

Darshan Singh S

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Education

- M.S by Research in Computer Science** 2022-present
International Institute of Information Technology Hyderabad (IIIT-H)
 - CGPA : **9.6/10**
- B.E in Electronics and Communication** 2015 - 2019
Sri Jayachamrajendra College Of Engineering, Karnataka, India
 - CGPA : **9.07/10**
- Higher Secondary School - VVS Golden Jubilee PU College, Karnataka - 92.16%** 2013 - 2015
- Secondary School (10th Standard) - Sadvidya High School, Mysore - 98.56%**
(Among top 10 in the state out of over 800,000 applicants) 2013

Experience

- Research Fellow, CVIT Lab, IIIT Hyderabad** July, 2021 - Aug, 2022
 - Worked in the Video-Language (Multimodal) team under the supervision of Prof. C. V. Jawahar and Prof. Makarand Tapaswi.
 - Worked on Audio-Visual lecture segmentation, published at the Winter Conference on Applications of Computer Vision (WACV), 2023.
- Graduate Engineer Trainee, Mercedes Benz R&D India** Aug, 2019 - Aug, 2020
 - Implemented graph algorithms for enhancing functionalities of a CAD software platform called Micro-Station.
 - Developed software applications for Daimler Buses and Vans.

Technical Skills

Programming Languages - Python, C, C++, MATLAB, Assembly Language(8051), Embedded C
Tools/Libraries - PyTorch, NumPy, scikit-learn, L^AT_EX

Publications

- Darshan Singh S**, Zeeshan Khan, Makarand Tapaswi, “FiGCLIP: Fine Grained CLIP Adaptation via Densely Annotated Videos”, [arXiv](#).
- Darshan Singh S**, Anchit Gupta, C. V. Jawahar, Makarand Tapaswi, “Unsupervised Audio-Visual Lecture Segmentation”, Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2023. [view here](#)
- B A Sujathakumari, M H Abhishek, **Darshan Singh S**, Aneesh K N, Rakesh D S, B S Mahanand, “Detection of MCI from MRI using Gradient Boosting Classifier”, International Conference on Advances in Information Technology, 2019. [view here](#)
- K N Aneesh[†], **S Darshan Singh**[†], M H Abhishek[†], T Shreekanth, “Two-Dimensional ECG Signal Compression Based on Region of Interest Using PCA”, International Conference on Communication and Electronics Systems, 2019. [view here](#)

Relevant Courses^[1]

Statistical Methods in AI*, Topics in Deep Learning*, Advanced NLP, Computer Vision, Data Structures and Algorithms*, Digital Image Processing*, Fairness, Privacy & Ethics in AI*, Operating Systems, Programming in C*, Advanced Calculus*, Multivariable Calculus*, Probability and Statistics,

Selected Projects

- FiGCLIP: Fine-Grained CLIP Adaptation via Densely Annotated Videos** [arXiv](#)
 - Addressed the lack of fine-grained and syntactic information in CLIP’s representations by adapting CLIP on holistic, multidimensional, and densely annotated video-text data.
 - Proposed a lightweight adaptation strategy with LoRA adapters that enable learning fine-grained representations without catastrophic forgetting.
 - Performed experiments across 5 diverse tasks: video situation recognition, zero-shot text2video retrieval, zero-shot action recognition, dense video captioning and localization, and VL compositional reasoning and outperformed the base CLIP in all these settings.

^[1] Courses marked (*) indicate grade ‘A’ awarded for outstanding performance (10/10).

[†] = Equal Contribution

- **Unsupervised Audio-Visual Lecture Segmentation** [arXiv](#)
 - Proposed video lecture segmentation that splits lectures into bite-sized topics.
 - Approached this problem by first learning the lecture-clip representations by leveraging visual, textual, and OCR cues using a pretext self-supervised task of matching lecture narrations with temporally aligned visual content.
 - Used these learned representations to temporally segment the lectures using an algorithm called TW-FINCH.
 - Introduced a new dataset, AVLectures, a large-scale dataset consisting of 86 courses with over 2,350 lectures covering various STEM subjects from MIT-OpenCourseWare, which we used for pre-training, fine-tuning, and evaluating the segmentation performance.
- **Grounded Image Situation Recognition using CLIP**
 - Proposed an approach that built upon CoFormer(CVPR'22) by introducing several design changes, such as leveraging CLIP features, object features, and contextualized role-aggregated image features.
 - Achieved a significant improvement on all the metrics, notably verb prediction accuracy using CLIP ViT-L/14@336px.
 - Tested extensively on real-world images captured using a mobile camera with no pre/post-processing of the images. Despite several challenges with the captured images, such as illumination, occlusion, etc., our approach made good predictions.
- **Detection of MCI from MRI using Gradient Boosting Classifier**
 - Proposed a non-invasive approach for the detection of Mild Cognitive Impairment (MCI) using Magnetic Resonance Imaging (MRI).
 - The MRI scans were first subjected to segmentation from which the gray matter images were obtained.
 - Then the resulting images were pre-processed using 2D Dual-Tree Complex Wavelet Transforms. The features obtained were combined with the personal characteristics data and were fed to the gradient-boosting classifier.

Online Courses (MOOC's)

- **Machine Learning** (Course Instructor: Prof. Andrew Ng, Stanford Online)
[View verified certificate](#)
- **Mathematics for Machine Learning: Linear Algebra** (Course Instructors: Prof. David Dye and Prof. Samuel J. Cooper, Imperial College London)
[View verified certificate](#)
- **CS50: Introduction to Computer Science** (Course Instructor: Prof. David Malan, HarvardX)
[View verified certificate](#)
- **Neural Networks and Deep Learning** (Course Instructor: Prof. Andrew Ng, deeplearning.ai)
[View verified certificate](#)
- **Improving Deep Neural Networks** (Course Instructor: Prof. Andrew Ng, deeplearning.ai)
[View verified certificate](#)

Achievements and Awards

- Won the best paper award for the paper “*Detection of MCI from MRI using Gradient Boosting Classifier*” at ICAIT, 2019 (an IEEE conference).
- Awarded second prize for presenting the paper titled “*High Speed Micro Electro-Mechanical Systems (MEMS) Based Vehicles with Swarm Intelligence for Interstellar Travel*”. at IEEE Papyrus – 2018, held at SJCE, Mysore.
- Selected for National Means Cum-Merit Scholarship (NMMS).
- One of the State toppers in the 10th Standard Karnataka Board Exams with a score of 616/625 (98.56 %).