Jon Karakus

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EDUCATION

Queen's University — **Sept 2019 – May 2024**
Hons. B.ASc Electrical & Computer Engineering (ECE) — *Kingston, ON*

EXPERIENCE

Smith Engineering, AMSP Laboratory — **March 2024 – Present**
Machine Learning Researcher (Supervisor: Prof. Saeed Gazor) — *Remote*

- Researching supervised learning and data mining (**Python**) for audio datasets. Submitted IEEE conference paper.
- Collected **1200** speech samples for dataset, adhering to ethical guidelines set by Queen's Research and Ethics Board (QREB). The unique audio dataset will be published on IEEE DataPort to advance machine learning research.
- Developed high/low pass filter and **LMS** noise cancellation algorithms to prepare data for feature extraction.
- Implemented audio feature extraction methods to map and identify frequency components for ML model.
- Designed a parameter grid to optimize **SVM** model training and improve accuracy though **cross validation** tunning.
- Developing a 10-layer convolution neural network (**CNN**) using Keras, targeting above 80% f-score accuracy.

Thermo Fisher Scientific — **May 2023 – Aug 2023**
Engineering Specialist Intern (Equipment Engineering Team) — *Toronto, ON*

- Wrote and executed protocols for **~$2 million** of pharmaceutical processing and automated packaging machinery.
- Implemented a database (**SQL**) to collect pharmaceutical machine data automatically. Saved **~5 hours** per week of lab technologist time and eliminated human error.
- Organized **350+** engineering tasks and monitored team capacity metrics using PowerBI from data linked to Excel.

World Star Tech. — **May 2021 – Aug 2021**
Embedded Systems Engineer Intern — *Toronto, ON*

- Designed a portable spectrometer instrument using a Hamamatsu C12880MA module for manufacturing and QC.
- Developed unique spectrometer library to regulate channels, exposure, and delay time based on clock cycles.
- Utilized **Object Oriented Programming** (**C++**) to control components including LCD, spectrometer head, rotary encoder, and functional buttons. Interfaced with ESP32 microcontroller and connected through PCB.
- Designed and produced 2-layer **PCB** using **KiCAD** for spectrometer.
- Managed project using a Gannt chart in JIRA software and **reduced cost by ~25%** through bill of materials.

World Star Tech. — **May 2020 – Aug 2020**
Embedded Software Engineer Intern — *Toronto, ON*

- Designed a UV adhesive curing system using SolidWorks to mount optical lenses and motors onto laser products.
- Developed (**C++**) and assembled automated UV curing system with 6 servo motors using an Arduino microcontroller and Adafruit 16-channel pulse width modulation (PWM) shield.
- Enhanced manufacturing assembly line, yielding a **$10,500** weekly revenue increase by increasing part quantity.

PROJECTS

Speech Emotion Recognition using Machine Learning | *Python*, *Scikit*, *Numpy*, *Librosa*, *GitHub*, *MATLAB*

- University capstone project, achieving **~80%** f-score accuracy in speech emotion recognition across 4 emotions.
- Awarded **2nd place** among 60 competing groups and $1000 prize.

Engineering Blog | *HTML*, *CSS*, *JavaScript*

- Click "Engineering Blog" to see my projects in Control Systems, Digital Circuits, App Dev., Robotics, and more!

TECHNICAL SKILLS & INTERESTS

Languages:	C++, Python, Java, C, SQL, MATLAB, HTML, CSS, JS, Dart, NIOS II, VHDL
Technologies:	TensorFlow, Scikit, Keras, SourceTree, Git, VS, Android Studio, JIRA, PowerBI
CAD Tools:	KiCAD, Electric, LTspice, PSIM, SolidWorks, Sketch, AutoCAD, Quartus
Lab Equipment:	Oscilloscope, Function Generator, 3-D printer, Multimeter, Soldering, Laser Marker
Dev Boards:	ESP32, STM32f4-Discovery, Arduino, Raspberry Pi, Altera DEO
Interests:	Piano, Basketball Team Leadership, Community Fundraising, Multicultural Travel