and control (TensorFlow, Torch), and machine learning model (Scikit-learn).
- Hands-on experience in implementing Naive Bayes and skilled in Random Forests, Decision Trees, Linear, and Logistic Regression, SVM, Clustering.
- Devised a machine learning algorithm using Python for facial recognition.
- Used AWS (Amazon Web Services), Azure ML, and other cloud concepts with tensorflow framework to train deep learning models.

Automation Engineer, P. G. Drive, Mumbai, India **July 2015 - Dec 2017**

- Performed testing, commissioning, troubleshooting and maintenance of electrical panels, PLC systems, VFD, and HMIs for various field operation projects.
- Developed control logic, AutoCAD drawings, Technical specification documents, power & control wiring, specifications and inspection of low-medium power electrical equipment: switchgears, transformers, motor testing.
- Developed a manual solar tracker, also built a prototype to upgrade it to a sensor-based model in order to automate it.
- Acted as a lead engineer for numerous field operational projects, performed system analysis to manage it from design through to commission stage, also provided after sales and technical support.
- Responsible for electrical control panel design, PLC programming and implementation/commissioning for complex solutions involving a combination of IT networking and automation components.
- Prepared instruments data sheet, flow charts, BOM, Erection bill of material based on the solutions requirement.

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Maintenance Engineer, JK &PC Textlab Equipments, Mumbai, India **Jun 2014 - Jun 2015**

- Installed lab equipments - including complex and advanced machinery for clothing yarns.
- Updated the technical documentation database and performed analysis to find the innovations.
- Continued the enhancement of product portfolio by working on a special project for beaker dyeing machine.
- Diagnosed and troubleshoot the errors arising in systems & Engineered tactical solutions for improving machine efficiency.
- Calibrated and performed Factory acceptance tests for the instruments.

Relevant Coursework:

Planning, Perception, modelling and controls for Autonomous Robots, Robot Learning, Machine Learning, AI & Deep Learning, Planetary Surface Robotics, Software development for Robotics, Manufacturing & Automation, Wireless & Mobile Systems for the IoT.

Projects:

Path Planning Algorithm (RRT) on AGV **June 2019**

- Planning of route and navigation of obstacles using LiDAR from a start point to end point in a known simulated environment.
- Used g-mapping technique using SLAM and developed a binary map of the environment to feed to the RRT algorithm.

Emergency Vehicle Detection using Tensorflow API (Winner of Northrop Grumman Challenge) **Nov 2018**

- Worked on an emergency vehicle detection system in low visibility conditions, detected vehicles with accuracy of more than 85% on images/videos using transfer learning and faster RCNN model.
- Involved selection of appropriate CNN model selection and data augmentation.

TurtleBot walker **June 2018**

- Implemented a simple walker algorithm. The robot moves straight until it comes near to the obstacle. When it is near the obstacle, it rotates on its place until the way ahead is clear.
- It uses the laser scan published data to check for obstruction in its path to avoid it.

A* path planning for a differential drive robot **March 2018**

- Finding path between two given points in a given 2d map using A-star algorithm
- The 2d map is obtained by getting a gmap from the given rrlab.sdf file and then converting that to an .png file. The .png file is processed using OpenCV to obtain a C-Space map with 1's as obstacles and 0's as free space. Also, the known radius of the bot is used to pad 1's to the obstacles so that the robot can be considered a point robot.

ARIAC (Agile Robotics for Industrial Automation Competition) **Jan 2018 – May 2018**

- Established control between collaborative robots (UR10 and AGV) to fulfil the orders given to the competition environment and moved parts from assembly bins to AGV's. MoveIt & Gazebo are the ROS plugins used.
- Improvised the system by adding contingencies for Part Drop and Important Order First. (C++, ROS)

SunGanak – A solar tool **Oct 2017**

- A data science powered web-software giving a generation report of various parameter such as Return on Investment (ROI), carbon footprints, estimated generation of a solar PV Plant.

GPS based Vault with Integrated Fingerprint Scanner and Keypad Lock **May 2014**
(Winner of Best innovative project)

- Engineered a sequential multi-layered security vault that was operational only when it fulfills the following security combinations:
  Coordinate specific location, Biometric recognition, Encrypted 4-digit pin.