Shrisudhan **Govindarajan**

Data & Applied Scientist · Microsoft India R&D

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"Being weak isn't something to be ashamed of. But staying weak is."

Education

Indian Institute of Technology, Madras

Chennai, India

Interdisciplinary Dual Degree in Mechanical Engineering(B.Tech, Honours) and Data Science(M.Tech) — *August 2017 - May 2022*

- Cumulative Grade point average(CGPA): 9.17/10
- Completed Bachelors with honours

Maharishi Vidya Mandir

Chennai, India

High School | PCM along with Computer Science — *March 2013 - May 2017*

- Percentage: 96.2%

Publications

Synthesizing Light Field Video from Monocular Video

*ECCV, 2022[**Oral**]*

Shrisudhan Govindarajan, Prasan Shedligeri, Sarah, Kaushik Mitra — *Project page*

Research Experience

Self-supervised light field synthesis from Monocular video

Chennai, India

Masters Thesis, Computational Imaging lab, IIT Madras | Prof Kaushik Mitra — *May 2021 - March, 2022*

- Proposed a self-supervised learning technique to synthesize light field video from monocular video.
- Proposed an adaptive low-rank representation tailored for each scene to efficiently represent the light field sequence
- Proposed an explicit disocclusion handling technique, which facilitates the filling in of the disoccluded regions in light field based on the information available from the temporal video sequence on the dynamic scene.
- In addition, novel supervised refinement block(optional) is proposed that exploits available ground truth Light Field image dataset to improve the geometric structure of the synthesized light field using angular attention(ViT).
- This work is published as a oral paper in ECCV'22, Tel Aviv, Israel.

Self-supervised light field synthesis from Dual-Pixel video

Chennai, India

Computational Imaging lab, IIT Madras | Prof Kaushik Mitra — *April 2022 - Present*

- Developing a self-supervised learning technique to synthesize light field video from dual-pixel video.
- Utilizing the dual-pixel images pair to improve the geometric structure of the synthesized light sequence in comparison with monocular video input.
- Collecting a large scale multi-camera dual-pixel video dataset(using Google Pixel 4 smartphone) for training the network via self-supervised learning technique.

Battery Prognostics: Estimation of Remaining Operational Time of batteries using convolution and temporal-correlation

Hyderabad, India

Bachelors Thesis, IIT Madras | Prof N. Arunachalam — *May 2020 - July 2020*

- Proposed a novel deep neural network(DNN) based architecture which utilizes temporal variation in the battery data and utilizes that for estimating the remaining operational time.
- Proposed a two stage algorithm to learn the temporal variation: (*i*) 1D CNN block for understanding the local receptiveness, (*ii*) followed by transformers for global receptiveness on the data.
- Collected hours of DJI Mavic Mini 2 drone run-time data to train and test the model successfully for remaining operation time estimation.

Caching in DNNs - Speeding up Inference for similar inputs

Hyderabad, India

Research Internship, IIT Madras | Prof Pratyush Kumar — *May 2020 - July 2020*

- Proposed caching in DNNs to improve the inference speed for Image classification problems.
- Reduced the training and inference time of the popular classification network by caching the outputs of an intermediary layer which can then be used to predict the output in the test set.
- A computational and storage efficient version of k-NN, ProtoNN, is used to compare the cached feature embeddings with the current embeddings to predict the labels in test set.
- This also improve the robustness of the network towards brightness, contrast variations, and improves immunity towards adversarial attacks.

Work Experience

Microsoft India R&D Pvt. Ltd.
Hyderabad, India

Data and Applied Scientist — *July 2022 - Present*

- In the current version of Microsoft Teams, Office and Sharepoint space, for a given search, we see multiple entity sets, like People suggestions, Message suggestions, File suggestions, Calendar suggestions and others. I work on developing a ranking algorithm to rank these different entity sets based on their relevance to the searched query and previous user interaction.
- Developed a autonomous data extraction pipeline using SQL and C# to extract all available features that can be used for training without being listed individually.
- Working on developing a ranking algorithm which will identify a Hero answer(most clickable) for a given search based on previous user interaction, answer relevance and other factors.

Microsoft India R&D Pvt. Ltd.
Hyderabad, India

Data and Applied Scientist Intern — *May 2021 - July 2021*

- Developed an ranking algorithm to rank related suggestions for a query based on the relatedness and usefulness of the suggestion in an Enterprise-level(Microsoft Bing Work vertical) setup.
- Extracted important features for a ranking algorithm from the raw user log
- Implemented Generative Adversarial Network based training approach for the ranking problem to improve the performance on a large block of unlabelled data and improve generalization.
- A generative model with high recall and a discriminate model with high precision are used to train each other in a iterative fashion on huge amount of unlabelled data.
- Improved the DCG score of the ranker from a baseline of 1.53 to 2.34 on test set.
- Received Pre-Placement Offer for my work.

