Chirag Karia

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Education

Master of Science in Computer Science — Graduated Dec 2023
Ontario Tech University — *Oshawa, ON*
- 4.06/4.3 Cumulative GPA
- Best Thesis Award Nominee

Bachelor of Engineering in Software Engineering — Graduated Apr 2019
Ontario Tech University — *Oshawa, ON*
- 1st Place in Electrical & Software Engineering Capstone Competition

Experience

Computer Vision Research Assistant — Sep 2019 – Dec 2023
Ontario Tech University — *Oshawa, ON*
- Researched prediction of future 3D human meshes based on historical video data. Developed a Transformer model resulting in a 10% improvement in long-term accuracy over prior state-of-the-art as measured by Mean Per Joint Precision Error.
- Leveraged the PyTorch profiler and cProfile to identify bottlenecks in training; implemented workarounds including caching of expensive data augmentations and parallelizing sequential tensor operations, leading to a 46% reduction in training time.
- Established an automated hyperparameter tuning pipeline with Weights and Biases Sweep functionality, enhancing model performance by 8% when compared against the same model architecture with default hyperparameters.

Teaching Assistant — Sep 2019 – Dec 2022
Ontario Tech University — *Oshawa, ON*
- Head teaching assistant for Computer Vision; collaborated with the professor to refine course materials for enhanced student engagement and entrusted by the professor to deliver lectures in their absence due to strong subject knowledge.
- Repeatedly garnered positive feedback from students on ability to present complex concepts in a succinct manner as exemplified by an end-of-term rating of 4.7/5 and a nomination for the Excellence in Teaching Assistance award.

Data Scientist (Part-Time) — Jul 2020 – Dec 2020
Mikkila AI — *Toronto, ON*
- Spearheaded development of a preliminary ETL pipeline to aggregate and standardize the highly unstructured COT report from the CFTC. Utilized Requests for retrieval, Pandas for data formatting, and PostgreSQL for storage.
- Collaborated with the technical lead and DevOps team to plan the distributed architecture for company's software system, ensuring scalability, reliability, and performance while optimizing technology selections.

Machine Learning Developer — Apr 2017 – Mar 2019
Investabit (now InvestDEFY) — *Whitby, ON*
- Reproduced published ML research relevant to finance & portfolio management; successfully built a reinforcement learning agent using tensorflow and RLlib that executes trades based on live data and market predictions.
- Reduced developer hours dedicated to ML model development by 20% through the creation of a Pandas based data pipeline that gathers data from disparate sources and unifies feature engineering for all teams.

Projects

M.Sc. Thesis: Predicting Multi-Person Dynamics from Video | *PyTorch, SMPL, OpenCV, NumPy, PyRender*
- A novel Transformer based model that can predict the future 3D meshes of multiple people in future unseen frames conditioned on video data. These 3D meshes capture the shape, pose, and location of each individual in the scene.
- Method leverages a novel GPT style Transformer architecture with a custom attention layer designed specifically to model human pose and identity based query/key projections to better contextualize multiple people simultaneously.

Technical Skills

Languages: Python, C++, C#, JavaScript, Java, Bash
Frameworks: Vue.js, Flask, Django
Libraries: PyTorch, MMDetection, WandB, Tensorflow, Keras, OpenCV, Pandas, NumPy, PyRender, Matplotlib
Developer Tools: SQL, Mongo.DB, Git, Docker, AWS