Shagun Uppal

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Education

- **Indraprastha Institute of Information Technology (IIIT-Delhi)** — Delhi, India
  B.Tech, Computer Science and Engineering; CGPA: 9.27/10.0 — *2016 - 2020*

Summary

- **Research Interests**: Representation Learning, Self-supervised Learning, Computer Vision, Reinforcement Learning, Natural Language Inference.
- **Skills**: Python, C, C++, Matlab, Java, PyTorch, Linux.
- **Relevant Coursework (*=Graduate Level Courses)**: Linear Algebra, Probability and Statistics, Machine Learning*, Deep Learning*, Reinforcement Learning*, Multi-agent Systems*, Image Analysis*, Calculus in R^n*, Convex Optimization*, Probabilistic Graphical Models*, Scientific Computing, Multimedia Computing and Applications*.

Research Experience

- **Brain Lab | Singapore University of Technology and Design (SUTD)** — Singapore
  Research Intern — *May 2019 - Aug 2019*
  - **Disentangled Representations using Gaussian Processes for Video Prediction:**
    Advisor: Dr. Nengli Lim
    *Collaboration: Bioinformatics Institute, A*STAR, Singapore.*
    - Worked on the unsupervised learning of video sequences to obtain disentangled representations.
    - Utilising latent disentangled representations for downstream tasks such as video-frame predictions.
    - **Keywords:** *Gaussian Processes, Disentanglement, Representation Learning, Deep Learning*

- **Infosys Center of Artificial Intelligence | IIIT-Delhi** — Delhi, India
  Undergraduate Researcher — *Jan 2018 - Jun 2020*
  - **B.Tech Thesis: Geometry of Neural Network-based Disentangled Latent Space Models:**
    Advisor(s): Dr. Saket Anand and Dr. Pavan Turaga
    Collaboration: Geometric Media Laboratory (GML), Arizona State University, USA.
    - Analysed Riemannian Geometry of latent spaces of disentangled representations of Deep Generative Models.
    - Using latent space as Product of Orthogonal Spheres for disentangling different factors of variation.
    - Explored Contrastive Predictive Learning for disentanglement using augmentations.
    - **Keywords:** *Disentanglement, Contrastive Predictive Learning, Riemannian Geometry*

- **Multimodal Digital Media Analysis (MIDAS) Lab | IIIT-Delhi** — Delhi, India
  Undergraduate Researcher — *Jan 2019 - Jun 2020*
  - **Textual Entailment for Natural Language Inference in low-resource languages:**
    Advisor(s): Dr. Rajiv Ratn Shah and Dr. Debanjan Mahata
    Collaboration: University of Utah and Bloomberg AI (USA)
    - Proposed a two-level classification using Textual Entailment for various semantic phenomenon.
    - **Keywords:** *Textual Entailment, Natural Language Inference, Natural Language Processing*

Work Experience

- **LinkedIn | AI Team** — Bangalore, India
  Summer Intern — *May 2020 - July 2020*
  - **Social Graph Quality Team**
    - Worked on the virality prediction of video posts by modelling time-series data using bayesian inference.
    - **Keywords:** *Bayesian Modelling, Virality, Dirichlet Processes, Hawkes Processes*

Publications

- **Shagun Uppal***, Sarthak Bhagat*, Vivian Yin, Nengli Lim. Disentangling Multiple Features in Video Sequences using Gaussian Processes in Variational Autoencoders. In *European Conference on Computer Vision (ECCV) 2020.* [Paper]
- **Shagun Uppal***, Vishaal Udandarao*, Sarthak Bhagat*. *DisCont*: Self-Supervised Visual Attribute Disentanglement using Context Vectors. In *Workshop on ML Interpretability for Scientific Discovery, International Conference on Machine Learning (ICML) 2020.*[Paper]
- **Shagun Uppal***, Anish Madan*, Sarthak Bhagat*, Yi Yu, Rajiv Ratn Shah. Weakly Supervised Categoric Visual Question Generation. In *Workshop on Visual Question Answering and Dialogue, Computer Vision and Pattern Recognition (CVPR 2020), Seattle, Washington, USA.*[Video][Slides]
- **Shagun Uppal**, Vivek Gupta, Avinash Swaminathan, Haimin Zhang, Debanjan Mahata, Rakesh Gosangi, Rajiv Ratn Shah and Amanda Stent. [In Review]
- Jagriti Sikka, Kushal Satya, Yaman Kumar, **Shagun Uppal**, Rajiv Ratn Shah, Roger Zimmermann. Learning based Methods for Code Runtime Complexity Prediction. In *European Conference on Information Retrieval (ECIR) 2020.* [Paper] *(Featured in comet.ml)*
- Ankita Shukla, **Shagun Uppal***, Sarthak Bhagat*, Saket Anand, Pavan Turaga. PrOSe: Product of Orthogonal Spheres Parameterization for Disentangled Representation Learning. In *British Machine Vision Conference (BMVC 2019), Cardiff, UK.* [Paper]
- Ankita Shukla, **Shagun Uppal***, Sarthak Bhagat*, Saket Anand, Pavan Turaga. Geometry of Deep Generative Models for Disentangled Representations. In *Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP 2018), Hyderabad, India.* [Paper]