AutoInfer Pvt. Ltd.
Bangalore, India

Machine Learning Engineer Intern — *June 2020 - August 2020*

- Developed a Generative Network inspired by the Layout2Image algorithm to generate realistic documents from user-specified layouts.
- Developed an algorithm to render additional erosion, dilation, and noise effects to enhance the document's realism. Utilizing perspective projection, the rendered document is warped on various artificial backgrounds to resemble captured documents.
- Built a table detection network inspired by LayoutLM algorithm which extracts textual and image features from the document to detect tables and information. The network was trained on a combination of ICDAR dataset and generated dataset.

Yamaha India Pvt. Ltd.
Chennai, India

Production Engineer Intern — *June 2019 - July 2019*

- Developed a procedure to optimize and semi-automate the assembly process for head cylinder used in Yamaha Z-ray.
- Designed an easily transportable carrier for transporting assembled head cylinders from one production line to another.

Projects

HDR Video Reconstruction using Coded Exposure Sensor

Computational Photography Course | Prof Kaushik Mitra

- Developed a SegNet based HDR(High Dynamic Range) reconstruction network which uses multiple neighbouring frames with alternate LDR (Low Dynamic Range) exposures as the input to reconstruct HDR frames.
- Temporal-Shift Module (TSM) was incorporated to improve information retrieval and to enable the network to learn temporal consistency.

Hierarchical RL for Room Grid World and Deep RL for CartPole

Reinforcement Learning Course | Prof Balaraman Ravindran

- Implemented Semi-MDP based Q-learning technique with and without intra-option learning model to learn the policy/action value function for Room Grid World.
- Implemented ANN architecture-based Q-learning algorithm with Experience Replay to avoid overfitting and Target Network for learning action value function for CartPole environment.

Reproduced results of HoloGAN paper

Computational Imaging and Displays Course | Prof Mansi Sharma

- Implemented HoloGAN model for 3D novel-view synthesis from a single input image using 3D CNN to extract 3D representational information and pinhole camera model for projection.
- Improved network performance by introducing skip connections and used bottleneck architecture for optimizing latency and compute.

Driver Assistance Systems with Computer Vision

Nikotto Pvt. Ltd. | Center for Innovation, IIT Madras

- Worked on improving and implementing State of the Art algorithms on lane detection in roads, 3D object detection from stereo image pair, and, signal and sign board detection
- Developed multi-task learning algorithm, with a common MobileNet backbone which will be utilized by the above specified networks, followed by task specific layers to reduce the latency per prediction and improve generalization.
- Optimized the computational requirement of the networks using pruning on the task specific layers to facilitate deployment on small scale devices.

Invited Talks

Mobile Intelligent Photography & Imaging Workshop(MIPI), ECCV 2022 *Tel Aviv, Israel*

Invited Talk on Synthesizing Light Field Video from Smartphones *October 2022*

- This talk focuses on self-supervised learning technique to reconstruct light field(containing 3D information) video from simple smartphone camera configurations, namely monocular camera and stereo camera(2D projections).
- Discussions on various novel techniques introduced to handle the challenges associated with these camera configurations in an attempt to synthesize structurally and temporally consistent light field video were conducted.

Achievements

2021	**Fellowship,** Qualcomm Innovation Fellowship, 2021-22	*India*
2021	**Fellowship,** Samsung IITM-Pravartak Undergraduate Fellowship, 2021-22	*India*
2021	**Ranked 27th across the world,** International Data Analytics Olympiad (IDAO)	
2018	**Participant,** Inter IIT Tech Meet in Engineer's Conclave Event	*Mumbai, India*
2017	**All India Rank 1460,** Joint Entrance Exam(Advanced); 200,000 candidates	*India*
2017	**All India Rank 2823,** Joint Entrance Exam(Mains); 1,000,000 candidates	*India*

Extracurricular Activity

IIT Madras Institute Football team *Chennai, India*

Goalkeeper

References

Dr. Kaushik Mitra *Chennai, India*

Assistant Professor, Dept. of Electrical Engineering, IIT Madras

- **Email**: kmitra@ee.iitm.ac.in

Dr. Pawan Baheti *Bangalore, India*

Director of Engineering, Qualcomm India Pvt. Ltd.

- **Email**: pbaheti@qti.qualcomm.com

Dr. Pratyush Kumar *Chennai, India*

Assistant Professor, Dept. of Computer Science and Engineering, IIT Madras

- **Email**: pratyush@cse.iitm.ac.in

Mr. Sumod K Mohan *Bangalore, India*

Founder/C.E.O, AutoInfer Pvt. Ltd.

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