

# Joseph Chan

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## EXPERIENCE

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### First-Year Innovation & Research Experience (FIRE)

College Park, MD

*Student Researcher, Capital One Machine Learning (COML) Stream*

*Aug. 2019 - Dec. 2020*

- Trained convolutional neural networks (CNNs), using Keras and TensorFlow, on various computer vision datasets: (1) custom CNNs on image classification dataset, (2) U-Net CNN on a semantic segmentation dataset, (3) Inception CNN with triplet loss on a face recognition dataset, and (4) VGG-16 CNN on in-house dataset of classmates' faces.
- Explored and investigated features influencing viewership on YouTube, suggesting certain title keywords, video categories and publish times lead to higher viewership.

### CBCM

Gaithersburg, MD

*Software Engineering Intern*

*June 2019 - Aug. 2019*

- Revamped the codebase (C#, Xamarin) for *Open Sesame*, a building access management app, to patch existing login vulnerabilities and make the app compatible with Android 8.1.
- Discussed and met regularly with technical and non-technical stakeholders to review design specifications, present progress updates, and obtain user experience feedback.

### U.S. Army Research Laboratory

Adelphi, MD

*Research Intern*

*June 2018 - Aug. 2018*

- Designed a gimbal adjustment algorithm (C++) for automatically reorienting laser communication gimbals in military vehicles, in order to maximize inter-vehicle signal strength in the battlefield.
- Developed a simulation environment to evaluate how quickly the algorithm could reorient a given gimbal to communicate with other gimbals in arbitrary orientations.

### U.S. Army Research Laboratory

Adelphi, MD

*Research Intern*

*June 2017 - Aug. 2017*

- Built a Python+LabOne based laser system to automate the laborious process of locating spin defects in silicon carbide samples.
- Created an intuitive GUI (Tkinter and Matplotlib) to help a team of physicists easily run the laser system and visualize their results with 3D plots, thus increasing labor savings.

## PROJECTS

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### Explaining the Predictions of BERT Language Models

June 2021 - Aug. 2021

- Trained BERT models for hate speech detection and sentiment analysis, using PyTorch and Hugging Face.
- Generated extractive explanations for BERT models' predictions, using attribution algorithms (integrated gradients, gradient\*input) in Captum.
- Analyzed BERT model explanations from different attribution algorithms by visualizing explanations as heatmaps.

### Extracting Insights from Twitch Streamer Data

Nov. 2020 - Dec. 2020

- Cleaned and analyzed data about the top 1000 Twitch streamers, including features like watch time and followers gained.
- Plotted Pearson correlation heatmaps and boxplots to visualize pairwise feature relationships, using Pandas and Seaborn. Discovered that the watch time per follower is unusually high for Thai-speaking Twitch streamers.

## EDUCATION

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### University of Maryland

College Park, MD

*BS in Computer Science, Minor in Physics*

*Aug. 2019 - Present*

- **First-Year Innovation & Research Experience (FIRE):** Accelerated undergraduate research program for students interested in machine learning. Students develop hands-on experience with using deep learning to solve problems in computer vision and NLP.
- **Relevant Coursework:** Machine Learning, Data Science, Linear Algebra, Algorithms, Discrete Structures

## SKILLS

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**Languages:** Python, Ruby, Rust, Java, JavaScript, HTML, CSS, C++, C#, Matlab, Bash

**ML Tools:** PyTorch, PyTorch Lightning, Neptune, Captum, Scikit-learn, TensorFlow, Keras, Google Compute Engine

**NLP/CV Tools:** Hugging Face, OpenCV, Imgaug

**Data Analysis Tools:** NumPy, Pandas, Seaborn, Microsoft Excel, Google Sheets

**Other Tools:** Git, Hydra, Docker, Google Colab, Gatsby, NodeJS, Django, PostgreSQL, SQLite, LabOne, Unity