Projects

- **Learning to Paint using Model-based DDPG and TD3 Algorithm**: Teaching an agent to replicate an image by decomposing it to a set of strokes that can be painted on a canvas. [Slides][Code]
  - *Course Project: Reinforcement Learning; Instructor: Dr. Sanjit Kaul*
- **Learning Transferable Co-operative Behavior in Multi-Agent Teams**: Modelling multiple agents to perform coverage, formation and line control and prey-predator tasks. [Slides]
  - *Course Porject: Multi-Agent Systems; Instructor: Dr. P.B Sujit*
- **Sat2Map**: Learning mappings for generating city maps from satellite images using VAEs and GANs. [Slides][Code]
  - *Course Project: Machine Learning; Instructor: Dr. Saket Anand*
- **All-In**: Detection of the suit and rank of the cards on a poker table and predicting player ranks. [Slides][Code]
  - *Course Project: Image Analysis; Instructor: Dr. A.V. Subramaniam*

Awards and Achievements

- **Dean's RnD Award**
  Awarded for exceptional research contributions in the academic year 2018-2019. *2018 - 2019*
- **Dean's List Award for Academics**
  Awarded for excellence in academics in the academic years 2018-2019 and 2019-2020. *2018 - 2020*
- **Google I/O CodeJam**
  Global Rank: 52 [2019]; 221 [2018] *2018 - 2019*
- **Awarded IIIT-Delhi's prestigious Chairman's Merit Scholarship**
  Among the 4 students to receive it out of 278 students. *2016 - 2020*
- **Awarded Principal's Commendation Medal (School Topper)**
  Scored 97.25% (best of 4) in CBSE, Class XII. *2016*
- **International Mathematics Olympiad (Science Olympiad Foundation)**
  International Rank: 241 (2013); 414 (2012) | Awarded Gold Medal (School Topper) *2012 -2013*
- **All India Rank 4, NASA Astronomy Olympiad**
  Among 6000+ shortlisted candidates. *2013*

Teaching Experience

- **Deep Learning (CSE 641)**
  Teaching Assistant for a class of 120 undergraduate and postgraduate students. *Jan 2020 - May 2020*
- **Machine Learning (CSE 543)**
  Teaching Assistant for a class of 150 postgraduate students. [Course page] *Aug 2019 - Dec 2019*

Co-curricular Activities

- **Talks**
  - **Winter School on Artificial Intelligence:** Conducted labs and tutorials for Deep Learning Module.[Tutorial]
  - **Disentangling Video Sequences using Gaussian Processes:** Presentation on current advances in generative disentanglement at Bioinformatics Institute, A*STAR, Singapore.[Slides]
- **Volunteering**
  - **ACM Student Chapter:** Conducted mentoring and networking sessions for students with professionals.
  - **Esya | Technical Fest, IIIT-Delhi:** Organized Design360 (design hackathon 2018, +200 participants) and Chakravyuha (online cryptic hunt 2017, +250 participants).
  - **WiT | Women in Tech Club:** Mentoring sessions for coding practices and various opportunities for women in tech.

References

- **Dr. Nengli Lim**: Assistant Professor, Singapore University of Technology and Design (SUTD)[Contact]
- **Dr. Saket Anand**: Director of Infosys Center of Artificial Intelligence, Assistant Professor, IIITD [Contact]
- **Dr. Rajiv Ratn Shah**: Director of Multimodal Digital Media Analysis(MIDAS), Assistant Professor, IIITD [Contact]