Nicolas Fleece

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SUMMARY

I have proven professional experience utilizing PHP, Python, and Kotlin as well as extensive experience working with machine learning technologies such as TensorFlow, Scikit-Learn and PyTorch alongside typical data analysis tools Pandas and NumPy.I am able to quickly adapt to new technologies, languages, and challenges.

PROFESSIONAL EXPERIENCE

University of Ottawa / Teaching Assistant
SEPTEMBER 2020 - PRESENT, OTTAWA

Assisted students with tutorials, assignments, and labs. Graded deliverables and assignments and provided students with feedback. I was a teaching assistant for the following courses: Data Structures and Algorithms (Fall 2020, Fall 2021), Data Science (Winter 2021, Winter 2022), and WWW Structures & Techniques (Summer 2021).

Kegshoe / Web & Android Developer
SEPTEMBER 2018 - PRESENT, REMOTE

Worked with PHP, Kotlin, and HTML/CSS/XML in order to develop complex web and android applications for the keg tracking industry. Have also used REST API standards to develop inter-application APIs and services.

MC Countermeasures / Software Developer
JANUARY 2018 - APRIL 2018, OTTAWA

Worked with C# as well as XML on the high-tech IREWTS radar jamming software. This involved working with and testing on proprietary hardware as well as collaborating with electrical engineers in order to be able to ensure that it would function on production machines.

Public Services and Procurement Canada / Web Developer
MAY 2017 - AUGUST 2017, GATINEAU

Utilized the Drupal CMS to develop a charity auction website for the government, as well as customized the necessary features using PHP and JavaScript.

EDUCATION

University of Ottawa / Master of Computer Science in Applied AI
SEPTEMBER 2020 - PRESENT

Working with Professor Robert Laganiere on my thesis in the area of human action recognition using deep learning techniques. My thesis' primary point of interest is pose-based intermediate representations in order to allow for faster and simpler action recognition. Hold a 9.8 CGPA in all required courses.

University of Ottawa / Honours in Computer Science (Co-op)
SEPTEMBER 2015 - DECEMBER 2019

Completed my degree with a 7.55 CGPA (B+ or ~77%), as well as held an above 8.5 GPA for my final two full-time semesters (8.65 GPA or ~83%).

RESEARCH PROJECTS

CATSA Search Validation Action Recognition (Work in progress)
TensorFlow, PyTorch

Validated that various areas of a car were searched by security officers at airport entry gates. This was done through a two step process where I first utilized a state-of-the-art person detection model (ByteTrack), then passed that information along to a pretrained model (Resnet 3D) which was fine-tuned to match the use case of the task.

Pose-Based Action Recognition (Work in progress)
TensorFlow, PyTorch

Utilized exclusively 2-dimensional pose data in order to classify human actions. This was done through a small, novel convolutional network. This work was done in conjunction with WRNCH and is being developed as a part of my master's thesis.

Simple Models for Solving VQA
TensorFlow

Investigating VQA (Visual Question Answering, utilizing both image and text data to answer a question), it was found that many models were very complex and difficult to interpret, so we proposed two new styles of model. The first was a VAE-style model where we concatenated the image and text data. The second was a simple CNN-style model where the image and text data were combined and passed through a simple CNN. The results were negative, showing that model complexity is often needed for these types of issues.

Energy-GAN's Using Hopfield Energy Equations
PyTorch

Utilized the theory behind Hopfield network energy equations to replace the discriminator used in most modern GANs. The results were mixed, with most generators resulting in mode collapse; a combined discriminator and energy approach was determined to give better results.

Diabetes Dataset Exploration & Prediction
Scikit-Learn

Used a dataset looking at risks of hospital readmission rates in people who have been hospitalized for diabetes to find high risk factors in hospitalized patients. This data was then passed through several different models to attempt to determine if a model can correctly predict whether someone will be readmitted to the hospital. The results showed that most models were able to predict whether someone would be readmitted with approximately 70% accuracy. In addition, some unlabelled data was used for semi-supervised learning, which led to a slight increase in accuracy.

DNS Exfiltration Detection Using Machine Learning
Scikit-Learn

Worked with Professor Miguel Garzon at the University of Ottawa in order to detect when data is being exfiltrated through the DNS protocol. Utilized machine learning and a random forest classifier and achieved an F1-score greater than 99%.