THANHTHANH NGUYEN

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Education

California Institute of Technology September 2022 – Expected June 2026
Computer Science, BS, GPA: 4.1 *Pasadena, CA*

Relevant Coursework: Data Structures, Software Design, Discrete Mathematics, Linear Algebra, Multivariable Calculus, Applied Linear Algebra, Intro to Computing Systems, Learning Systems

Professional Experience

Computational Linguistics Research June 2023 – October 2023
California Institute of Technology *Pasadena, CA*

- Utilized the Kanerva network mathematical model to investigate the rigor of the "Principles and Parameters" linguistics framework in Python under the guidance of Professor Matilde Marcolli, developing a strong command of a specialized Sparse Distributed Memory (SDM) library used to generate the network.
- Collected focused sets of syntactic parameters for processing, used for comparative analysis based off existing research results.
- Discovered a robust link between subject-verb-object word order parameters across languages, with a less pronounced link for negation-related parameters, by analyzing language parameters' popularities and their connections to syntactic variations.
- Performed system administration tasks and researched library installation methods to maintain project consistency.
- Began process of updating existing research repository to ensure compatibility with the latest stable release of the SDM library.

Projects

Geometry Dash Remixed March 2023 – June 2023
California Institute of Technology *Pasadena, CA*

- Developed a physics engine in a 4-person team using C and SDL2 to implement and simulate Newtonian physics principles, and applied it to user-oriented gameplay in a 5-level remixed replica of Geometry Dash, introducing dynamic visual elements and immersive auditory effects.
- Implemented a web application of the final game using Emscripten to maintain cross-platform compatibility.

Analysis of Probabilistic Models July 2022 – August 2022
California Institute of Technology *Pasadena, CA*

- Collaborated in a two-person team on a Python project, focusing on the usage of Markov chain Monte Carlo methods in answering probabilistic questions under the mentorship of Dr. Robert Webber for the Freshman Summer Research Institute (FSRI) program.
- Utilized Gaussian sampling approach to simulate n-ball volumes and validate current findings for multidimensional geometry and its applications.
- Conducted simulations of random walks, investigating their mathematical properties and practical implications in various fields.

Sentiment Detection Model for Natural Language March 2020 – June 2020
Personal Project *Oakland, CA*

- Conceptualized, designed, and implemented a sentiment analysis program in Python to determine the emotional tone (positive or negative) of textual content, and allowed for user input capabilities and analysis of real-time texts.
- Employed the Bag-of-Words model as the foundation for text representation, effectively transforming textual data into numerical features.
- Used natural language processing (NLP) libraries and techniques to preprocess and prepare text for analysis.

Specialized Skills

Programming Languages: Python, C, C++, Java, JavaScript
Technical Skills: NumPy, Pandas, PyTorch, Tensorflow, Git, Firebase, Android Development, Web Development
Languages: English, Vietnamese, French

Other Experience

Student Admissions Ambassador May 2023 – Present
California Institute of Technology *Pasadena, CA*

- Responding to inquiries and interacting with prospective students and their families regarding the Caltech undergrad experience via phone calls and in-person interactions in an office environment.
- Leading Caltech campus tours, showcasing its facilities, and providing information on academic offerings to visiting students and parents.