Hongyu Tu

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Education

University of Massachusetts Amherst — Amherst, MA
Master of Science in Computer Science — *Aug. 2021 – May 2023*

University of Maryland, College Park — College Park, MD
Bachelor of Science in Computer Engineering — *Aug. 2017 – May 2021*

Technical Skills

Languages: Python, C/C++, Java, MATLAB, SQL, Assembly, HTML, CSS
Tools & Libraries: Git, Docker, PyTorch, ROS, pandas, NumPy, Flask, Matplotlib, Seaborn, OpenCV, SciPy
Courses: Reinforcement Learning, Adv. Natural Language Processing, Deep Learning for Computer Vision/Graphics, Probabilistic Graphical Models, Data Science, ML Algorithms (Numerical Optimization, Statistical Estimation)

Experience

Machine Learning Engineer — Feb. 2024 – Present
LCE Optics — *Remote*
- Developing and optimizing deep learning-based feature extraction and matching pipelines to improve Visual SLAM performance for autonomous navigation, contributing to robust perception systems under real-world conditions.
- Enhancing perception accuracy through camera calibration and multi-sensor fusion.
- Applying RL in NVIDIA Isaac Sim/Lab with ROS 2 to train control policies in simulated environments.

ARVR System Research Assistant — June – Dec. 2023
Futurewei Technologies, IC Lab — *Austin, TX*
- Built real-time tracking and rendering systems using Azure Kinect DK, MediaPipe, and Unity.
- Created custom animation datasets and improved long-range finger/face tracking algorithms.
- Fine-tuned Transformers for motion prediction with temporal and spatial consistency.

Recommender System Research Assistant — Dec. 2019 – Jan. 2020
Tencent, News Feed Flatform Department, KanDian Team — *Shenzhen, China*
- Leveraged NLP techniques and internal data to improve recommender system performance.
- Analyzed real-time data streams to generate actionable insights for content personalization.

Projects

Bilimemenet | *Python, Hugging face, ByT5, Chinese Roberta, GPT-2, bilibili-api* — Jan. – May 2022
- Scraped over 1 million Danmu (live comments) from a Chinese video site Bilibili to form Danmu dataset.
- Proposed to extract in-jokes that are popular within different videos categories from the text-based comments using fine-tuned BERT, and generate Danmu that fits specified video categories.

Auto Crossy Road | *Python, PyTorch* — July – Dec. 2021
- Built an autonomous agent to play Crossy Road using deep learning, with modular design: object detection, state representation, and action generation.
- Developed a custom YOLO model with self-supervised labeling for real-time object detection, improving accuracy and reducing input complexity for downstream tasks.
- Trained a DQN using over 100 hours of gameplay data, outperforming supervised learning baselines and achieving faster convergence through efficient state-action modeling.

Robotic Arm Control with Reinforcement Learning | *c#, Unity ML-Agents* — Aug. – Dec. 2020
- Proposed to use the robot arm to interact with boxes on a table, maximizing the visibility by minimizing overlay while avoiding knocking anything to the ground.
- Used Unity library called ML_Agents to train for robotic arm's control policy in virtual environments.

Publication

H. Tu, S. Shorewala, T. Ma and V. Thost, **Retrosynthesis Prediction Revisited**, NeurIPS 2022 AI for Science: Progress and Promises, **2022**.