Harsha Vardhini Vasu

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EDUCATION

Master of Science in Computer Science | University of Texas at Dallas | Richardson, TX | May 2021

Selected Coursework: Natural Language Processing, Computer Vision, Artificial Intelligence, Machine Learning, Special topics in CS: CNN

Bachelor of Technology in Computer Science | Amrita Vishwa Vidyapeetham | Coimbatore, India | April 2019

Selected Coursework: Intelligent Systems, Database Management System, Machine Learning and Data Mining.

EXPERIENCE

Undergraduate Student Researcher | Amrita Vishwa Vidyapeetham | Coimbatore, India | June 2018 – July 2019

- Developed a rainfall prediction application to predict average monthly rainfall for each district in Tamil Nadu, India, using location-based analysis.
- Built regression models using Decision Tree, Random Forest, XGBoost & 7 other regression methods on each district's data.
- Used Elbow method to identify the ideal number of clusters and grouped districts with similar rainfall patterns using K-Means clustering & training regression models on the grouped data
- Combined regression model using ensemble techniques such as Blending. The best hybrid ensemble model achieved an EVS of 0.911.
- **Technology Stack:** Pandas, Scikit-Learn, NumPy, SciPy, Collections, Matplotlib, Itertools. **Links:** [PDF, GitHub]

SKILLS

Proficient: Python, C, SQL, HTML, CSS | TensorFlow, Keras, Scikit-Learn, NumPy, Pandas, Pickle, Matplotlib, SpaCy | Git, GitHub | Latex

Intermediate: R, LISP, Prolog, C++, Java, JSP | PyTorch, NLTK, SciPy, OpenCV, Flask | Docker | Apache Tomcat

PUBLICATIONS

- Estimation of Rainfall Quantity using Hybrid Ensemble Regression: ICACC (Scopus Indexed) | February 2020
- Forecast of Rainfall Quantity and its Variation using Environmental Features: IPACT (Scopus Indexed) | January 2020

PROJECTS

Detecting Winking faces | Computer Vision Project | April 2021 – May 2021

- Built a model using MTCNN (Multi-Task Cascaded CNN) and Cascade Classifier to detect people's faces who are winking in photos and videos.
- MTCNN was used to detect faces, and five key points in the human face and cascade classifiers are used to detect eyes.
- Heuristics were built using these features to filter faces that are winking from the faces detected by MTCNN.
- **Tech Stack Used:** OpenCV, Numpy. **Links:** [GitHub]

Information Extraction Application | Natural Language Processing (NLP) Project | March 2021 – May 2021

- Built an NLP pipeline to extract BORN, ACQUIRE, and PART_OF templates from a large text file & output the extracted Information in a JSON file.
- Templates were extracted using following NLP features: Lemmas, Parts of Speech (POS) tags, dependency parse, wordnet features (Holonyms, meronyms), Named Entity Recognition (NER), Pattern Matcher.
- **Tech Stack Used:** Spacy, NLTK. **Links:** [GitHub]

EfficientNet from scratch for Image Classification | CNN Project | March 2021

- Designed and built an EfficientNet for Image Classification task and got an accuracy of 71%.
- Built each building block of the network, including Inverse Residual Block and Squeeze-and-Excitation Block from scratch.
- **Tech Stack Used:** PyTorch, Numpy, Matplotlib. **Links:** [GitHub]

Neural networks from scratch | December 2020 - February 2021

- Implemented all building blocks of Dense Neural Network (DNN) from scratch using NumPy for a cat classifier - 80% Test accuracy.
- Implemented all building blocks of Convolutional NN (CNN) from scratch using NumPy for Sign classification - 78.3% Test accuracy.
- Built a Residual Network (ResNet) based CNN from scratch for classifying Numerical Hand Signs - 86.6% Test accuracy.
- **Tech Stack Used:** Keras, Numpy, Matplotlib, TensorFlow.

Neural Machine Translation with Attention Mechanism | February 2021

- Developed an application to translate all formats of human-readable dates to machine-readable format (YYYY-MM-DD).
- Used Bidirectional LSTM Encoder, Unidirectional LSTM Decoder model, and Bahdanau Attention for developing Neural Network.
- Optimized the output using Adam optimizer and visualized attention weights learned by the network.
- **Tech Stack Used:** Keras, Numpy, Matplotlib, TensorFlow.

LEADERSHIP

Anokha National Techfest | Amrita Vishwa Vidyapeetham | Event Manager | December 2017 - February 2018

- Led a team of 6 to organize a Machine Learning and IoT Workshop for 61 participants - 82% of the participants provided a 100% satisfaction rate.

Executive Member | ASCII Technical Club | Amrita Vishwa Vidyapeetham | June 2018 - April 2019

- (One of the few active members of the club) helped organize multiple events like quizzes and workshops throughout the year.
- Spokesperson of a introductory python workshop for junior students - 46 participants & 80% of them wanted to have an advanced python workshop.