Yijie (EJay) Guo

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Highlights

Interested in Artificial Intelligence (AI), Machine Learning (ML), Deep Learning (DL), Computer Vision (CV) and Graphics. 2-years' experience in AI and ML research and full-stack web development, game engine and gameplay development.

Educations

Master of Science in Applied Computing **University of Toronto** **Sept 2021 - Dec 2022 (Exp)**

Courses: Deep Learning, Trustworthy ML, Tools & Techniques for ML, Foundations of ML, etc.

Scholarship: The Vector Scholarship in Artificial Intelligence.

Bachelor of Science in Computer Science **University of Utah** **Jan 2016 - May 2019**

Courses: AI, ML, Computer Graphics, Image Processing, Web Architecture, Database Systems, Data Mining, etc.

Scholarship: The Wilford and Dana Druk Scholarship.

Grade: GPA 3.99 / 4.00, Graduated with **Summa Cum Laude**. Dean's List from Spring 2016 to Spring 2019.

Bachelor of Science in Economics **Shanghai University** **Sept 2007 - Jul 2011**

Research Experience

Trustworthy ML Project **University of Toronto, Ontario, Canada** **Sept 2021 – Dec 2021**

Data-free Training Data Reconstruction from Black-box Models [Python, Pytorch, Jupyter, ML, DL]

- Created a data-free reconstruction method for rebuilding training data out of black-box neural networks.
- Modified a new energy-based Generative Adversarial Network (GAN) to synthesize training data.
- Formulated a distance-free clustering method extracting most significant features in the latent space.
- Successfully recreated several visually identifiable digits of the MNIST dataset from black-box models.

Research Assistant **University of Utah, Utah, USA** **May 2018 – June 2020**

Shape Anomaly Analysis Project [Python, Pytorch, Jupyter, ML, DL, Computer Graphics, Medical]

- Built Shape Normality Metric for modeling normal skulls and identifying abnormal ones via neural networks.
- Integrated the ML pipeline for 3D data transformation, data engineering and model deployment.
- Tuned and tested hyper parameters via cross validations and achieved 85 - 95% accuracy.

Unmanned Aircraft Systems (UAS) and UAS Traffic Management (UTM) [C, AI, Robotics, Simulation]

- Coded the lane-based strategic deconfliction algorithm and passed formal verifications.
- Visualized UAS traffic in the UTM network and optimized the UAS network's speed and throughput.

Probabilistic Knowledge Base Implementation [Python, Matlab, ML, CV]

- Created an automation DL system detecting and recording videos with single moving object from a live camera.
- Extracted objects' sizes, colors and shapes as features using image processing techniques.
- Trained and converted a Decision Tree (DT) to a Probabilistic Knowledge Base (KB).
- Proved the converted KB was the original DT in explainable format with the same 95% classification accuracy.

Software Development Experience

Full-stack Developer **University of Utah, Utah, USA** **Mar 2019 – June 2020**

Shape Anomaly Analysis Web App Development [C#, JavaScript, Python, Web, AWS, ML, DL]

- Designed and built the **Shape Anomaly Analysis Project** website: (1) Users can upload skull CT scans and review anomaly ratings. (2) Researchers can upload and download datasets for physicians to review and label.
- Individually coded the entire web system of frontend, backend, 3D visualization, database and user management.
- Architected the ML pipeline and system and host it on a Flask server for handling DL analysis.
- Deployed all servers on AWS, published the website and had 100+ active users by June 2020.

Senior Software Engineer **Immortal Studio, Shanda Games, Shanghai, China** **May 2013 – Apr 2015**

Game Engine and Game Development [C++, Gameplay, Physics Simulation, Mobile, AI, Computer Graphics]

- Coded component-oriented animation module and optimized collision detection using dynamic space separation.
- Improved garbage collection to speed up resource loading by 70% and created AI behavior tree visualization tool.
- Engineered the gameplay, combat and character module on the mobile client.
- Programmed the player interaction module with finite state machines and AI gameplay behavior trees.

Skills

Programming Language: C++, C#, Python, Matlab, JavaScript, TypeScript

Web Dev & Database Sys: .Net Core, Flask, OAuth(Auth0), Angular, Reactjs, MongoDB, SQL Database Sys, Serverless

Amazon Web Services: Sagemaker & Studio, S3, Route53, EC2 & RDS, Elastic Beanstalk, Docker, Lambda

Others: Pytorch, Scikit-learn, Jupyter Notebook, Google Colab, Unity3D, Unreal4, OpenGL, Box2D