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.
- **Skills**: Python, C++, 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**, Vivek Gupta, Avinash Swaminathan, Debanjan Mahata, Rakesh Gosangi, Haimin Zhang, Rajiv Ratn Shah, Amanda Stent. Two-Step Classification using Recasted Data for Low Resource Settings. In *Acia-Pacific Chapter of the Association for Computational Linguistics (AACL-IJCNLP) 2020.*

- **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]

- 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**: Teaching an agent to replicate an image as strokes on canvas using DDPG, TD3. [Slides][Code]
  - *Course Project: Reinforcement Learning; Instructor: Dr. Sanjit Kaul*

- **Learning Transferable Co-operation**: Modelling multi-agent behavior for coverage, formation, line control. [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*

- **Chain Reaction**: A JavaFX based application for the android game - Chain Reaction. [Slides][Code]
  - *Course Project: Advanced Programming; Instructor: Dr. Vivek Kumar*

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]