Amitoj Battu

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About Me

A proficient AI developer specializing in Robotics, looking to work in a dynamic and challenging environment while collaborating with a motivated team. Currently seeking a position that takes advantage of my programming capability and a diverse skill set to ideate, contribute to the project development life-cycle, and deliver meaningful, high-quality results.

Education

M.Sc in Artificial Intelligence *2020-Ongoing*

University of Groningen, Netherlands

B.Tech in Mechatronics Engineering *2015-2019*

Manipal University Jaipur, Jaipur, India

Skills

Programming Languages Python | C++ | Embedded C | PLC Ladder Logic | KUKA Robot language

Frameworks & Libraries Tensorflow | Pytorch | SKlearn | Keras | Numpy | ROS | Pandas | Gym | Autodesk Fusion | MATLAB
Siemens S7-200 | LabVIEW | Arduino | RaspberryPi | Git | Docker | Googling | KUKA | LaTeX

Languages English (Fluent) | Dutch (Beginner)

Projects

Master's Thesis - Communication in Human-Robot Collaboration

- Developed and trained custom neural networks on a custom created dataset to recognize physical gestures for collaborative object carrying with TIAGo robot (Time series classification).
- Implemented a Point-and-target method to indicate the desired location of the object simply by pointing to the location, including image matching to PointClouds, frame conversion, and image recognition.
- Programmed TIAGo robot using C++ and Python within a behavioral architecture, while communicating with AI models running in Docker via RESTful API and ROS Nodes.

ROS & ROS2

- **Domestic Robot Butler:** Currently under development by leveraging ROS2 on Raspberry architecture for SLAM, object and voice recognition, enabling navigation to specific rooms in the house and autonomous retrieval and delivery of objects.
- **Pick & Place Robot:** Implemented SLAM on a 4W mecanum robot, utilizing the generated map for navigation to key locations for object grasping and dropping based on object recognition.
- **5 DOF Arm:** Designed and developed a custom 5 DOF robotic arm in Gazebo, creating URDF and MoveBase functionalities from scratch for precise pick and place operations.

Deep Learning and Reinforcement Learning

- **DL:** Completed projects include Handwriting recognition on the Dead Sea scrolls, ASL to text converter, NLP twitter sentiment analysis, and Irish folk music generation utilizing RNNs.
- **GAN:** Completed projects include utilized GAN and DCGAN architectures to train deep CNN models for generating handwritten MNIST digits, performed style transfer using cyclegan models, generated MNIST fashion dataset using autoencoder models, and trained WGAN models for generating Van Gogh paintings.
- **RL:** Developed custom environments in Pygame, such as FlappyBird, to train agents using the NEAT algorithm for reinforcement learning. Additionally, trained RL agents in environments including Lunar-Lander, Q-Learning frozen-lake, Deep Q-Learning for Atari games, A2C for robotic simulation in Pybullet, and conducted experiments with Policy Gradient using PyTorch.

Bachelor's thesis - Metal Additive Manufacturing

- Developed and implemented custom algorithms to convert CAD models into Gcodes, enabling precise control for 3D printing metallic objects using a welding gun mounted on the KUKA robotic arm.

Experience

Intelligent Project Solutions (Canada) *Feb '19 - Dec '20*

• As an Engineering intern, I worked with Piping and Instrument Diagrams (P&ID) for different chemical plants, understanding plans and annotating symbols for NN training using .DWG files or 3D models in AutoCAD Plant3D.

KUKA Robotic Training Centre (AKGEC) *Jan - Jul, '19*

• 6-month internship: mastered setup, calibration, and programming of robotic arms for industry applications. Programmed arms for various exercises and developed custom welding gun modules for additive manufacturing.

Extras

Publications

Medical

- DOI: Comparison of Incidence of Pre-Analytical phase errors in OPD and IPD samples in a super-specialty hospital: A Retrospective study.
- DOI: Incidence of Pre-analytical Phase Errors: A Retrospective study in biochemistry lab of a tertiary care hospital.
- DOI: Training - An important factor in reducing Pre-Analytical errors in Biochemistry lab of a tertiary care hospital.

Posts Held

- **UNICEF Sub-committee Secretary:** 1 year volunteering work for the local chapter of UNICEF, organizing fund-raising events around Groningen, Netherlands.
- **Project Head/Coordinator for the Robotics Club (B.Tech):** Taught a team of 30+ students the basics of electrical and electronics while helping build projects using various controllers. Position also included organising and managing Technical events and seminars for the Robotics Club.
- **Program Committee member for IEEE (B.Tech):** Assisted in planning venues and organize Technical events held by local Chapter of IEEE.

Extracurricular Courses

- (AKGEC) KUKA Robot Programming Basic Level
- (AKGEC) KUKA Robot Programming Advance Level
- (AKGEC) LabVIEW CORE III
- (AKGEC) Siemens NX-11 CAD/CAM
- ROS for Beginners I: Basics, Motion, OpenCV - Udemy
- ROS for Beginners II: Localization, Navigation and SLAM - Udemy
- ROS2 How To: Discover Next Generation ROS - Udemy
- Introduction to Computer Science and Programming Using Python - edX
- Introduction to Programming with MATLAB - Coursera
- Control of Mobile Robots - Coursera

Smaller Projects

- **KUKA Robot arm palletizer:** Programmed a real-world KUKA arm to palletize cubes in various patterns while using keypad input to differentiate between cubes, orientation and target bins.
- **Microcontrollers and Microprocessors:** Developed various projects including a 5 DOF robotic arm, an RFID-based E-passport system, a PLC-based traffic density control, a biometric security system, the Theo Jansen walking mechanism, and an 11-segment, 6-digit display.