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SOURABH KULHARE

PROFESSIONAL SUMMARY

Artificial Intelligence research engineer with over 8+ years of experience in developing advanced AI algorithms for complex problem-solving and innovative applications. Proficient in Python, TensorFlow, PyTorch, and LLM Ops with a strong ability to lead and mentor teams towards achieving innovative solutions. Passionate about leveraging advanced AI techniques to drive impactful advancements.

EMPLOYMENT HISTORY

2020 - PRESENT

Machine Learning Research Engineer, Global Health Labs , Bellevue

- Leading advanced machine learning initiatives across multiple projects.
- Developing a **self-supervised learning** framework for training a vision **foundational model**.
- Implementing **state-space-modeling** (MAMBA) training pipeline for efficient and scalable video analysis.
- Used **LLMs**, **RAG**, and **LangChain** to fine-tune a model on daily financial news for end-of-day stock market prediction.
- Leveraged open-source large language models (**LLMs**) to classify scientific journal categories.
- Designing experiments to leverage **generative models** (DCGAN, Cyclic GAN, Diffusion Models) for data synthesis and domain adaptation.
- Mitigated risks in **AI** technology for estimating hemoglobin (**Hgb**) levels using **hyperspectral** imaging.
- Mentoring associate ML scientists by creating opportunities, setting impactful paths, and communicating clear goals.
- Working with clinicians and subject matter experts to design data collection protocols.
- Partnering with hardware manufacturers to implement efficient deep learning algorithms for low-compute use cases.

MAY, 2017 - JUL, 2020

Associate Machine Learning Scientist, Intellectual Ventures Laboratory, Bellevue

- Designed **YOLOv7** and **DINO V2**-based image quality frameworks to filter out sub-optimal images.
- Developed an algorithm using MFCC features, **LSTM**, and a multiple instance learning (**MIL**) framework to predict Tuberculosis (TB) from cough **audios**.
- Developed a suite of algorithms for diagnosing lung abnormalities using image/video classification, motion estimation, and quantity estimation.
- Delivered **AI** technology to a hardware partner for submission to the **FDA** for approval.
- Experimented with deep learning architectures such as Single Shot Detector (**SSD**), EfficientNet, Spatial Transformer Networks (**STN**), and Long Short-Term Memory (**LSTM**).
- Deployed a highly accurate, **low-latency** deep learning algorithm on two different hardware solutions.

DEC, 2016 - MAY, 2017

Deep Learning Graduate Researcher, Rochester Institute of Technology, Rochester

- Engineered a **multi-model** CNN framework to classify activities in video sequences.
- Designed a comprehensive CNN framework for **video-to-text summarization**, incorporating key-frame detection, visual and temporal attention mechanisms, word embedding, and LSTM modeling.

EDUCATION

AUG, 2014 - MAY, 2017

Masters, Computer Engineering, Rochester Institute of Technology, Rochester

Thesis : Deep Learning for Semantic Video Understanding

AUG, 2009 - MAY, 2013

Bachelor of Technology, Lovely Professional University, Jalandhar

Project : Eye Controlled Wheel Chair

SKILLS/TOOLS

Python/C/C++

PyTorch/TensorFlow/scikit-learn

OpenCV

Hugging Face/NLTK/LLMs

Model Contect Protocol (MCP) Agent2Agent (A2A)

Flask/TensorRT/TFLite

LangChain/RAG

AWS/Azure

SQL/S3

Docker/W&B

Git/GitHub

LINKS

LinkedIn (Sourabh Kulhare)

Google Scholar (Sourabh Kulhare)

PUBLICATIONS

How Good Are Synthetic Medical Images? An Empirical Study with Lung Ultrasound (2nd Author)

THE MEDICAL IMAGE COMPUTING AND COMPUTER ASSISTED INTERVENTION SOCIETY (MICCAI), SASHIMI, VANCOUVER, 2023

Introducing the application of generative models for image synthesis, and novel metrics to compare real and synthetic distributions.

Deep Learning Video Classification of Lung Ultrasound Features Associated With Pneumonia (1st Author)

IEEE/CVF CONFERENCE ON COMPUTER VISION AND PATTERN RECOGNITION (CVPR), DUA, VANCOUVER, 2023

Introducing three video-level algorithms to detect various pneumonia features.

Ultrasound-Based Detection of Lung Abnormalities Using Single Shot Detection Convolutional Neural Networks (1st Author)

THE MEDICAL IMAGE COMPUTING AND COMPUTER ASSISTED INTERVENTION SOCIETY (MICCAI), SASHIMI, GRANADA, SPAIN, 2018

Presenting an object detection algorithm to locate abnormal regions in ultrasound lung scans.

Semantic text summarization of long videos (2nd Author)

IEEE WINTER CONFERENCE ON APPLICATIONS OF COMPUTER VISION (WACV), SANTA ROSA, 2017

Introducing a novel method to summarize hours-long videos into short visual clips and concise paragraphs.

Key frame extraction for salient activity recognition (1st Author)

23RD INTERNATIONAL CONFERENCE ON PATTERN RECOGNITION (ICPR), CANCUN, 2016

A method for identifying salient frames to enhance video classification.

TALKS

- Introduction to Neural Networks, IEEE Global Humanitarian Technology Conference, 2020.
- Deep Learning for Pneumonia, CVPR, DL-UIA, 2023, Vancouver.
- Building AI Solutions that fit the jigsaw puzzle, Innovation Renaissance, 2024, Seattle.
- When Algorithms Fall Short : Handling Real World Variability, IEEE Seattle, 2024, Seattle.

INTERNSHIPS

JUN, 2016 - DEC, 2016

Computer Vision Intern, Ahold-USA, Boston

- Developed a tracking system on an embedded device with a camera to monitor the supply.
- Integrated depth and vision sensors with the iRobot Roomba platform to automate navigation within a grocery store.
- Created a chatbot-based solution for customer inquiries.

MAY, 2015 - SEP, 2015

Machine Learning Intern, Future Everyday Technology Research Lab (FETLab), Rochester

- I used the Microsoft Kinect V2 sensor to develop an augmented reality Windows application for overlaying previews of 3D printing.