Jitender Singh

Applied AI Researcher/Engineer

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PROFILE

AI Engineer and Applied Researcher with 4 years of industry and 3 years of academic experience in deep learning, medical imaging, and end-to-end AI system design. Specialized in developing vision-language models, AutoML frameworks, and self-improving pipelines for radiology imaging (CT, MRI, PET, X-ray, US). Led high-impact R&D as CTO/CIO at a healthcare AI startup, deploying scalable AI solutions on GCP using Docker and Kubernetes. Collaborated with institutions like NIH, IITs, IIAI, and Uppsala on projects spanning DKI/DTI analysis, Alzheimer's classification, and PPD risk prediction. Strong in PyTorch, Python, and medical AI research with a track record of translating innovation into production.

WORK EXPERIENCE

Chief Technology Officer (CTO) & AI Engineer | *Sept 2023 - Present*
Manentia AI | *Bangalore, Karnataka, India*
- **Developing MIMICRad**, a vision-enabled LLM tool with report style transfer, template formatting, and a conversational interface for querying medical images.
- **Engineering a closed-loop self-training system** that incorporates radiologist feedback, generates structured annotations, and auto-retrains models for continual accuracy gains.
- **Designing a modular AutoML framework** with plug-and-play pipelines for 2D/3D imaging (CT, MRI, X-Ray, PET), supporting classification, segmentation, detection, and LLM-driven reporting.
- **Built an intelligent pipeline controller** that dynamically selects imaging pipelines using DICOM or inferred metadata via custom modality and zero-shot body part classifiers (144 anatomical classes).
- **Curated a 1.2M-sample dataset** and trained a 99.6%-accurate modality classifier across 6 imaging types (CT, DX, MG, MR, PT, US) for robust pipeline routing and non-DICOM inference.
- **Standardized preprocessing workflows** for CT, DX, MR, and US to ensure consistent input quality across pipelines.
- **Deployed AutoML system on GCP** using Kubernetes and Docker, with automated inference, DICOM-annotated reports, and **full PACS integration** via team collaboration.
- **Led a cross-functional AI team** to deliver robust, real-world AI tools for clinical workflows in radiology.

Chief Information Officer (CIO) & AI Engineer | *Apr 2022 - Aug 2023*
Manentia AI | *Bangalore, Karnataka, India*
- **Developed a 2D production-ready deep learning pipeline** from data preprocessing to deployment for lung disease classification using X-ray imaging.
- **Built an end-to-end 2D deep learning pipeline** for pulmonary nodule detection in CT scans, covering all stages from data munging to model deployment.
- **Implemented a full 3D production-ready deep learning pipeline** for pulmonary nodule detection using CT imaging, including lung and lobe segmentation, nodule detection, and detailed classification (location, size, margin, distribution, etc.).

MRI Image Processor | *Jul 2021 - Mar 2022*
Radiodiagnosis and Imaging Department, PGIMER | *Chandigarh, India*
- **Conducted Diffusion Kurtosis Imaging (DKI) image preprocessing, registration, and analysis** under the NIH-funded research grant *"MRSI and DKI Evaluation of HIV-1 Clade C Infection in the Whole Brain"*, in collaboration with the University of Miami School of Medicine and supported by the Fogarty International Center.
- **Performed Diffusion Tensor Imaging (DTI) image processing and data analysis** for a clinical research study on Infantile Tremor Syndrome (ITS) in North India. (code)

RESEARCH EXPERIENCE & FELLOWSHIPS

Machine Learning Research Assistant | *Mar 2019 - Mar 2022*
CBIL Lab, Indian Institute of Technology (IIT) Ropar | Rupnagar, Punjab, India
- **Worked on Visual Question Answering and Generation (VQAG)** for medical imaging in collaboration with the Inception Institute of Artificial Intelligence (IIAI).
- **Developed a risk prediction model for Postpartum Depression (PPD)** in collaboration with Uppsala University Hospital, Sweden.
- **Designed and implemented a lightweight CNN architecture** using mixed asymmetric kernels for efficient medical image analysis.
- **Curated and preprocessed ~1.5TB of unlabeled CT scans** for semi-supervised learning in large-scale model training.
- **Worked on multi-modal Alzheimer's classification** using combined MRI and PET imaging data.

