

# Hongyu Tu

240-706-6288 | [hongyutu@umass.edu](mailto:hongyutu@umass.edu) | [linkedin.com/in/h-tu/](https://www.linkedin.com/in/h-tu/) | [h-tu.github.io](https://h-tu.github.io)

## EDUCATION

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### University of Massachusetts, Amherst

*Master of Science in Computer Science*

Amherst, MA

Aug. 2021 – May 2023

### University of Maryland, College Park

*Bachelor of Science in Computer Engineering*

College Park, MD

Aug. 2017 – May 2021

## TECHNICAL SKILLS

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**Languages:** Python, C/C++, Java, MATLAB, SQL, Assembly, HTML

**Tools & Libraries:** Git, Docker, PyTorch, pandas, NumPy, Flask, Matplotlib, Seaborn, OpenCV, SciPy

**Courses:** Reinforcement Learning, Natural Language Processing, Deep Learning for Computer Vision and Graphics, Probabilistic Graphical Models, Data Science, Machine Learning Algorithms (numerical optimization, statistical estimation)

## EXPERIENCE

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### SLAM Research Assistant

*LCE Optics*

Mar. 2024 – Present

*Remote*

- Developing in progress. Topics: Visual Odometry, Deep learning-based feature extraction and feature matching

### ARVR System Research Assistant

*Futurewei Technologies, IC Lab*

June – Dec. 2023

*Austin, TX*

- Built real-time tracking & rendering system using Microsoft Azure Kinect DK, MediaPipe, Unity, Zeromq, etc.
- Defined custom file format for humanoid location and rotation data storage and created several datasets containing animations done by different avatars in such format
- Designed algorithms to improve the tracking accuracy for finger and face landmarks over long-distance
- Used transformer model to perform motion prediction using spatial and temporal information

### Recommender System Research Assistant

*Tencent, News Feed Platform Department, KanDian Team*

Dec. 2019 – Jan. 2020

*Shenzhen, China*

- Collected dataset with Tencent Internal Domain knowledge for better performance of the model.
- Used NLP techniques to improve the recommender system and generate insights with real-time data feed.
- Aimed to give user better article suggestion by predicting which one will be read the most beforehand.

## PROJECTS

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### Re-visiting Retrosynthesis | *Python, PyTorch, AiZynthFinder, PaRoutes*

Jan. – July 2022

- Evaluated the multi-step performance of 6 existing single-steps models for retrosynthesis analysis
- Augmented the data to form a new dataset and proposed new metrics for model evaluation
- Paper “Retrosynthesis Prediction Revisited” selected as NeurIPS 2022 Workshop paper

### Bilimemet | *Python, Hugging face*

Jan. – May 2022

- Scraped over 1 million Danmu (live comments) from a Chinese video site Bilibili
- 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

- Applied computer vision and reinforcement learning to play an arcade game called Crossy Road with three modules: game object detection, state representation generation, and decision making.
- Trained custom YOLO with Self-supervised labeling for real-time game object detection, enabling accurate identification of game elements, which is crucial for decision-making.
- Implemented state representation techniques to reduce input complexity, improving the model’s efficiency.
- Used over 100 hours of gaming session to train a custom Deep Q Learning network which outperforms supervised learning approaches

### Robotic Arm Control with Reinforcement Learning | *c#, Unity ML-Agents*

Aug. – Dec. 2020

- Proposed to use the robot arm to interact with objects to maximize the perception of the object during object identification through recovering the lost information caused by objects concealed by each other
- Used reinforcement learning library called ML-Agents to train for robotic arm’s control policy