Thasanka Kandage

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Education

University of Alberta **Sept 2021 - Apr 2026**
Software Engineering, BSc Co-op Program *Edmonton, AB*

Experience

Undergraduate Research Assistant **Aug 2024 - Present**
University of Alberta - Renewable Thermal Laboratory *Edmonton, AB*

- Implementing multi-objective optimization for storage efficiency and temperature uniformity of a liquid-based volumetric solar thermal receiver using genetic algorithms and MATLAB
- Developing a Physics-Guided Neural Network to predict experimental outputs of a volumetric solar receiver by integrating theoretical outputs from a physics model with the system input features
- Built Python scripts to collect, process, and structure experimental and simulation data, improving readability and ensuring compatibility with machine learning algorithms
- Leading a team of two junior members in developing Python scripts for data collection and processing, while mentoring them in machine learning concepts, and understanding the overall sustainable energy system

Machine Learning Engineer **Jan 2024 - Aug 2024**
Hub for Neuroengineering Solutions *Lethbridge, AB*

- Applied and tested CNN and Vision Transformer models for object detection and tracking, achieving a mAP@50-95 of 93%
- Designed an annotation tool using a pre-trained model to assist with bounding box annotations, improving speed by retraining on new data, and eventually automating the process
- Utilized unsupervised learning methods, including t-SNE for dimensionality reduction, DBScan for clustering, and convex hull analysis for boundary identification, to identify diverse images and improve data selection and training quality
- Prepared monthly shareholder updates to communicate project milestones, model performance, and key recommendations

Projects

Software Team Member | University of Alberta Robomaster **Sept 2024 - Present**

- Creating a Python program using OpenCV and ROS for the retrieval of camera calibration parameters
- Constructing an auto-aiming algorithm using computer vision techniques to determine 3D target positioning

UFC Dataset and Fight Prediction Model

- Scraped 4,000+ fighter profiles, 650+ event records, and 7,500+ fight statistics from the UFC website using BeautifulSoup
- Constructed and tested various machine learning algorithms, such as Random Forest Classifiers, SVMs, and XGBoost for predicting fight outcomes achieving accuracies of 80%, and utilized grid search and bayesian optimization for fine-tuning
- Performed data preprocessing and exploratory data analysis to identify key data relationships for feature selection

NBA Game Prediction Model

- Developed a binary classification model and tested three different algorithms: SVMs, Balanced Random Forest Classifiers, and Neural Networks. Achieved an F1 score of 62% and made use of grid search for hyperparameter tuning
- Performed extensive feature engineering and preprocessing, including data cleaning, feature selection, and developing rolling averages (5, 10, and 25 games) as input features for the model

AI Sudoku Solver

- Built a Convolutional Neural Network for digit detection, automating number extraction from Sudokus
- Demonstrated proficient knowledge in computer vision techniques such as contour detection, blurring, thresholding, perspective warping, and histogram equalization for image preprocessing
- Designed a Sudoku solving algorithm using a recursive backtracking approach

Software Team Member | EcoCar Autonomous Programming Competition **Feb 2022 - March 2022**

- Collaborated with team members to research and test path planning algorithms, such as Dijkstra's and RRT
- Developed and deployed a user-friendly tool for quick and accurate coordinate retrieval based on distances

Technical Skills

Languages: Python, MATLAB, SQL, Java, C/C++, R, Rust, Assembly, JavaScript, HTML/CSS

Developer Tools: GitHub, Firebase, MongoDB, Docker, GCP, Kubernetes, AWS SageMaker, Azure AI, Tableau, PowerBI

Libraries: Pandas, NumPy, OpenCV, PyTorch, TensorFlow, scikit-learn, Matplotlib, CUDA, seaborn, BeautifulSoup, PyQt