

Duy Nguyen

[Email](#) | [LinkedIn](#) | [GitHub](#) | [Portfolio](#)

TECHNICAL SKILLS

Languages: Python, Latex

Frameworks: Pytorch, Tensorflow, Flask, Chainlit, Streamlit, Neo4j, Deep Lake

Developer Tools: Git, Jupyter Notebook/Lab, Google Colab, VS Code

Libraries: pandas, NumPy, Matplotlib, seaborn, plotly, pydantic, llamaindex, langchain, transformers, sklearn

ML/AI Concepts: Clustering, Regression, Classification, Time Series, Optimization, Regularization, Feature Selection

Advanced Techniques: DNNs, NLP, Generative AI, Recommendation Systems, Ensemble Methods

PROFESSIONAL SUMMARY

- Accomplished AI/ML cohort with a UC Berkeley professional certificate, whose capstone project was selected as both a program exemplar for future cohorts and marketing material showcasing the impeccable quality of UC Berkeley-Emeritus online education
- Proficient in large-scale data processing and analysis using Python libraries including Pandas, NumPy, Plotly, Seaborn, Matplotlib, scikit-learn, and TensorFlow
- Skilled in translating complex data analysis into actionable business insights and strategic recommendations
- Developed a medical AI chatbot prototype for Voronoi Health Analytics, significantly reducing manual report retrieval times for CT and MRI scan analytics by 50%
- Shortlisted in the Top 4 for the SFU CS Diversity Award developing AI Immigration Chatbot, demonstrating innovative problem-solving and cross-functional collaboration
- Achieved top-tier ranking (12th place) in Kaggle's Embryo Image Classification competition, showcasing proficiency in deep learning model optimization

EDUCATION

UC Berkeley College of Engineering and Haas School of Business

Professional Certificate in Machine Learning and Artificial Intelligence

Remote

July 2024

Simon Fraser University

Bachelor of Arts in Economics and Data Analysis

Burnaby, BC

Dec 2022

EXPERIENCE

AI Engineer

Mar 2024 – October 2024

Simon Fraser University Blueprint

- Transform Canadian Immigration Consultant using AI knowledge Retrieval Engine (Shortlisted Top 4 SFU CS Diversity Award)
- Resolved persistent hyperlink functionality issues in AI chatbot, improving user experience and information accessibility
- Engineered integration of hyperlinks into Neo4j graph database, utilizing vector embedding for efficient retrieval and incorporation
- Collaborated with front-end engineers to implement parsing solution for AI-generated hyperlinks, bridging gap between backend and frontend systems
- Demonstrated cross-functional problem-solving skills, enhancing chatbot's practical implementation and overall performance

Volunteer Software Developer

Jan 2024 – May 2024

Simon Fraser University Faisal Lab

- Developed a retrieval augmented generation software that translates doctors' natural language requests into JSON, streamlining access to CT and MRI scan analytics through the DAFs application
- Eliminated the need for medical professionals to memorize complex codes for report retrieval, potentially saving hours of manual reference time per week
- Utilized Python and frameworks such as Llama Index and the OpenAI API to develop the software, enhancing efficiency and accuracy in processing natural language to JSON conversion

PROJECTS

Optimizing Marketing Campaigns for Customer Subscriptions | UC Berkeley

Jun 2024

- **EDA and Visualization:** Conducted comprehensive exploratory data analysis, revealing key insights such as higher subscription rates for university-educated customers and a significant class imbalance favoring non-subscribers
- **Model Evaluation:** Compared four models (Logistic Regression, Decision Tree, KNN, SVM) and identified SVM as the top performer with the highest accuracy and AUC, despite higher computational costs
- **Feature Importance Analysis:** Utilized permutation feature importance for SVM and Logistic Regression, identifying 'num_emp.var.rate', 'num_duration', and 'num_cons.price.idx' as top features
- **Strategic Business Recommendations:** Suggested maintaining call durations within 6-8 minutes, reducing campaign contacts, and optimizing re-contact timing to enhance subscription rates

What drives the price of a car? | UC Berkeley

Apr 2024

- **Utilized Advanced Analytics:** Applied Lasso and Ridge regression and PCA + KMeans in a used car valuation project to identify key pricing factors, enhancing my ability to refine insurance risk assessment models
- **Relevant Variables for Insurance Pricing:** Discovered the significant impact of odometer readings and vehicle age on car prices, crucial for setting accurate insurance premiums based on risk profiles
- **Economic Insights for Strategic Adjustments:** Analyzed how rising fuel prices and changing interest rates affect vehicle sales, providing insights for insurance companies to adjust coverage and premiums in anticipation of market shifts
- **Targeted Insurance Products:** Identified distinct consumer preferences through segmentation analysis, enabling the design of tailored insurance offerings to meet diverse needs, such as premium packages for luxury vehicles or economical options for older cars

Embryo Image Classification | Kaggle

Nov 2023

- Fine-tuned the ResNet50 model for embryo image classification using Python and PyTorch, enhancing accuracy and efficiency in algorithm development and machine learning implementation
- Achieved a 57.1% accuracy rate and ranked 12th Place on leader board, demonstrating the effectiveness of the deep learning model and optimization techniques

PUBLICATIONS

Nguyen, D. (2024). *Geometric Implicit Regularization: Duy Integral Theorem*

([Click here to view full paper](#))(Independent, non-peer reviewed).

- Proposes a measure-based PDE framework (the “Duy Integral Theory”) to explain why gradient-based training in overparameterized neural networks favors flat, generalizing regions.
- Models the parameter space as a continuum with a time-evolving measure under gradient flow, demonstrating that sharp directions are exponentially suppressed while flat submanifolds retain measure.
- Refines the theory by incorporating the effects of label noise and finite-step training, showing that even moderate curvature can emerge yet still yield strong generalization.
- Introduces the concept of **geometric engineering**: demonstrating that architectural and regularization choices can amplify the intrinsic mechanism of high-dimensional gradient flow to suppress sharp directions, thereby counteracting the force of noise and steering solutions toward flatter regions.
- Provides formal proofs for the existence and uniqueness of the measure evolution, supported by technical lemmas and empirical validations that connect the theoretical predictions to observed flat minima.

Nguyen, D. (2024). *Exponential Neuron Networks: A PDE-Inspired Approach to Neural Architecture Design.*

([Click here to view full paper](#)) (Independent, non-peer reviewed).

- Introduces the Exponential Neuron Network (ENN), a novel architecture inspired by PDE solving techniques (method of characteristics), incorporating exponential activations
- Proves ENN’s universal approximation capability, extending classic results to this new architecture.
- Empirically demonstrates ENN’s competitive performance in time series prediction and classification tasks
- Analyzes ENN’s robustness and efficiency in capturing exponential patterns, suggesting promising directions for PDE-inspired neural network designs