

# Thasanka Kandage

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## Education

### University of Alberta

Software Engineering, BSc Co-op Program

Sept 2021 - Apr 2026

Edmonton, AB

## Experience

### Undergraduate Research Assistant - ML & Optimization

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, Assembly, JavaScript, HTML/CSS

**Developer Tools:** GitHub, Firebase, MongoDB, Docker, GCP, Wandb, AWS SageMaker, MLflow, Tableau, PowerBI

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