Kumar

Hacker, Researcher, Engineer

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Summary

- **Specializations**: Information Security, Cloud Automation, Machine Learning
- **Background**: Certified Pentester with Software Engineering Experience
- **Software Engineering Experience**: Azure, Automation, Web Applications
- **Information Security Experience**: Pentesting, Threat Assessment, Incident Response
- **Machine Learning Experience**: Self Study and Independent Researcher with several projects at https://wxc.io

Skills

Software Engineering

Functional programmer with experience with all aspects of the software engineering workflow, including development, testing and deployment. Experience with a variety of programming languages, including Python, C#, Go, JavaScript, Elixir and PowerShell. Experience with a variety of industry standard development and DevOps tools, including Visual Studio, VS Code + Remote Development, Docker, Git, VSTS/VSO, etc. Experience building Azure based tools and applications including with Cognitive Services, Batch, Compute, App Service, Storage and more.

Information Security

Trained and experienced pentester with OSCP certification. Experience at multiple companies as a Red Team operator/consultant performing Pentests, Threat Profiling, Security Assessments, Incident Response and Remediation. Experience with standard industry tools and techniques, including Kali, nmap, Burp, OWASP Top 10, etc. Experience securing Azure based assests from time with Azure Red Team.

Machine Learning

Seven months of self directed machine learning study, including with fast.ai MOOCs, OpenAI Spinning Up, DeepLizard Reinforcement Learning, Python Programming Reinforcement Learning and reading research papers. Experience with Python, fast.ai, PyTorch, Ax, Jupyter Lab, OpenAI Gym. Completed several machine learning engineering and research projects which are available on https://wxc.io

Misc

Experience with full stack web dev with WebAPIs, SPAs and PWAs using VueJS, Phoenix + LiveView, Flask/Starlette, Neo4J and MonogoDB. Data Science experience with data collection, preprocessing and analysis, including Geographic Information Systems (GIS) analysis, using Python, Pandas, NumPy, GeoPandas, Folium, ArcGIS and Jupyter SciPy Stack. Experience in photography, woodworking, rock climbing, race car driving, racing drone piloting, 3D printing, roleplaying gamemastering and general approximate knowledge of many things.

Experience

Machine Learning Study, Research and Development – Self Study, Jul 2019 - Current

- Self study of current machine learning techniques and research, including deep learning and reinforcement learning
- Completed fast.ai: Pratical Deep Learning for Coders and Deep Learning from the Foundations
- Studying Reinforcement Learning, including OpenAI Spinning Up and DeepMind Reinforcement Learning series
- Completed several machine learning engineering and research projects, available on https://wxc.io
- Projects include self built virtualized GPU rig, pet breed detector, eyetracker, interview chat bot and mind control drone flight

CrowdStrike Red Team Consultant – Senior Consultant, Professional Services, CrowdStrike, Jan 2019 - Jul 2019

- Executed pentests, red teaming and incident response services
- Wrote reports, created cloud assessment offerings and performed client scoping and readout calls
- Researched and developed tools, techniques and procedures and integrated them with existing processes

Azure Red Team Operator – Software Security Engineer I, Azure Red Team, Microsoft, Apr 2017 - Jun 2018

- Performed network and cloud based pentest operations against Azure teams and services
- Wrote reports, filed security bugs and performed pentest readouts with Azure teams
- Performed security assessments, created threat profiles and remediation plans
- Researched real world threat actors and aligned tools, techniques and procedures for adversary emulation
- Developed and maintained red team automation tools using C#, PowerShell, Python and Azure

Automation and Tools Engineer – Software Engineer II, Bluetooth SIG, Apr 2015 - Jan 2017

- Created and maintained 5+ ongoing automation projects using C#, .NET and Selenium
- Developed and maintained tools using C#, F#, JavaScript, Python, .NET Core and Azure
- Performed data analysis and generated reports using Python, R, Google Analytics and raw data
- Contributed to an experimental Bluetooth Gateway project, wrote whitepaper on device virtualization
- Mentored and trained junior programmers, defined coding style guides and technology stacks
- Lead and performed security testing for multiple projects, filed and verified security related bugs

Cloud Network Engineer – SDE/SDET Hybrid, Cat Daddy Games, Dec 2013 - Feb 2015

- Created load testing suite to perform client emulation load testing for three titles
- Created and maintained Azure logging and health testing tools for all Cat Daddy titles
- Created and maintained browser based CRM tools for the Cat Daddy support team
- Maintained and added functionality and gameplay features to Azure based game servers

Education

Self Study

fast.ai: Pratical Deep Learning for Coders
Course completed with self directed projects

fast.ai: Deep Learning from the Foundations
Course completed with self directed projects

DeepLizard: Reinforcement Learning Series
Study of core reinforcement learning techniques

Python Programming: Reinforcement Learning Series
Study of core reinforcement learning techniques

OpenAI: Spinning Up
Ongoing study of advanced reinforcement learning techniques

Reading

Life 3.0: Being Human in the Age of Artificial Intelligence

AI Superpowers: China, Silicon Valley, and the New World [...]

