EKANSH CHAUHAN

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Examination	University	Institute	Year	GPA/%
Graduation	IIIT Hyderabad	International Institute of Information Technology, Hyderabad	2022 - Current	9.17
Under Graduation	GGSIPU, Delhi	Maharaja Agrasen Institute of Technology, Delhi	2017-21	8.6
AISSCE	CBSE, Delhi	Hope Hall Foundation School, New Delhi	2015-16	82.2

* GPA: out of 10 (best possible grade)

RESEARCH INTERESTS

* AI for Healthcare   * Medical Signal/Imaging Analysis   * Multi-Modal Learning   * Deep Learning

EXPERIENCE

- **Centre for Visual Information Technology (CVIT), IIIT-H**
  *Research Fellow – Cancer Diagnostics [Advisors: **Prof. Vinod P K** and **Prof. CV Jawahar**]*   *(Jan'22-Present)*
  Cancer diagnosis and prognosis using giga-pixel histopathology images
  - **India Pathology Dataset**, *link*
    - Curated one of the largest histopathology dataset in Asia, specifically focused on India, consisting of cancer subtypes, grades, and various Immunohistochemistry (IHC) biomarkers.
  - **Weakly Supervised Learning for slide level classification in Brain histopathology images**
    - Concept Used: Multi-Instance Learning (MIL), Self-Supervised Learning, Attention & Vision Transformer
    - Explored MIL algorithms for brain cancer subtype classification with self-supervised feature extractor.
    - Developed deep-learning techniques for classifying IHC stained biomarkers with H&E stain.
  - **Detection of Glomeruli and classification of Lupus Nephritis (LN)**
    - Concept Used: Object Detection, Unsupervised Learning, Attention and LSTM
    - Developed an interpretable pipeline for LN subtype classification using glomerulus patches in a kidney WSI.
    - Exploited medical insights of class 5 LN (membranous), uniformity across Glomeruli, using self attention.

- **Game Theory, Bangalore**
  Computer Vision Intern   *(Dec'23 – Feb'24)*
  - **3D Shuttle Tracking using multiple cameras**
    - Deployed a cloud-based 3D badminton shuttle tracking (Triangulation + YoloV8) system using multiple synchronized cameras (Camera Calibration) for video capture.
  - **IoT based Real-time Person Footfall Tracking in a room**
    - Deployed using computer vision methods on a Raspberry Pi5 and Jetson Nano with TensorRT optimization.

- **iHub-Data, International Institute of Information Technology, Hyderabad (IIIT-H)**
  *Research Fellow – Healthcare & Artificial Intelligence (HAI) [Advisor: **Prof. Bapi Raju**]*   *(May'21-May'22)*
  Worked in the broad areas of 3D Computer Vision and Affordable AI solutions
  - **LRH-Net: A Multi-level Knowledge Distillation Approach for Low-Resource Heart Network**
    - Concept Used: Multi-Level Knowledge Distillation (MLKD), Squeeze and Excitation network.
    - Developed a model for detecting multiple cardiovascular diseases at once using only 2-lead ECG signal.
    - The proposed model has 106× fewer parameters and 76% faster inference than the teacher model for detecting cardiovascular diseases, making it suitable for edge devices.
  - **Oro-Facial Video Analysis for Accurate Classification of ALS, Post-Stroke, and Healthy Subjects**
    - Concept Used: Variational Autoencoders, Optical flow, 3D CNN's, LSTM
    - Encountered challenges such as limited and noisy data, complex temporal dynamics, and in-distinctive features across different class videos.

- **Indian Institute of Technology (IIT- BHU), Varanasi**
  *Summer Intern – [Advisor: **Prof. Hari Prabhat Gupta**]*   *(June'20 – July'20)*
  - **Data-Driven River Ganga Quality Assessment using Machine Learning**
    - Concept Used: Multiclass Classification, Overfitting Mitigation
    - Developed a river ganga quality assessment using ML methods in collaboration with Harvard University.
    - Results showed: Turbidity, Total Solids, Dissolved Oxygen, pH, and Temperature are critical parameters for determining water quality.