Computer Vision and Deep Learning Research Intern | *Aug 2018 - Feb 2019*
LASII Group, Indian Institute of Technology (IIT) Ropar | Rupnagar, Punjab, India
- **Developed a computer vision-based automatic collage maker Android app** in collaboration with Samsung India.
- **Built Garuda**, a deep learning-powered Android app for real-time background danger detection while taking selfies. [demo](), [Times of India (TOI)](), [Gadgets Now]()

Machine Learning Innovation Fellow | *Jul 2018 - Dec 2018*
Savera.ai startup (Sungineers Energy Private Limited) | Work from home
- **Developed a rooftop segmentation model** for Indian buildings using satellite imagery. ([code]())
- **Designed and presented an end-to-end pipeline** for rooftop detection, including data cleaning, preprocessing, training, and postprocessing.

AI Research Fellow | *Aug 2017 - May 2018*
Axis India Machine Learning Lab | Jaipur, Rajasthan, India
- **Studied core foundations** of Computer Vision, Machine Learning, Deep Learning, and Reinforcement Learning.
- **Implemented face recognition and verification systems** using deep learning and transfer learning techniques.

Big Data and Hadoop Undergraduate Intern | *Feb 2017 - Jul 2017*
Headstart Education (IBM Business Partner) | New Delhi, India
- **Developed a real-time Twitter sentiment analysis system** using Big Data technologies and the Hadoop ecosystem. ([code]())
- **Gained hands-on experience with Hadoop tools** including HDFS, Pig, Hive, MapReduce, and Flume

PUBLICATIONS, ABSTRACTS, & ARTICLES

- **Abstract: J. Singh**, S. Tyagi, M.M. Jabeer, A. Chandalia, "Automatic Detection and Reporting of Chest CT Findings based on AI" ERS Congress 2025, Sep-Oct. (Accepted)
- **Chapter:** A. S. Ben Geoffrey, **Jitender Singh Virk**, Deepti Mittal, Gurjeet Kaur & Syed Azmal Ali, "*Data-Driven and Artificial Intelligence Approaches for System-Wide Prediction of the Drugable Proteome to Drug Discovery in Farm Animals*" Springer Nature Switzerland, Mar 2024, pp 155-172. ([Paper]())
- **Jitender Singh**, Dwarikanath Mahapatra, and Deepti R. Bathula, *"Medical VQA: MixUp Helps Keeping it Simple"* IVCNZ 2022: Image and Vision Computing, LNCS, Volume 13836, pp 402-414. Feb 2023. [Paper]()
- **Jitender Singh** and Surender Singh, *"Simple Methods is All You Need for Medical VQA: An ImageCLEFs Med-VQA Task Methods Review"* ICAIDS 2022: GRENZE International Journal of Engineering and Technology, Volume 9, Issue 1, Pages: 2292-2299. 2023. [Paper]()

