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CHIRAG KARIA

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EDUCATION

M.Sc. in Computer Science — **Ontario Tech University** — **Class of 2023**

- Three Minute Thesis Finalist
- Teaching Assistant Excellence Nomination

B.Eng. in Software Engineering — **Ontario Tech University** — **Class of 2019**

- Internet of Things specialization
- 1st Place in Electrical & Software Engineering Capstone Competition

EMPLOYMENT

Teaching Assistant — **Ontario Tech University** — **Sept 2019 - Dec 2022**

- Lead TA for Computer Vision; covered topics include Image Formation, Camera Calibration, Image Pyramids, Template Matching, Edge Detection, SHIFT descriptors, and Homography.
- Primarily tasked with running the laboratory component of course, receiving positive feedback from students on the quality and clarity of the content communicated with an average end-of-term rating of 4.7/5.
- Collaborated with the professor to design and revise course materials to enhance student engagement and assumed responsibility of delivering lectures in the absence of the professor.
- Other courses taught: Scientific Data Analysis, Mobile Devices, Web Application Development, Software Design & Analysis, and Computer Architecture.

Machine Learning Developer — **Investabit (now investDEFY)** — **Apr 2017 – Mar 2019**

- Responsible for reproducing published ML research relevant to finance and portfolio management; successfully built a reinforcement learning agent that executed trades based on live data and market predictions.
- Created an automated feature engineering pipeline to unify data sources for various ML models in production. Resulted in reducing developer time spent on model development by 20%
- Generated reports digesting market performance and model effectiveness into various tables and graphs to effectively communicate findings to teams leads and management.

PROJECTS

M.Sc. Thesis: Predicting 3D Multi-Person Dynamics from Video

- Developed an SMPL based model that can predict the shape, pose, and location of multiple people in future unseen frames based on input video data.
- Model leverages a GPT style transformer architecture with a custom attention layer that is augmented with a human pose specific inductive bias and identity based query/key projections to better contextualize multiple people simultaneously.
- Built with PyTorch, PyTorch3D, MMDetection, SMPL, OpenCV, Pillow, WandB

SMPLify 3D

- Extended the original SMPLify model by using paired 2D and 3D keypoints to fit a human mesh to an image.
- Original model uses only 2D keypoints and a weak-perspective camera, meaning it cannot estimate mesh depth, just shape and pose. Addressed this inability by using a differentiable renderer to optimize for the mesh location through the projection equation.
- This approach can be leveraged to generate pseudo groundtruth 3D mesh data to train subsequent models with accurate depth.
- Built with PyTorch, SMPL, OpenCV, Pillow, Numpy

LANGUAGES AND TECHNOLOGIES

- **Languages:** Python, JavaScript, Bash, C#, Java, C++
- **Libraries:** Pytorch, Tensorflow, Keras, OpenCV, Pillow, Pandas, Numpy
- **Tools:** Linux, Git, Docker, SQL, Mongo.DB