

# Patrick Lai

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## EDUCATION

### McGill University

B. ENG: SOFTWARE ENGINEERING

- GPA in Computer Science Courses: 3.93/4.00, Overall GPA: 3.33/4.00
- NSERC Industry Undergraduate Research Award: 2016, 2017
- Notable Courses: Applied Machine Learning, Operating Systems, Databases

Montreal, QC, Canada  
Expected December 2019

## EXPERIENCE

### CAE

SOFTWARE DEVELOPER INTERN

- Developed a framework to automate validation of flight simulation software, 3-D models, and environment renders using C#.
- Created multithreaded simulations for navigation, environment and weather servers using Java and Apache JMeter
- Reduced validation time of vehicle models and load testing from 2-3 days to overnight through integration into the automation software.
- Wrote scripts to allow the automation software to remotely connect to different servers without user configuration.
- Designed a GUI using Windows Forms to give users easy access to information about test packages and results

Montreal, QC, Canada  
September - December 2017

### Sensequake

SOFTWARE DEVELOPER

- Transformed the main application from a proof of concept to a software to be used by researchers, engineers and university professors
- Prototyped and implemented building health analysis algorithms in C# and MATLAB used to analyse over 300 buildings in Canada
- Improved user experience and accessibility by designing a custom ribbon interface in Visual Studio using WPF
- Built a web application using Node.js and MongoDB to let users submit, view and manage various analysis results
- Collaborated with a Cybersecurity firm to create a license activation and application protection system
- Improved 3D animation of largest building cases from 12 to 60 FPS by improving animation algorithm
- Optimized Stochastic Subspace Identification processes to reduce runtime of average test case from 2.5 min. to 40s

Montreal, QC, Canada  
May 2016 - September 2017

### McGill Robotics

SOFTWARE DIVISION MEMBER

- Stimulated competition environment using Gazebo and ROS in Linux
- Wrote AUV simulation plugins in C++ to mimic events and object movement

Montreal, QC, Canada  
September 2015 - May 2016

## SKILLS

**Programming:** C#, Java, JavaScript, Python, MATLAB, C, C++, SQL, PHP, Solidity  
**Software:** GIT, Visual Studio, REST APIs, Linux, MongoDB, Unity Engine, Azure  
**Frameworks:** Node.JS, React.JS, .NET, WPF, Windows Forms  
**Knowledge:** Data Structures and Algorithms, Object-Oriented Programming, Machine Learning, NLP

## PROJECTS

### Machine Learning Match Prediction

November 2017

- Used a neural network to predict how likely two people will be romantically compatible based off of socio-economic factors, age, and hobbies
- Trained a model using data collected from dating websites and a speed-dating study with over 10,000 training examples
- Created a web interface using HTML, CSS, and javascript to allow users to input features and view the likelihood of matches

### Open Source Gift Card System

March 2017

- Collaborated with engineers from LightSpeed and other students to build a gift card system for an ecommerce platform with over 10,000 users
- Created a responsive front-end UI using React.JS that allows users to purchase, validate, and add funds to cards
- Implemented an API in node.js and express.js to communicate with the main LightSpeed servers

### Autonomous Tower Building Robot – Software Lead

October - December 2017

- Divided tasks amongst members, managed GIT repository, report software team's progress with other division leads
- Designed and implemented detection and avoidance algorithms in Java to help the robot find blocks on a grid
- Produced code to maneuver lifting claw designed by the hardware team to collect blocks

### Anime Suggestions

October 2017

- Built a recommendation engine in Java that suggests Anime to users based on a list of ones they currently enjoy
- Used the OpenNLP library to parse synopses from MyAnimeList's API for keywords to formulate suggestions
- Designed a ranking algorithm based on number of related items, similarity factor and internet ratings

### What Should I do Today? – 2nd place at Angel Hack

June 2016

- Built a web app in JavaScript that allows users to explore tourist attractions around the world by clicking on a map
- Used Expedia's API to retrieve information and Google Maps API to show interactive panoramas of each destination