Abhisek Konar

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SUMMARY

Machine learning engineer with experience of over 4 years in implementing advanced machine learning models for solving real-world problems.

WORK EXPERIENCE

SAMSUNG AI CENTER | Machine Learning Engineer, Research — Montreal, QC | Feb 2022 – Feb 2024

- **Smarthome automation using LLMs:** An agent-style conversational AI using multi-modal transformer models to create context-aware, personalized home automation systems capable of interpreting complex commands conveyed in everyday conversational language. [In submission: IoT-J]
  - Built an audio capture tool using OPENAI whisper to enable voice interaction with the user.
  - Optimized the prompt design to boost system performance to $\times 2.5$ existing methods.
  - Constructed a benchmark of 50 involved day-to-day tasks.
- **Robotic manipulation:** A novel technique to collect expert demonstrations for robotic manipulation tasks like object placing that drastically reduces the need for human supervision. [In submission: IEEE IROS 2024]
  - Developed the grasping part of the task using a combination of contact-graspnet to detect valid grasps followed by a grasp correction algorithm leveraging STS (in-house built touch sensor) increasing the robustness of our approach by 200%.
- **Load balancing for Communication:** A statistical preference-learning method to train load balancing policies from sub-optimal demonstrations. [Accepted: IEEE ICC 2023]
  - Led the model development, including data pre-processing, resulting in an improvement of 19.6% in minimum IP throughput.
  - Facilitated the framework development for the model training, evaluation and analysis across different sites.

SAMSUNG AI CENTER | Research Intern, Machine Learning — Montreal, QC | April 2021 - Jan 2022

- **Social navigation using IRL:** A sample efficient behaviour planning algorithm to generate robot navigation policies that was $\times 10$ more sample efficient while enjoying 80% higher success rate to existing methods. [Accepted: IEEE IROS 2022]
  - Undertook the analysis of the proposed method by implementing baselines, designing data visualizations, and synthesizing metrics pertinent to social navigation.

NOAH'S ARK LAB, HUAWEI | Research Intern — Montreal, QC | May 2020 – Aug 2020

- Using Carla, an open-source driving simulator, set up pipelines for data acquisition and training models for autonomous driving using IRL.
- Upgraded the existing algorithm to be compatible with continuous action space.

COGNIZANT TECHNOLOGY SOLUTIONS | Programmer Analyst — Pune, IN | Jul 2015 – May 2017

- Exploring the application of machine learning for fraud detection in banking.

EDUCATION

McGill University — Montreal, QC | Nov 2020
Masters' in Computer Science

- **Thesis:** Social Navigation using Inverse reinforcement learning.

Maulana Abul Kalam University of Technology — Kolkata, IN | Jun 2015
Bachelors' in Information Technology

PROJECTS

ROBOT NAVIGATION — Python, ROS, SLAM, Motion planning
A telepresence robot (Ohmni) capable of mapping and navigating.

FACE RECOGNITION AND TRACKING — Computer vision, Face recognition, ROS, Object detection and tracking
Developed an application deployed on a USB camera mounted on a pan-tilt unit that would recognize, and follow faces in the field of view.

SKILLS

Languages and frameworks: Python, OpenCV, Pytorch, ROS, Langchain, Transformers, Scikit Learn, Numpy, Pandas

Technology: Git, Docker, Bash, LaTeX

AI/ML: Statistics, Deep learning, Neural networks, CNN, Supervised learning, IRL, Robotics, Transformers, LLMs, RAG, Generative AI, Vector Databases, NLP, Prompt Engineering.