Amitoj BATTU

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ABOUT ME

A skilled AI and Robotics developer seeking to work in stimulating and demanding conditions while collaborating with a driven team. I am currently looking for a job that allows me use my programming experience and wide range of skills to come up with ideas, contribute to the project development life-cycle, and produce useful, high-quality results.

EDUCATION

M.Sc in Artificial Intelligence
Aug '20 - Jun '23

University of Groningen, Netherlands

B.Tech in Mechatronics Engineering
Aug '15 - Jul '19

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	Docker	RESTful API	Git	Autodesk
	AWS	Siemens S7-200	Arduino	RaspberryPi	MATLAB	Gym	Googling	KUKA	LaTeX
Languages	English (Fluent)	Dutch (Beginner)

PROJECTS

MASTER'S THESIS - HUMAN-ROBOT COMMUNICATION DURING OBJECT CO-TRANSPORTATION 🔗

- 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, which included camera image aligning to PointClouds, frame conversions, 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 developing 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.

MACHINE LEARNING

- **NLP Sentiment Analysis: Docker / AWS implementation:** 🔗

  I curated a custom dataset from labeled text in past competitions to train a BERT language model. The model was fine-tuned and deployed locally in a Docker container with a RESTful API for smooth inferences. For online hosting, I developed a Flask application, hosting the sentiment analysis model on an EC2 instance through the Deep Learning Amazon Image.
- **Deep learning & Reinforcement learning**
  - I developed projects include Handwriting recognition on the Dead Sea scrolls, American Sign Language to text converter using OpenCV, and Irish folk music generation utilizing RNNs.
  - Further created custom environments in Pygame, such as FlappyBird, to train agents using 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.
- **Generative Adversarial Network(GAN) development:**

  Completed projects used 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.