HIRESH GUPTA

Member of Technical Staff - II, Adobe Systems

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EDUCATION

Birla Institute of Technology and Science, Pilani *Jul'14 - May'18*
B.E. (Hons) in Computer Science Engineering
CGPA: **9.05** (*Passed with Distinction*)

DAV Public School, New Shimla *2014*
All India Senior School Certificate Examination, Percentage: **97.4** %

PUBLICATIONS

Form2Seq : A Framework for Higher-Order Form Structure Extraction [PDF]
Milan Aggarwal, **Hiresh Gupta**, Mausoom Sarkar, Balaji Krishnamurthy
Accepted at the Conference on Empirical Methods in Natural Language Processing (*EMNLP 2020*)

Document Structure Extraction using Prior based High Resolution Hierarchical Semantic Segmentation [PDF]
Mausoom Sarkar, Milan Aggarwal*, Arneh Jain*, **Hiresh Gupta***, Balaji Krishnamurthy
Accepted at the European Conference on Computer Vision (*ECCV 2020*)

Multi-Modal Elements Association Approach for Form Structure Extraction [PDF]
Milan Aggarwal, Mausoom Sarkar, **Hiresh Gupta**, Balaji Krishnamurthy
Accepted at the IEEE Winter Conference on Applications of Computer Vision (*WACV 2020*)

Powering Robust Fashion Retrieval With Information Rich Feature Embeddings [PDF]
Ayush Chopra*, Abhishek Sinha*, **Hiresh Gupta***, Mausoom Sarkar*, Balaji Krishnamurthy
Accepted at the IEEE Computer Vision and Pattern Recognition Workshop (*CVPR 2019*)
[Best Paper Award] [Slides] [Poster]

PATENTS

Improving Performance of Neural Networks using Learned Specialized Transformation Functions *US 16/534,856. (Filed)*

Identifying Digital Attributes from Multiple Attribute Groups Within Target Digital Images Utilizing Deep Cognitive Attribution *US 16/564,831. (Filed)*

Methods for Exploring and Recommending Matching Products Across Categories *US 16/417,373. (Filed)*

Digital Image Search Training using Aggregated Digital Images *US 16/177,243. (Published)*

EXPERIENCE

Adobe Systems, India AEM Forms
Member of Technical Staff-I *Jul'18 - Jun'19*

- Worked on a fresh project which focused on digitizing print forms into interactive *Adaptive Forms* by automatically extracting the **hierarchical document structure**. Designed multiple network architectures to address this problem by performing **semantic segmentation** on document images.

- Our work (paper) on *High-Resolution segmentation of Form Document Images* got shipped as Automated Forms Conversion Service in **Adobe Sensei**. [Blog]

Member of Technical Staff-II   Jun'19 - Present

- Focused on customer-oriented research and driving continuous innovation to the service.

- Worked on designing **multi-modal networks** that leverage spatial and textual information in addition of visual inputs to further improve the accuracy.

- *Published two more papers* in WACV 2020 and EMNLP 2020 in relation of the same project.

Media and Data Science Research Lab, Adobe Inc   Jan'18 - Jul'18
Computer Vision Research Intern   *Advisor: Balaji Krishnamurthy*

- Worked on deep learning based **Visual Product Search**, which segments different products in a wild image and performs search in a large catalogue.

- Proposed a *novel* **grid-based training** for *Siamese networks*, allowing it to observe multiple positive and negative image instances simultaneously. The research was awarded the Best Paper Award at *CVPR 2019 Workshop* on *Fashion and Subjective Search*.

- Presented my project in a *Tech Fair* event at *Adobe Tech Summit, 2019*. It is currently in pre-deployment phase within *Adobe Sensei*.

BITS Pilani   Jan'17 - Dec'17
Teaching and Research Assistant

- **Teaching Assistant - Computer Programming**: Assisted **Prof. Vishal Gupta** in conducting lab sections, exams and lectures for first year students.

- **Research Assistant - Prof. Poonam Goyal**: Conducted research on *Text Generation for Images* at *Web Intelligence & Social Computing Laboratory*, BITS Pilani.