Superintelligence: Paths, Dangers, Strategies

The Fourth Age: Smart Robots, Conscious Computers, and [...]

Artificial Intelligence: Confronting the Revolution

The Big Nine: How the Tech Titans and Their Thinking [...]

Human + Machine: Reimagining Work in the Age of AI

The Hundred-Page Machine Learning Book

Certifications

Offensive Security Certified Professional
Achieved Jun 2016 after completion of Pentesting with Kali

Data Science Dojo Bootcamp
Achieved Sep 2015 after completion of one week bootcamp

Incomplete - Data Science Specialization
John Hopkins University via Coursera, completed 9/10 core courses with projects 2014, capstone pending

Academic

Incomplete - M.Sc. Computer Science
Georgia Institute of Technology, OMSCS, Accepted 2016, Dropped out 2017 due to new career opportunity, intending to reenroll in future

B.Sc. Game and Simulation Programming
Graduated Jun 2013

Notable Projects

Interview Bot

Interview Bot is built and trained to act as a virtual interview candidate. Built using two Azure Cognitive Services offerings: QnA Maker and Web App Chat Bot, the bot's knowledge base was built with predefined questions and answers, then fed into the QnA maker service which trains a model to be able to intelligently answer the questions. This model is then passed along to the Web App Chat Bot, which provides the interface for being able to query the model with user input and present the responses. Found online at https://wxc.io/projects/interview-bot

WhatBreed

WhatBreed is a tool for detecting the breed of your pet from over 100 of the most popular dog breeds identified by the American Kennel Club and the 25 most popular cat breeds identified by the Cat Fanciers Association. Built using fast.ai and data from Oxford Pet Dataset, Stanford Dogs Dataset as well as other data sources, the backend is a Dockerized webserver built with Python and Starlette hosted on Render. The frontend is built using VueJS as a Progressive Web App, which is acessible via the browser or installable on mobile devices. Found online at https://whatbreed.ai

Webcam Gaze Tracking with Neural Networks

An gaze tracking application built to take raw webcam frames to predict the gaze of a user on the screen. Built using fast.ai, the project trains a neural network with two pretrained ResNet branches. The first network receives frames from the webcam while the second is trained on a calibration image, a composite of the user looking at different locations during calibration time. The results show that it is possible to use a neural network to perform gaze tracking without specialized hardware or complex code. See the active project log online at https://wxc.io/projects/eyetracking.

EEG Mind Control of Virtual Drone

A work in progress, this project attempts to build a system to allow a user to fly a virtual racing drone using their thoughts via an EEG headset. To accomplish this, a regression neural network is trained to take recordings of the user flying a drone using a flight controller while wearing an EEG headset. Mark I research is complete with Mark II underway with primary focus on improvement of data recording. See the active project log online at https://wxc.io/projects/eyetracking.

Spiking Neural Networks in Elixir

A work in progress, this project builds a Spiking Neural Network in Elixir using GenServers, Phoenix PubSub and LiveView to simulate realtime neurons. The main design of the network architecture is complete with the current focus on improving interoperability with Python and data science libraries. See the active project log online at https://wxc.io/projects/eyetracking.

Self Hosted Virtual GPU Lab

Created a headless self hosted GPU lab at home from scratch. Hardware sourced and assembled after research into ideal specifications for home lab while leveraging modern GPU features. Hosted on Ubuntu, the host holds a GPU VM with PCI passthrough as well as other VMs. The GPU VM has support for both direct GPU usage as well as Dockerized applications with GPU support. Currently running a Jupyter Lab Docker container with PyTorch for machine learning workloads. Performs significantly better and more cost effectively than comparable cloud GPU vendor options.

Virtual Tabletop

A virtual tabletop prototype built using the new Elixir Phoenix LiveView technology which merges the backend and frontend into one programming model using WebSockets, so that the the backend can automatically update the frontend state without user code. Design includes a very light frontend using VueJS, PixiJS and PDFJS to handle rendering of the virtual table while the Elixir backend handles all virtual table, seat and game logic.