

Murtaza Khuzema Basuwala

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Portfolio: <https://murtazabasu.github.io>



Experience

- 10.2020 - Present** **OBO Bettermann Group**
Industrial Engineer
- **Objectives:** Industry 4.0, Predictive Maintenance, Data Visualization and Exploration, Machine Learning, Deep Learning, AI.
 - **Tools:** ViewSystems, Python, Schaeffler Smart Utility, OPC-UA Interface.
- 10.2019 – 09.2020** **Student Research Assistant at Fachhochschule Südwestfalen Soest, Germany**
- **Objectives:**
 - Design and test reinforcement learning, deep learning, and machine learning algorithms.
 - Worked with the company Bültmann GmbH, to analyse their data and improve their production using machine learning.
 - **Tools and Libraries:** Python, Pandas, Pytorch, Numpy, Matplotlib, Seaborn, Scikit-Learn, etc.
- 07.2017 – 08.2017** **Intern at Ashok Leyland Ltd (R&D Centre), Chennai, India**
- **Objectives:**
 - A four-wheeler assembly was designed for a heavy vehicle to withstand the weight of the engine, radiator, transmission, and exhaust system.
 - Run the vibration analysis of the assembly to analyse the frequency of vibration based on real world simulation.
 - **Tools and Libraries:** CATIA, Enovia

Education

- 04.2018 – 09.2020** **Master of Science in Systems Engineering and Engineering Management (CGPA-1,6)**
Fachhochschule Südwestfalen, Soest, Germany
Focus areas: Machine Learning, Deep Learning, Reinforcement Learning, Advanced Production Engineering, Modelling and Simulation of Mechanical Systems.
Other areas: International Project Management, Integrated Management and Business & Engineering.
- 08.2013 – 05.2017** **Bachelor's in Mechanical Engineering (CGPA - 1,8)**
Sri Sairam Engineering College, India
Focus areas: Machine design, Production Engineering, Kinematics and Dynamics of Machines, Operations Research.

Master Thesis

- 12.2019 – 09.2020 **Coordination of two Universal Robot (UR5) in ROS/Gazebo with Reinforcement Learning algorithm – Proximal Policy Optimization (PPO) – Grade – (CGPA – 1,0)**
Fachhochschule Südwestfalen, Soest, Germany
- **Objectives:**
 - Developing robot environment for training the RL agent.
 - Training a UR5 robot with Robotiq 85 gripper to reach random targets using reinforcement learning, and then testing it additionally to reach new targets.
 - Coordination of two UR5 robots with Robotiq 85 grippers to reach a common target position using reinforcement learning, so that one robot can transfer an object to another.
 - **Tools and libraries:** Python, PyTorch, ROS/Gazebo

Projects

- 10.2020 – 11.2020 **Identifying Pneumothorax Disease using UNet – CNN (Deep Learning)**
- A UNet was developed using Convolution Neural Networks to learn the chest X-ray images provided by the Society for Imaging and Informatics in Medicine (SIIM).
 - The X-ray images were pre-processed using image augmentation libraries and then given as input to the model.
 - **Tools and libraries:** Python, Pandas, PyTorch, Scikit-Learn, Matplotlib, Numpy, Seaborn, Albumentations
- 09.2015 – 03.2018 **Controlling a mobile robot (Turtlebot3) in ROS to reach random target position using Reinforcement Learning**
- The mobile robot learns to reach a random target position using various reinforcement learning algorithms such as Q-Learning, Actor-Critic, and Proximal Policy Optimization (PPO).
 - If the mobile robot is trained on sufficiently random targets, it generalizes to reach new targets on which it has never been trained on.
 - **Tools and libraries:** Python, PyTorch, ROS/Gazebo, Matplotlib, Numpy
- 09.2015 – 03.2018 **Motion Control of a Peristaltic Sorting Machine (PSM) using Reinforcement Learning**
- To develop a reinforcement learning agent for the actuator of the PSM machine to reach random parcel position in the most efficient way.
 - Advantage Actor.Critic (A2C) was used as the RL agent for the PSM environment.
 - **Tools and libraries:** Python, PyTorch, Numpy, Matplotlib
- 09.2015 – 03.2018 **Non-linear controller for a Bioreactor System (Advanced Control Technology)**
- To develop and design a linear and a non-linear controller to control the non-linearity of the bioreactor system.
 - **Tools and libraries:** Matlab/Simulink

Certifications

1. Deep Learning Specialization, *deeplarning.ai*, Coursera
Focus Area: Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization, Neural Networks and Deep Learning, Structuring Machine Learning Projects, Sequence Models, Convolution Neural Networks.
2. Reinforcement Learning Specialization, *Alberta Machine Intelligence Institute*, Coursera
Focus Area: Sample-based Learning Methods, Prediction and Control with Function Approximation.
3. Deep Neural Networks with Pytorch, *IBM Coursera*
4. Python Programmer, *Datacamp*
5. Python Bootcamp: Python 3, *Udemy*
6. Using OpenAI with ROS, *The Construct*
7. TF Ros 101, *The Construct*
8. ROS Control 101, *The Construct*

Skills

- **Skillset:** Machine Learning, Deep Learning, Deep Reinforcement Learning, Robotic Programming, Advanced Production Engineering.
- **Programming Languages:** Python, MATLAB & Simulink, basics of SQL and R.
- **Python Libraries:** PyTorch, TensorFlow, Keras, Gym, Scikit-Learn, XGBoost, Numpy, Pandas, Plotly, Seaborn, Matplotlib, Flask, Streamlit, Rospy.
- **Tools and Technologies:** ROS, Microsoft VS Code, Spyder, PyCharm, Sublime Text, Jupyter Notebook, GitHub, AutoCAD, Catia V5, MS Office, MS Project, MS Publisher.
- **Operating Systems:** Windows, MacOS, Linux (Ubuntu).
- **Interpersonal Skills:** Public speaking, Team player, Adaptability.
- **Languages:** English, German (B1), Hindi, Tamil, Gujarati, Urdu, Arabic (writing & reading).

Hobbies

- Painting, Cricket, Reading, Running.