Constantin Petrescu

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SKILLS

Technical Skills: C/C++, Python, ML libraries (Keras, TensorFlow, PyTorch), Data Visualisation (MatPlotLib, Plotly), Database (MySQL), Web Development, DevOps (Git, Docker, AWS, Slack Integrations), Build systems (gn, ninja), Testing systems (PyTest, Nose2), Compiler (Clang, LLVM, TypeScript, Python Interpreter)

WORK EXPERIENCE

Software Engineer, *Freelance* 2017 – 2024

- Developed sentence transformers and LLM models to evaluate semantic similarity between functions
- Developed various websites, such as a responsive flight tracking website using agile principles; Stack: Front-end: CSS, JS, jQuery; Back-end: Node.JS; Database: MySQL; Data gathering was done using a Node.JS web crawler

PhD Projects, *University of Surrey* 2019 – 2023

- Dynamic Analysis Tool to Identify Untested Functions
    - Tool that executes Python integration tests (PyTest, Nose, Tox) to identify tested and untested functions
    - Created a statistical model with 80% accuracy to identify functions that require integration testing
- Static Analysis Tool to Evaluate C++ Type Conversions
    - Created a custom compiler pass for Clang to parse C++ files and extract type conversions
    - Developed model to evaluate security and quality of type conversions with 81% precision and 90% recall
- Static Analysis Tool to Identify Optimal Data Structures
    - Developed a C++ tool integrated with LLVM compiler to identify and rewrite optimised data types
    - Used genetic algorithms to identify the most optimal data structures or library interface optimisations
    - Improved three open-source libraries up to 16.09% CPU usage, 27.90% runtime, and 2.74% memory

Research Intern, *UCL* 2018 – 2019

- Developed an AI coding co-pilot for C/C++ using a neural network to predict multiple tokens and improve code completion; Data gathering was done through NLP by building a Clang plugin to process open-source projects

Software Engineer Intern, *Emotech* 2017

- Improved the architecture of existing scrapers to allow multiple scrapers to gather data at the same time. Increased the speed of scraping by 30x and added functionality to make it easy to run and manage
- Set up a set of servers on AWS capable of auto-scaling according to the usage demand

EDUCATION

University of Surrey, *PhD Computer Science* 2019 – 2023

- Supervisor of Final Year Projects for BSc and MSc, and Research Summer Internships

Royal Holloway, *MSc Information Security* 2018 – 2019

University College London, *BSc Computer Science* 2015 – 2018

PROJECTS

Smarter Code Completion – UCL final year project 2017 – 2018

- Added a feature in code completion for TypeScript to predict external API calls using Neural Network ML model

PUBLISHED WORK

Bimodal Vetting of Integration Tests. 2023
C. C. Petrescu, S. Smith, A. Butler, R. Giavrimis, S. K. Dash. *Under review*

Do Names Echo Semantics? A Large-Scale Study of Identifiers Used in C++'s Named Casts. 2023
C. C. Petrescu, S. Smith, R. Giavrimis, S. K. Dash. *Journal of Systems and Software from Elsevier*

Genetic Optimisation of C++ Applications. 2021
R. Giavrimis, A. Butler, C. C. Petrescu, M. Basios, S. K. Dash. *ASE Late Breaking Results Track.*

INTERESTS

Hackathons: Microsoft UCL Data Science Challenge – App that predicts sleep quality using ML model (**top 5 apps**)
Interests: Basketball (college team), Bouldering, Gym, Rubik's Cubes (solving 3x3 in under 40 seconds), Chess