Samsung Research Institute, Noida   May'17 - Jul'17
Software Development Intern   *Advisor: Moolchand Tyagi*

- Contributed for development of a new *Bluetooth Low Energy Profile* on Air Toxicity, to create a standard platform for all air quality sensing devices.

Indian Institute of Remote Sensing, ISRO   May'16 - Jul'16
Research Intern   *Advisor: Vinay Kumar*

- Worked on the *Development of Data Cube* for Uttrakhand State in India, to store and retrieve large volumes of Earth Observation data by stacking satellite tiles over time.

MAJOR ACADEMIC & INDUSTRIAL PROJECTS

Document Image Generation using Generative Adversarial Networks   Apr'20 - Aug'20

- Trained a pix2pix based **Image translation** network to generate a Document Image for a given layout. Used attention for blending textual information to generate real-like documents.

- Leveraged layout (mask) and pix2pix generated output (Image) information to further improve our segmentation network accuracy in solving complex patterns and layouts.

Semantic Mapper for Meta Modal matching   Apr'19 - Nov'19

- Focused on learning a semantic mapping between form fields and schema. Used perceptron-tagger and english grammar to perform meta-modal matching for *Automated Forms Conversion Service*.

Water Quality Analysis using Machine Learning Techniques   Jul'17 - Dec'17
Guide: Dr. JL Raheja

- Applied statistical analysis and **machine learning techniques** to monitor water quality from different water sources in India.

Automated Image Captioning using Multimodal Recurrent Nets   Jul'17 - Dec'17
Guide: Prof. Poonam Goyal

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- Designed an end to end model for generating sentence long descriptions of an input scene using **CNNs** to extract image features and **RNNs** to decode them into natural language. Used *Beam Search*, *Scheduled Sampling* & *Caption re-ranking* strategies to improve the caption quality.

- Focused on incorporating *contextual knowledge* to improve visual representations for handling complex scenes. Also, explored other options to *apply vision concepts* to fields where currently text is used more often, such as *Indexing images for tag-based search*.

Image Super Resolution using deep Convolutional Neural Networks   Aug' 16 - Dec'16
Guide: Prof. Surekha Bhanot

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- Implemented a **deep CNN model** in NumPy to generate a higher quality/ detailed version of the low-quality input image.

- The model outperformed the traditional heuristic based approaches on Timofte benchmark. The research was also presented in a paper at *APOGEE, BITS Pilani*. (Certificate)

ACHIEVEMENTS AND AWARDS

Best Paper Award - CVPR 2019 Workshop
Won the Best Paper Award at (FFSS-USAD) held at CVPR 2019.

Early Promotion - Adobe
Promoted to Sr. Member of Technical Staff within 9 months of joining Adobe.

Institute Merit Scholarship - BITS Pilani
Recipient of Institute Merit Scholarship, offered to top 2 % students in the university.

All India Rank - 117 JEE (Joint Entrance Examination) - Mains
Secured an All-India-Rank of 117 out of 10 lakh candidates (99.98 percentile).

POSITIONS OF RESPONSIBILITY

President - Renewable Energy Club
Responsible for club activities throughout the year, and club events in the cultural and technical fests. Organized Green Week in BITS campus to spread awareness through various events and drives.

Publicity Head - Coding Club
Responsible for conducting club events and managing the publicity work throughout the year.

TECHNICAL STRENGTHS AND INTERESTS

Programming	Python, Java, Scala, C/C++
Machine Learning	TensorFlow, Pytorch, Keras, NLTK, Spacy, NumPy, OpenCV, scikit-learn
Softwares/IDE	PyCharm, IntelliJ, Microsoft VS Code, Adobe Photoshop
Research Interests	Computer Vision, Multimodal Learning, Motion Planning, Self-Driving Cars

SELECTED COURSEWORK

Mathematics: Multivariable Calculus, Linear Algebra, Probability Statistics, Differential Equations.

Data Sciences: Machine Learning, Neural Networks, Information Retrieval, Cognitive Computing.

Software Engineering: OOP, OS, Data Structure & Algorithms, Database Systems.

MOOC: Stanford's CS231n: CNNs for Visual Recognition; deeplearning.ai specialization (Certificate).