Ze Ming (Tommy) Xiang

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Skills

Languages: **Python**, **Java**, **JavaScript**, **C/C++**, **TypeScript**, **Kotlin**, C#, HTML, CSS, QML, SQL, Haxe, Lua, Bash, Emacs Lisp.
Frameworks: **PyTorch**, **Angular 2**, Node.js Express, Ionic, React, Bazel, Vue.js, TensorFlow, OpenGL, Qt Quick.
Tools: Git, Perforce, Emacs, Vim, Linux, Unity3D, G-Suite, Microsoft Office.

Education

University of Toronto | Computer Science Specialist | Honors Bachelor of Science **Class of 2021**
CGPA: 3.98/4.0, Dean's List Scholar every semester, President's Entrance Scholarship, Woodsworth College Scholarship

Upper-level Courses: Neural Networks and Machine Learning, Algorithm Design & Complexity, Software Engineering, Natural Language Computing, Introduction to Visual Computing, Computer Graphics

Professional Experience

- **Google LLC**, ***Software Engineering Intern*** 2020 Summer - Present
  - Designed and implemented **full-stack** solution enabling business intelligence visualization tool administrators to rapidly connect with an active user
  - Technologies: **TypeScript, HTML/CSS, SQL, Protobuf, Angular 2, Java**
- **NVIDIA**, ***Deep Learning Research Intern***, Toronto Artificial Intelligence Lab 2019 Fall - 2020 Spring
  - Supervised by **Sanja Fidler, co-founder of the Vector Institute, Director of AI at Nvidia, and Canada CIFAR AI Chair**.
  - Co-authored research project on novel representation for 3D deep learning, with paper submitted to **NeurIPS** (pending review)
  - Led research project for 3D asset generation from 2D images with minimal 3D supervision, using techniques including convolutional neural network, differentiable renderer, generative adversarial network, and Learned Perceptual Image Patch Similarity (LPIPS) loss
  - Developed modularized implementation of state-of-the-art point cloud classifier and differentiable renderer for **NVIDIA Kaolin**, the PyTorch library for 3D Deep Learning research, which gained more than **2,000 stars** on GitHub, with co-authored paper submitted to *arXiv*
  - Technologies: **PyTorch, Python, CUDA, OpenCV, NVIDIA GPU Cloud, Docker, CNN, GAN**
- **Google LLC**, ***Software Engineering Intern*** 2019 Summer
  - Designed and implemented **full-stack** data quality alert system for internal intelligence visualization tool used by more than **30,000** Google employees
  - Deployed into production and immediately used to notify users of critical data anomalies, saving significant cost from **25-35** data errors annually
  - Technologies: **TypeScript, Angular 2, Java, Node.js, Python**
- **Google LLC**, ***Software Engineering Intern*** 2018 Summer
  - Implemented **MVC structured**, accessibility-friendly user interface for layout formatting on Google Docs Android, reaching over **100 million users**
  - Technologies: **JavaScript, Java + Android, Google Closure, Bazel**

Technical Projects

- **Cellular** *2D Procedurally-Generated Game* **C/C++, OpenGL, Lua, SDL 2, Cpp-Taskflow, Fruit, Entt**
  - Designed and developed procedurally-generated 2D action & adventure game, achieved **1st place** in UofT Game-Making Deathmatch 2017
  - Implemented a high-performance, ECS-based, multi-threaded game engine in **C/C++** and **OpenGL**. Designed concurrent renderer with fully automatic sprite batching. Designed lock-free task graph system allowing near-maximum hardware utilization using topological sorting and RLF vertex coloring heuristic. Utilized template metaprogramming to auto-detect race-condition. Achieved simulation of up to **200000+** animated entities at **60fps**
- **Catalyzer** *Hybrid App for Time Management* **TypeScript, Angular 2, Ionic, HTML, CSS**
  - Implemented time-management hybrid app using **TypeScript**, leveraging **Angular 2** and Ionic, with automatic scheduling and reward system
  - Developed real-time constraint-based optimal schedule generation through ad-hoc greedy algorithms, tree-based ordered sets, and priority queues
  - Achieved generation of **365** days of future schedule with respect to **3000** constraints within **0.5s** on a mobile device
- **Emacs Client for TabNine** (github.com/TommyX12/company-tabnine) **Emacs Lisp**
  - Developed Emacs client for Jacob Jackson's code-completion system *TabNine*, which displays intelligent and relevant completions using deep learning
  - Implemented low-latency sub-process communication for candidate fetching, achieving **5ms** overhead per keystroke
  - Received more than **392 stars** on GitHub, and more than **8041** downloads on Emacs package archive
- **ShareSchedule** *Course Time-Table Generator* **JavaScript, Node.js + Express, PostgreSQL**
  - Developed web application and RESTful API for UofT time-table generation using Node.js + Express and PostgreSQL
  - Implemented backtracking constraint-satisfaction algorithm on pure client-side JS to solve for conflict-free schedules with **<100ms** latency
  - Interface with Cobalt-UofT API to retrieve relevant course info, as well as using Facebook login to allow time-table sharing between students

Awards and Contributions

- 1st Place - Bloomberg Codecon UofT 2017
- 2nd Place - Microsoft Code Competition UofT 2017
  - Solved one of the hardest problem
- 2nd Best Accuracy - (National) USC Competition 2017
  - Developed geo-tagging tool for drone mission
- Silver Medalist - (National) Canadian Computing Olympiad (Link) 2016
- Co-President of Game Design and Development Club 2017 - 2018
- 1st - UofT Game-Making Deathmatch 2017
  - Best Overall and Best Technical Achievement Award
- 3rd Place - Big Data Challenge 2016
  - Analyzed and visualized open data using Python
  - Journal Published on STEM Fellowship (Link)
- Vision Subdivision Lead of University of Toronto Aerospace Team: Aerial Robotics division 2017 - 2018