Vardhan Dongre

Data Science | Structural Engineering | Project Management
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EDUCATION

University of Illinois — Grainger College of Engineering, *Urbana-Champaign, IL*
Master of Science in Civil Engineering *Aug. 2018 – Aug. 2020*
Coursework: Machine Learning, Deep Learning, Applied Machine Learning, Autonomous Decision Making, Statistics and Probability II, Database Systems,Finite Element Method, Earthquake Engineering, Structural Dynamics, Structural Mechanics, Steel Design II, Concrete Design II, Topology Optimization (Independent Study)
GPA: 3.73 / 4.00

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

WORK EXPERIENCE

Illinois Solar Decathlon, *Champaign, IL*
Structural Engineer & IOT Developer, Build Team *Aug. 2019 – May. 2020*
- Developed structural designs for Gravity framing, lateral load resisting system & connection details of a modular building
- Developed state of the art IOT home automation system to be installed in the solar smart home
- Developed design documentation and presentation of the design for the showcase at NREL, Golden, Colorado which won seed funding of $130,000 from NREL

University of Illinois, *Champaign, IL*
Graduate Teaching Assistant *May. 2019 – May. 2020*
- Assisted in course evaluation, handling student queries and partial instruction of course content
- Designed homework problems, exam content and course review materials
- Assisted undergraduate students in learning fundamental programming skills

Ministry of Housing & Urban Affairs, *Bhopal, India*
Engineering and Site Operations Intern, CPWD *May. 2016 – Aug. 2016*
- Performed structural analysis of deep beams and Post Tensioned slab designs for public buildings
- Prepared and presented structural peer review report for residential structures

TEACHING EXPERIENCE

Graduate Teaching Assistant
Apr. 2019 – May. 2020
- **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 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 the structure in Champaign city and deploying smart technology

Comparative study of GIS data, Ground surveying and Remote Sensing,
National Institute of Technology, India *Aug. 2016 – Dec. 2016*
- Developed digital elevation models in ArcGIS for assessing ground topology under survey.
- Performed image analysis using ENVI on satellite imagery provided by CartoSat.

ACADEMIC PROJECTS

Performing a comparative study between XLNet and BERT,
pytorch *Jan. 2020 – Feb. 2020*

- Compared XLNet and BERT models by fine-tuning the parameters on 18 fundamental tasks of XLNet.

Cloud Detection and Masking on NASA's Terra MODIS satellite images using Deep Learning,
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
- The project was the winning entry in NCSA-NVIDIA AI Hackathon

Performance Predictors for Meta-Learning and AutoML,
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.

Implementation of Deep Image Prior ,
python, pytorch *Aug. 2019 – Dec. 2019*

- Implemented the findings from Deep Image Prior Research by formulating inverse problems of inpainting, super-resolution, denoising and reconstruction of images as optimization problem

Distributed Training of Deep Learning Models on Supercomputer ,
pytorch, cuda *Aug. 2019 – Aug. 2019*

- Implemented a deep ResNet to train for CIFAR100 based on technique of transfer learning
- Performed synchronous and asynchronous distributed SGD training using CUDA

Deploying GAN for synthetic image generation using ACGAN & Wasserstein GAN,
pytorch *Sept. 2019 – Sept. 2019*

- Trained discriminator/generator pair on CIFAR10 utilizing techniques from AC GAN and Wasserstein GAN for learning synthetic images that maximized class output scores.

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

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

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.

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*: MATLAB(4), Python(4), Shell Scripting(4), SQL(3), R(3), C++(3), Java(2)
Cloud Computing Platforms: Google Compute Engine, AWS, Microsoft Azure
Tools & Libraries: Scikit-learn, Pytorch, Tensorflow, Pandas, Matplotlib, NumPy, Jupyter Notebook, Google colab
Version Control: Git, Github
Github repositories: Github
* 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
Deans List (2014, 2015): Included in the Deans list amongst high performing students of the academic year

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PUBLISHED RESEARCH: Structural Engineering

- Analyzing Utility of Component Elements of Outrigger System [Paper]