

# DESH RAJ

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1 E University Pkwy, Unit 904, Baltimore 21218

## EDUCATION

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### Johns Hopkins University

*ongoing*

Ph.D. in Computer Science

*Advisors:* Daniel Povey, Sanjeev Khudanpur

### Indian Institute of Technology Guwahati

*June 2017*

B.Tech. in Computer Science & Engineering

GPA: 9.35/10

*Thesis:* Relation extraction in clinical text using deep learning

## PROJECTS

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### Irony detection in English tweets

January 2018

- Used circular cross-correlation between tweet text and hashtags to model irony and transfer learning from pretrained DeepMoji model for in-text irony detection
- Achieved 70% accuracy on validation set in SemEval 2018 Task 3

### Relation classification in biomedical text

Bachelor Thesis

*Guide: Prof. Ashish Anand, Dept. of CSE*

- Implemented a novel CRNN model to learn long and short term dependencies and evaluated attention-based pooling
- Achieved state-of-the-art performance on two benchmark datasets (i2b2 and DDI) without any manual feature engineering
- Recently devised a Graph CNN model to leverage information from dependency parse of the sentence; this outperforms earlier model.

### Spatial Transformer Networks

Fall 2016

*Guide: Prof. Arijit Sur, Dept. of CSE*

- Used STNs for activity prediction from egocentric images
- Achieved performance comparable to state-of-the-art on GTEA and Intel Egocentric Vision datasets with extremely fast convergence.

### Pattern recognition in multidimensional fuzzy sets

Summer 2015

*Guide: Prof. Frank Rhee, Hanyang University*

- Proposed an algorithm to select multidimensional fuzzy membership functions according to data, using Wilcoxon's nonparametric tests
- Extended the method for high-dimensional data using dimensionality reduction approaches like PCA, kernel PCA, probabilistic PCA, and t-SNE
- Worked on improving clustering performance of fuzzy ART algorithm by integrating Interval Type-2 approach into vigilance parameter computation and improved classification results by 5-10%

## EXPERIENCE

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**Samsung Research Institute Bangalore**  
*Research Engineer*

June 2017 - June 2018  
*Bangalore, India*

- Conceptualized and implemented several key features like undo, selective delete, etc., as part of Context Engine team in Conversational Intelligence
- Devised a bit truncation method to reduce word embeddings size for on-device AI; achieved 75% compression with 95% correlation in word similarity task

**Microsoft India**  
*Software Development Engineering Intern*

May 2016 - July 2016  
*Hyderabad, India*

- Developed a cross-platform mobile application in Xamarin Forms for OEM digital contracting system
- Evaluated various notification services and implemented GCM for push notifications
- Conceptualized statistics APIs to improve business efficiency

## PUBLICATIONS

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### Conference

- **D.Raj**, S.K.Sahu, A.Anand, *Learning local and global contexts using a convolutional recurrent network model for relation classification in biomedical text*. SIGNLL Conference on Computational Natural Language Learning (CoNLL) 2017. PP 311–321
- **D.Raj**, A.Gupta, K.Tanna, B.Garg, F.C.H.Rhee, *Principal component analysis approach in selecting type-1 and type-2 fuzzy membership functions for high-dimensional data*. In Proceedings: 17<sup>th</sup> World Congress of International Fuzzy Systems Association 2017.
- **D.Raj**, B.Garg, K.Tanna, F.C.H.Rhee, *Visual analysis and representations of type-2 fuzzy membership functions*. In Proceedings: IEEE International Conference on Fuzzy Systems 2016. PP 550–554

### Journal

- **D.Raj**, A.Gupta, B.Garg, K.Tanna, F.C.H.Rhee, *Analysis of data generated from multidimensional type-1 and type-2 fuzzy membership functions*. IEEE Transactions on Fuzzy Systems.
- S.Majheed, A.Gupta, **D.Raj**, F.C.H.Rhee, *Uncertain Fuzzy Self-organization based Clustering: Interval Type-2 Approach to Adaptive Resonance Theory*. Information Sciences 424 (2018). PP 69–90

## ACHIEVEMENTS

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Receipient of **INAE Travel Grant Scheme** by Govt. of India for oral presentation at WCCI 2016

Receipient of **Kalyani Research Scholarship** from Alumni Affairs (IIT Guwahati) for publishing at an international conference during B.Tech.

Offered **INSPIRE scholarship** by Dept. of Science and Technology, Govt. of India, for being among the top 1% in AISSCE-2013

## TECHNICAL SKILLS

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<b>Programming Languages</b>	Python, C, C++, Java, C#
<b>Libraries &amp; Frameworks</b>	Tensorflow, Keras, PyTorch
<b>Software</b>	MATLAB, Visual Studio, Eclipse, Android Studio, L <sup>A</sup> T <sub>E</sub> X
<b>Operating Systems</b>	Linux, Windows