Abichal Ghosh

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Education

Arizona State University Aug. 2022 – May 2024
Master of Science, Computer Science *GPA - 3.96/4.00*

Birla Institute of Technology and Science, Pilani Aug. 2018 – May 2022
Bachelor of Engineering, Computer Science, First Division *GPA - 8.65/10.00*

Technical Skills

Languages: Python, C, C++, JavaScript, Java, MATLAB, HTML 5, CSS, Bash, MySQL
Tools: D3, React, Git, AWS, DynamoDB, TensorFlow, Pytorch, NumPy, SciPy, scikit-learn, Pandas, Linux, CUDA
Subjects: Data Mining, Natural Language Processing, Data Visualization, Semantic Web Mining, Cloud Computing, Data Structures & Algorithms, Software Design, Computer Vision, Artificial Intelligence, Operating Systems, DBMS

Experience

Machine Learning Engineer Intern May 2023 – Dec 2023
501CThree.Corp *Michigan, USA*
- Refactored and debugged existing code for data collection from Raspberry Pis resulting in improved efficiency.
- Implemented a new streamlined distributed system with separate folders and AWS DynamoDB tables to enable simultaneous real-time data collection and upload from multiple Raspberry Pis across 4 different locations.
- Detected anomalies for enabling accurate failure detection in the data collected from the Raspberry Pis.
- Utilized AWS Cloudwatch and lambda triggers to create a real-time warning system based on detected anomalies.
- Trained a classification model with 85.7% accuracy on data with effective interpolation of missing values.

Machine Learning Research Intern Aug 2021 – Dec 2021
Computer Vision Center (CVC, UAB, Spain) *Barcelona, Spain*
- Analyzed image compression codecs and Variational Autoencoder(VAE) models to identify areas for improvement.
- Visualized the Filters of the 1st layer of the models, and examined the other layers of the models using PCA, CKA, Canonical Correlational Analysis (CCA), Singular Vector Canonical Correlational Analysis (SVCCA), etc.
- Improved the size and the performance by evaluating a prototype, achieving an average improvement of 47.5%.

Machine Learning Intern May 2020 – June 2020
RRSC West, NRSC, ISRO *Rajasthan, India*
- Generated and exported 500+ Satellite Images from Google Earth Engine using JavaScript & Data Augmentation.
- Utilized DeepLabv3+ and UNet for high-res Satellite Image Segmentation to detect Solar Farms and Sand Dunes.
- Achieved autonomous target detection for the precise tracking and monitoring of solar farms and sand dunes.

Projects

Effect of Honest Examples in LLM | *Python, LLMs, PEFT, Finetuning* Aug 2023 – Dec 2023
- Generated a diverse dataset consisting of 800 'unsafe' questions in the format of the Alpaca dataset.
- Finetuned the Llama 7-billion model using PEFT-LORA on subsets of the curated dataset to evaluate the effect of incorporating 'unsafe' questions on the model's ethical and safety consideration.
- Evaluated the generalizability and conservativeness of the finetuned models on "Do not answer" and "LLM attacks" dataset with the highest generalizability accuracy of 92.27% and highest coservativeness accuracy of 90%.

Effective Image Watermarking | *Python, Pytorch, Computer Vision, GANs* Jan 2023 – May 2023
- Curated a diverse dataset of 12779 watermarked images comprising of 6 different watermark variations.
- Utilized YOLO v5 and U2Net for precise watermark detection and GANs for the successful watermark removal.
- Assessed watermark robustness via SSIM, with the top variation exhibiting a 16.4% increase over the basic version

Cloud System Visualization with Behavioral Lines | *Javascript, D3.js, AWS* Aug 2022 – Dec 2022
- Leveraged a dataset with 1440 data points, containing 5 performance metrics of multiple clusters of AWS servers.
- Developed an interactive and flexible visualization using D3.js consisting of 4 charts to analyze the highly complex and correlated cloud computing dataset.

Publications

[1] **Ghosh, A.**, et al. 2023. Industrial Revolution 4.0 With a Focus on Food-Energy-Water Sectors. In Encyclopedia of Data Science and Machine Learning (pp. 2199-2210). J. Wang, Ed. IGI Global. DOI: 10.4018/978-1-7998-9220-5.ch131