Vardhan Dongre

1112 S Second St. #B203, Champaign, IL 61820

✉ vdongre2@illinois.edu +1 (217) 721-2870

EDUCATION

University of Illinois — Thomas M. Siebel Center for Computer Science, *Urbana-Champaign, IL*
Master of Science in Computer Science, GPA: 4.00 / 4.00 *Aug. 2020 – May. 2022*

University of Illinois — Grainger College of Engineering, *Urbana-Champaign, IL*
Master of Science in Civil Engineering, GPA: 3.76 / 4.00 *Aug. 2018 – Aug. 2020*

National Institute of Technology, *Bhopal, India*
Bachelors of Technology in Civil Engineering, GPA: 8.92 / 10.00 *Jul. 2013 – Apr. 2017*
Awarded Medal of Excellence for Academic Performance

WORK EXPERIENCE

Brunswick Corporation I-Jet Lab, *Champaign, IL*
Computer Vision & Deep Learning Engineer Intern *May. 2021 – Aug. 2021*

- Developed a scalable Azure ML pipeline for automated data labeling & augmentation for perception algorithms
- Proposed and **Patented** stereo vision based wave pattern recognition and early warning system
- Developed a multi-modal semantic segmentation framework to be deployed on prototype perception system of autonomous boats
- Technologies worked on: Sensor Fusion, LIDAR and point cloud learning frameworks, Stereo Vision, ROS, RTMaps

Illinois Solar Decathlon, *Champaign, IL*
Structural Engineer & IOT Developer, Build Team *Aug. 2018 – May. 2019*

- Developed structural designs for Gravity framing, lateral load resisting system & connection details of a modular building
- Developed IOT home automation software system for controlling HVAC, water supply and power for the smart home
- Developed new design documentation which increased the revenue savings by $130,000

ACADEMIC APPOINTMENTS

Course Director, Data Curation Program
Aug. 2021 – Present.

- Developed modules on PII Encryption strategies, Data anonymization, identifying bias in data and methods to tackle bias.
- Worked on developing curriculum on improving interpretability and explainability of deep learning models specific to the computer vision tasks.
- Organized the coursera platform for lecture delivery and wrote backend code for autograding notebooks on coursera.
- Handled a staff of 6 TAs and 12 graders during Fall 2021

Graduate Teaching Assistant
May. 2019 – Dec. 2020

- **CS 598, Data Curation**, Fall 20
  Lead TA for Data Curation course, assisted in instructing students on abstraction in data management, strategies for data transformation, transcoding and management of heterogeneity.
- **CEE 201, Systems Engineering & Economics**, Spring 20, Fall 19
  Instructed students on topics related to Integer programming, Dynamic Programming, Graph Theory, Optimization, Uncertainty & Decision theory
- **BADM 275, Fundamentals of Operations Management**, Fall 19
  Instructed students on topics related to decision making frameworks and techniques for effectively and efficiently managing operations
- **BADM 588, Business Practise Immersion**, Summer 19
  Instructed students on problem solving in an industry project based coursework.

RESEARCH & ACADEMIC PROJECTS *

Deep Learning based Structural Topology Optimization,
University of Illinois,, Urbana-Champaign *Jan. 2019 – May. 2019*

- Curated and processed binary image data obtained from Finite Element Solvers for developing a database of images
- Developed a fully deployable Autoencoder and U-Net based architecture for segmentation and predicting topologies

Developing Engineering Designs for Solar Smarthome, DOE Project,
University of Illinois, Urbana-Champaign *Sept. 2018 – Dec. 2019*

- Developed structural designs and home automation features for the solar smart house in Champaign city
- Working with a team of 100+ students on constructing structure in Champaign city and deploying smart technology

Detecting spoofed audio for preventing attacks on ASV systems [PPT] [Report],
python, pytorch *Aug. 2021 – Dec. 2021*

- Implemented end2end residual framework as baseline for classifying frontend audio features like Constant Q Cepstral coefficients, Inverted Melfrequency cepstral coefficients and Linear frequency Cepstral coefficients
- Proposed a novel architecture based on ResNet50 and Squeeze Excitation blocks trained on fused features obtained using attentional feature fusion mechanism that outperforms baselines

