Kritthika Shanmugam

Portfolio: https://kritthikashanmugam.com/
LinkedIn: www.linkedin.com/in/kritthikashanmugam

Email: kritthika.shan@gmail.com
Mobile: +1 425-439-6938
GitHub: https://github.com/Kritthika

Education

- **City University of Seattle** — Seattle, WA
  Master of Science in Computer Science; GPA: 4.0 — *Oct 2023 - June 2025*
  Courses: *Full Stack and Web development(Mobile app), Software Engineering, Discrete Mth/Algorithms computing, Programming for Computing, Machine Learning/Deep Learning, Artifical Intelligence for Data Science, Cloud Computing Overview*

- **Kongu Engineering College, Anna University** — Tamil Nadu, India
  Bachelor of Engineering - Electronics and Communications Engieering; GPA: 8.5/10 — *July 2016 - June 2020*
  Courses: *Problem solving and programming(C Language), Object Oriented Programming(C++)*

Skills Summary

- **Programming Languages**: Python, C++, C, SQL, R, HTML, CSS, JavaScript
- **Frameworks and Libraries**: Scikit, TensorFlow, Keras, OpenCV, Pytorch, React, Flask, Bootstrap
- **Development Tools**: Jupyter, GIT, Github, MySQL, NoSQL, Anaconda, VSCode, RStudio, Power BI, Docker
- **Technologies**: Password Hashing (Flask-Bcrypt), OTP Implementation (PyOTP), MFA, TOTP
- **Cloud Platforms**: Web, AWS (EC2, RDS, S3, Route 53)
- **Operating Systems**: Linux, Windows

Project Experience

- **Drowsy Driver Detection**: (Python, VSCode, TensorFlow, Kaggle Dataset, Machine Learning, CNN) (April '24)
  - Engineered a Drowsiness Detection System utilizing (Convolutional Neural Network) CNNs to analyze 726 eye images.
  - Implemented a 4-layer CNN architecture, integrating convolutional and pooling layers to improve accuracy in real-time detection of drowsiness indicators such as eye closure.
  - Incorporated data augmentation technique to zoom into eye movements of individuals wearing glasses, thereby increased CNN model accuracy by 35 percentage points.

- **Credit Card Fraud Detection**: (R, RStudio, VSCode, Kaggle Dataset, Fraud Detection) (Jan '24)
  - Designed and optimized a Decision Tree model in R for fraud detection, achieving 99.44% accuracy and 77.78% precision.
  - Mitigated class imbalance in a Kaggle dataset of 284,807 transactions, enhancing model effectiveness by undersampling the majority class.
  - Achieved an AUC of 0.886, indicating strong discrimination in fraud detection using ROC metrics.

- **React Native Weather Application** : (React Native, Weather API, Axios, AsyncStorage, NavigationContainer) (Oct '23)
  - Implemented 4 main features: Daily forecasts, Sunrise/Sunset times, Humidity levels, and UV index, to provide a user-friendly weather app with comprehensive functionality.
  - Provided with real-time weather forecasts with hourly updates and a 3-day outlook.
  - Incorporated a visually appealing GIF background and interactive UI for enhanced user engagement.

- **A Secure Multi-Factor Authentication System**: (Python, Flask, Flask-Bcrypt, SQLAlchemy, PyOTP, Docker) (Dec '24)
  - Developed a Flask-based backend with secure password hashing (Flask-Bcrypt) and 30-second refreshing OTPs using PyOTP for multi-factor authentication.
  - Designed a frontend with HTML, CSS, and Bootstrap, and containerized the system with Docker for scalable deployment.
  - Analyzed 4 different MFA - YubiKey, Google Authenticator, Azure MFA, and Duo Security, and chose Google Authenticator for its ease of integration and reliability.
  - Implemented modular architecture using Flask blueprints and secure database management with SQLAlchemy.

Publications

- **A Study On Detection Of Tuberculosis From Chest X Ray Images And Microscopic Images Based On Deep Learning Techniques(SVM, CNN, Deep Learning, Matlab)**: (Feb '20) LINK
  - Reviewed 20+ resources for tuberculosis research, focusing on CNN model development to combat overfitting using MATLAB, resulting in SVM and CNN accuracies of 73.9862% and 91.8892%, respectively.
  - Employed morphological opening with discrete wavelet transform for noise reduction and segment chest X-ray images.
  - Leveraged GLCM for texture feature extraction, enhancing accuracy in spatial relationship assessment.
  - Applied these methods to classify COVID-19 chest X-ray images, achieving superior results with a CNN accuracy of 94.48%, specificity of 92.45%, and sensitivity of 95.95% compared to SVM.

Honors and Awards

- Selected for Deans list in graduate work for Fall 23-24, Winter 23-24 and Spring 23-24 at City University of Seattle.
- Secured 3rd rank amongst one million students in class 10 Tamil Nadu state (India) board exams.