# Tyler Liddell

Sacramento, California | tliddell13@gmail.com | (530) 908-5676 | GitHub | Website

## EDUCATION

**City University of London, UK (2020 – 2024)**

*MSci Computer Science: Average: 69 (second class honors) ≈ 3.7 GPA*

- **Topics covered:** Data structures, algorithms, OOP, functional programming, databases, deep learning, machine learning, computer vision and natural language processing (NLP).
- **Research:** During my time at City University, I have cultivated a strong interest in Natural Language Processing (NLP) and Language Models. Through independent research, I have gained hands-on experience evaluating and fine-tuning open-source large language models like Llama-2, Mpt, and Mistral on various NLP tasks. I have explored advanced techniques such as transfer learning, prompt engineering, and few-shot learning for efficient model adaptation. Additionally, I have implemented benchmarking pipelines using Python libraries like Hugging Face and Pytorch to measure model performance across datasets. My research in this domain has allowed me to develop strong technical skills in language modeling and a deep understanding of state-of-the-art NLP methods.

## TECHNICAL SKILLS

- **Languages:** Strong in Python, Java, C++, SQL Proficient in Haskell, HTML/CSS, JavaScript, PHP
- **Tools:** GitHub, XCode, Linux, SLURM, Bash Scripting, Visual Studio, MATLAB
- **Libraries/Frameworks:** Pytorch, NLTK, Spacy, Transformers, React, Flask, Pandas

## SOFTWARE DEVELOPMENT PROJECTS

- **Pach.ai app:** As part of a collaborative effort, I contributed to the development of Pach.ai, a cross-platform application built with React Native. Leveraging a REST API and integrating a third-party service for scraping bank transactions, our team implemented a unique feature that calculates personalized carbon emission scores based on user spending habits. This innovative solution demonstrates my proficiency in React Native development, API integration, and implementing third-party services to deliver practical and environmentally conscious applications.
- **Jon-Mick Game:** Developed a 2D platform game using Java and a game development library. Implemented game mechanics, level design, and character controls. Applied object-oriented programming principles and software engineering best practices.

## RESEARCH PROJECTS

- **Word order in LLMs:** For my Master's dissertation I conducted research investigating how Large Language Models process language structure, evaluating multiple open-source models across benchmarks (MMLU, TruthfulQA, GSM8K). Developed comprehensive testing methodology using systematic word-order perturbations, revealing models maintain performance even with shuffled text. Demonstrated that current benchmarks may not effectively measure true language understanding, as models relied heavily on keyword associations rather than semantic comprehension. Results contributed key insights about LLM limitations and the need for more robust evaluation methods.
- **SMS spam detection:** Developed and evaluated multiple machine learning models using Continuous Bag-of Words (CBOW) and other NLP techniques to accurately classify SMS texts as spam or legitimate.
  Implemented data preprocessing, feature extraction, and model training pipelines. Achieved 98% accuracy on holdout test set.
- **Emotion analysis:** Performed fine-grained emotion classification on a dataset containing 5 emotions (anger, joy, etc.) using MATLAB. Developed and evaluated machine learning models to identify nuanced emotional states from text data, building upon techniques from sentiment analysis. Implemented data preprocessing, feature engineering, and model training pipelines. Explored various algorithms and architectures such as TFIDF, decision trees, and random forests.

## WORK

**Starbucks (2016 – 2024)**

- Embracing the role at Starbucks has been transformative for my soft skills. I've honed my communication abilities to a high standard, thriving in interactions with customers. Juggling work alongside my studies was demanding yet rewarding, notably refining my time management skills.