Deep Learning Assisted Camera Pose Estimation for Visual Odometry [Code] [Report] ,
python, pytorch *Aug. 2020 – Dec. 2020*

- Implemented the classical SIFT and RANSAC algorithms for estimation of camera pose for KITTI dataset
- Compared the classical approach with Deep Learning model for pose estimation based on SuperPoint

Detecting Deepfake Videos by Exploiting Spatio-Temporal Information [PPT] [Report],
python, pytorch *Aug. 2020 – Dec. 2020*

- Implemented 3D CNN based ResNets to learn spatio temporal features from video volume for detecting deepfakes on DFDC dataset as benchmark
- Achieved a 0.92 F1 score outperforming several baseline detectors

Full stack web development: UIUC MarketPlace [Code],
mysql, php, javascript, apache, html, css *Jan. 2020 – Feb. 2020*

- Built an e-commerce website for UIUC students for trading and purchasing commodities on campus
- Designed the relational database of users and developed the client database on server
- Developed the front-end and back-end of the sign-up and user login system for the website

Cloud Detection and Masking on NASA's Terra MODIS satellite images using Deep Learning [Code] [Viz],
pytorch, sckit-learn, fastai *Feb. 2020 – Mar. 2020*

- Explored binary pixel labelling and image segmentation approaches for developing baseline models
- Developed U-Net based novel architecture for detecting clouds in NASA's MODIS cloud mask product
- Model achieved 0.95 F1 score and was winning entry in NCSA-NVIDIA AI Hackathon

Performance Predictors for Meta-Learning and AutoML [Kaggle],
python, tensorflow, keras *Aug. 2019 – Dec. 2019*

- Developed a performance predictor model for a competitive deep learning challenge
- Developed a RNN using tf and keras that takes as input model architecture and hyperparameters and predicts its final performance with 97% accuracy.

Forecasting AAPL stock prices using Time series analysis in R ,
R, astsa *Sep. 2019 – Dec. 2019*

- Developed an ARIMA model to forecast Apple stock prices using data from Yahoo Finance.
- Performed multiple statistical checks for parameter estimation and model diagnostics to predict for stock prices for future time steps in RStudio.

Sentiment Analysis of IMDB Movie Reviews [NLP] [Code],
pytorch, NLTK, word2vec, GloVe, LSTM *Oct. 2019 – Oct. 2019*

- Trained Language Models for sentiment analysis & fake review generation of IMDB Large movie review dataset

* Refer website/Github for other works

COURSEWORK

Vision & Graphics: Computational Photography, Advanced Computer Vision, Machine Learning for Signal Processing
ML Theory: Machine Learning, Pattern Recognition, Adversarial Machine Learning
Applied AI: Deep Learning, Applied Machine Learning, Autonomous Decision Making, ML for Systems, Networks and Privacy

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SKILLS

Mathematics: Graph Theory, Probability Theory, Optimization, Statistical Modelling, Calculus and Finite Element Method
Machine Learning: XGBoost, PCA, Clustering, GLM, Ensembles, E-M, GMM, HMM
Deep Learning: Segmentation, NLP, Transfer Learning, CNN, VAE, Sequence Models, DDQN, A3C
Programming Languages*: Python(4), Shell Scripting(4), SQL(3), R(3), C++(3), PHP(3), Java(2)
Tools & Libraries: Scikit-learn, Pytorch, Tensorflow, Pandas, Matplotlib, NumPy, Jupyter Notebook, Google colab
Github/Web : Github/Web
* Proficiency on a scale of 1 (lowest) to 4 (highest)

AWARDS / HONORS

Graduate Assistantships (University of Illinois, Urbana-Champaign): Awarded full tuition waiver with stipend for Graduate Research and Teaching Assistant positions
Department Medal of Excellence (National Institute of Technology, Bhopal): Awarded Silver Medal for achieving rank 2 in class of 2017