- A. Bilal, D. Bathula, E. Bränn, E. Fransson, **J. Virk**, F. Papadopoulos, and A. Skalkidou, *"Mom2B: a study of perinatal health via smartphone application and machine learning methods"* European Psychiatry 65 (S1), S574-S575, 2022. Paper
- **Jitender Singh Virk** and Dr Surender Singh, *"Automatic Image Alignment and Fusion in a Digital Photomontage"* ITSS-IoE 2021. Paper
- **Jitender Singh Virk** and Deepti R. Bathula. *"Domain-Specific, Semi-Supervised Transfer Learning for Medical Imaging"* CODS-COMAD 2021 Paper
- **Abstract:** A. Skalkidou, D. R. Bathula, S. Illiadis, E. Bränn, **J. S. Virk**, "*Predicting postpartum depression with advanced machine learning methods*", Finnish Perinatal Mental Health Conference, Helsinki, Finland, June 2021
- Apoorva Sikka, Skand Peri, **Jitender Singh Virk**, Deepti R. Bathula *"MRI to PET Cross-Modality Translation using Globally & Locally Aware GAN (GLA-GAN) for Multi-Modal Diagnosis of Alzheimer's Disease"* The Journal of Precision Medicine: Health and Disease 2021. Preprint
- **Jitender Singh Virk**, Syed Azmal Ali, and Gurjeet Kaur. *"Recent update on COVID-19 in India: Is locking down the country enough"* medRxiv April 2020 Paper
- **Jitender Singh Virk** and Abhinav Dhall. *"Garuda: A Deep Learning-Based Solution for Capturing Selfies Safely"* ACM IUI 2019 Paper
- **Article:** Rudradeb Mitra, **Jitender Singh Virk**, and Iresh Mishra. *"Increasing solar adoption in the developing world by analyzing low-resolution Satellite images using Machine Learning"* (medium.com; datasciencecentral.com)

SKILLS

- **Programming & Scripting:** Python (main), R, C++, and Java.
- **Deep Learning & ML Frameworks:** PyTorch, PyTorch Lightning, TensorFlow, Keras, Scikit-Learn.
- **Computer Vision & NLP:** Medical Imaging (CT, MRI, and X-ray), DICOM, NIfTI, Visual Question Answering (VQA), Basic Prompt Engineering, Diffusion Imaging (DTI, DKI), Self-supervised & Semi-supervised Learning, Multimodal Learning.
- **DevOps & MLOps:** Docker, Kubernetes, Google Cloud Platform (GCP), Git, FastAPI, Flask, CI/CD workflows.
- **Data Handling & Engineering:** MONAI, Pandas, NumPy, OpenCV, NiBabel, PyDICOM, Big Data tools (HDFS, Hive, Pig, Flume, MapReduce).
- **Web & App Development:** Jupyter, Jekyll, Next.js, HTML5, CSS3, Bootstrap, Tailwind CSS, Android SDK.
- **Tooling & Platforms:** Jupyter Notebooks, GitHub, Google Colab, Visual Studio Code, VS, Android Studio.
- **Languages:** English (fluent), Hindi (fluent), Punjabi (native)

EDUCATION

ME in CSE (AI & ML Specialization) | *Aug 2020 - Aug 2022*
Chandigarh University | *Ajitgarh, Punjab, India*
CGPA - 9.11 / 10.0
- **Gold medalist** for outstanding academic achievement
- Dissertation: Medical Visual Question Answering and Generation (code)
- Graduate semester project: Molecular Chemical Images to Text Translation (code)

Bachelor of Technology in Computer Science and Engineering | *Jul 2013 - Jul 2017*
JECRC University | *Jaipur, Rajasthan, India*
CGPA - 7.24 / 10.0
- Dissertation: Real-time Twitter Sentiment Analysis with Big Data and Hadoop Ecosystem

- Undergrad semester projects: Teacher Review System ([code](#)), Home Automation System ([code](#), [extension](#))

CONTRIBUTION & PERSONAL PROJECTS

- **Mozilla Common Voice Contributor** (Jun 2021 – Aug 2021): Donated and validated voice clips in Punjabi, English, and Hindi for the open-source Common Voice dataset.
- **AI Search Algorithms Interactive Web App**, Nov 2020 – Jan 2021, [code](#), [short article](#)
- **Auto Photomontage Web App**, Nov 2020 – Jan 202, [code](#), [short article](#)

REFEREES

Deepti R. Bathula | *Associate Professor* | Indian Institute of Technology (IIT) Ropar, India
- Mob. No.: +919501196606
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Jaskirat Singh | *Machine Learning Researcher and Trainer* | Axis India Machine Learning Lab, India
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Dwarikanath Mahapatra | *Senior Scientist* | Inception Institute of AI (IIAI), UAE
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