PROJECTS

- **Smart Lightweight Medical Query System** | *HuggingFace, LLaMA, LangChain, FAISS, link*
    - Developed a medical response system optimized for local/edge devices enhanced with external documents.
    - Used LangChain to generate document chunks and FAISS to retrieve chunks relevant to query.
    - Experimented with Knowledge Distillation, Pruning, and Quantization to achieve model compression.
    - Pruning followed by GGML-based $q5$ quantization resulted in reducing model size from 13.5 GB to 2.5 GB.

- **1D and 2D GradCam for Interpretability of black box deep learning models** | *Gradient flow, link*
    - Implemented 1D Grad-CAM to visualize critical areas for accurate biomedical signal classification.
    - Worked with 2D variant also for visual question answering and image classification tasks.

SELECTED PUBLICATIONS

- **Lupus Nephritis Classification with only Slide-Level Labels**, *Paper*
  Amit Sharma*, **Ekansh Chauhan***, Liza Rajasekhar, Megha S Uppin, C V Jawahar, P K Vinod
  MIDL 2024
- **MIL for Histologic and Molecular Status of Brain Tumor using Hematoxylin and Eosin stained WSI**, *Paper*
  Ekansh Chauhan*, Amit Sharma*, Megha S Uppin, C V Jawahar, P K Vinod
  Under Review at Nature Scientific Data
- **LRH-Net: A Multi-level Knowledge Distillation Approach for Low-Resource Heart Network**, *paper*
  Ekansh Chauhan, Swathi Guptha, Likith Reddy, Bapi Raju
  MICCAI workshop, FAIR 2022
- **Analysis of COVID-19 pandemic and forecasting using machine learning models**, *paper*
  Ekansh Chauhan*, Manpreet Sirswal*, Deepak Gupta, Ashish Khanna, Aditya Khamparia
  International Journal of Computer Applications in Technology Vol. 66, No. 3-4
- **Analysing Radiographs using Artificial Intelligence for Covid-19 Existence**, *(book chapter)*
  Manpreet Sirswal*, **Ekansh Chauhan***, Deepak Gupta, Ashish Khanna, Fadi Al-Turjman
  AI-Powered IoT for COVID-19. CRC Press, 2020

  * indicates equal contribution | Full publication list at Google Scholar

TECHNICAL SKILLS

Programming Languages: Python, Core Java, C++, C, SQL.

Frameworks: PyTorch, MONAI (monai.io), Tensorflow, slurm

Technologies & tools: draw.io, Anaconda (Python), LINUX, MATLAB, LaTeX, WordPress, Advanced MS-excel

ANY OTHER SEMINARS / RELEVANT POSITIONS (FORMAL / INFORMAL)

- Attended Trustworthy AI Workshop | *University of Pennsylvania, Microsoft Research, Wadhwani AI*   *(Jan'23)*
    - 35 candidates were selected out of 150+ applications
- Teaching Assistant for CS7.501 Advanced NLP | *IIIT-Hyderabad*   *(Aug'23-Dec'23)*
    - Taught by Prof. Manish Shrivastava
- Coordinator for 6th Summer School on AI | *CVIT, iHub-Data, IIIT-Hyderabad*   *(July'22-Aug'22)*
    - Focus on Computer Vision & Machine Learning

ADDITIONAL EXPERIENCE & ACHIEVEMENTS

- Received Department of Science and Technology, Government of India, New Delhi fellowship for MS by Research.
- Conference Core Technical Organizer
    - ICICC-2021-23 : organized by Shaheed Sukhdev College of Business Studies, Delhi, India
    - ICDAM-2020-23, organized by Karkonosze University, Poland & Politécnico de Portalegre, Portugal, Europe
    - ICCCN-2021-23, organized by Manchester Metropolitan University, Manchester, United Kingdom

- Member of Student Parliament at IIIT Hyderabad
- Winner of Cricket Tournament as a Captain at IIIT-H & Maharaja Agrasen Institute of Technology (2018, 2022)

EXTRA CURRICULAR ACTIVITIES

I like playing different sports like Cricket, Badminton, Table Tennis, Chess, and Carrom. I'm good at strategic games like Poker too (for fun). I also enjoy watching documentaries to keep learning new things.

LANGUAGES

I have studied English and Hindi, and I am proficient in speaking, reading, and writing it.