ABHISHEK KUMAR

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SKILLS

Languages : (**Proficient**) Python, C++, SQL, (**Familiar**) Java, Go.
Libraries/ Cloud : PyTorch, TensorFlow, OpenCV, NumPy, Pandas, Scikit-Learn, Git, Docker, Flask, AWS, GCP.
Computer Vision : Stereo, Epipolar geometry, Homography, Rotation, Calibration, SIFT, Constrained Convolution.
ML/ DL : Regression, Classification, PCA, SVM, Random Forest, XGBoost, CNN, Transformers, GANs.
Databases : MySQL; MongoDB; Oracle; Solr, Elasticsearch

WORK EXPERIENCE

Computer Vision Researcher, IAD (SemaFor SRI-UB team) Sept 2022 – Aug 2023

- Implemented JPEG compression analysis and trained a model to **classify** manipulated images with 94% accuracy.
- Created a module to **localize** and predict manipulated regions in images using noise and edge level features
- Trained YOLO-v8 model with 0.69 F1 score on custom dataset to **detect** small object in manipulated regions.
- Containerized the application using Docker and setup end-to-end CI/CD pipeline on Gitlab.
- Developed a tool that can perform controlled entity replacements in long texts using Python, SpaCy and NLTK.
- Detected inconsistencies in multimodal news articles with entity mismatch and contradiction detection algorithms.
- Designed a linear model over CLIP features that analyzes generated images and predicts aesthetic sores.

Teaching Assistant, (CSE 701/702) , University at Buffalo June 2022 – Aug 2022

- Guided students to develop deep learning projects with ML design patterns for video analysis in sports domain.
- Conducted classes, graded assignments, and reviewed students' technical presentations.

Software Engineer - Data, Infosys Feb 2018 – Aug 2020

- Developed employee task delegation system to manage production workflow data using Python and React.
- Built REST API to parse delegation data from JSON files received in hourly batches with Flask and Python.
- Designed scripts to extract, parse and transfer millions of parts data across 6 pricing interfaces using PLSQL.
- Reduced batch transfer failure rate by 20% by automating and monitoring batch jobs using RPA and Appworx.
- Built pricing page that shows available dependent and independent part prices from our database in Java.
- Managed deployment and maintenance pipelines for system availability and reliability using Jenkins and Git.

EDUCATION

Masters in Computer Science and Engineering, (University at Buffalo, GPA - 3.72/4.0) Sept 2021 - Aug 2023

- Courses : Computer Vision, Machine Learning, Deep learning, Video Analytics, Distributed Systems, Algorithms
- Thesis: Forensic Methods to Detect Manipulated News Media. Link: https://github.com/abhinine4/news_forensics

PROJECTS

Temporal Action Spotting, (PyTorch, Transformers, NumPy, Matplotlib, Boundary Regression, Action Classification)

- Achieved 5th rank in SoccerNet competition among 50+ participants for classifying 17 action classes and identifying temporal boundaries with 52% mAP using a Transformer + ResNet model with multiscale RGB features.

Ear Hair-Cell Detection and Counting, (Python, Template Matching, Non-max Suppression, Dbscan Clustering)

- Successfully detected and extracted damaged inner and outer ear hair cells to measure deafness in animals using supervised and unsupervised machine learning algorithms.

Player Re-Identification, (Pytorch, C++, transfer learning, ResNet, OpenPose, Bilinear Pooling, Batch Norm, Triplet Loss)

- Increased baseline player re-identification score in broadcast soccer videos by 6%, using a dual branch deep learning model with appearance and body part features extracted by ResNets and an OpenPose subnetwork.

Automatic Panoramas, (Python, KNN, Homography, Ratio Testing, RANSAC, OpenCV, Linear Algebra.)

- Developed an automated algorithm that can stitch stereo image pairs using SIFT features and projective transformation to build seamless panoramas.

Other Projects,

- Camera calibration, Camera Pose Estimation, Point Cloud Segmentation, Object Tracking, Image Morphology.

CERTIFICATIONS

- Distributed Deep Learning with Horovod, NVIDIA, June 2022
- Computer Vision with OpenCV and Deep Learning, Udemy, Jan 2021