Desh Raj

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EDUCATION

Bachelor of Technology
Indian Institute of Technology Guwahati, India, June 2017
Major: Computer Science and Engineering
Aggregate: 9.35/10 (Latest GPA 9.81)

RESEARCH INTERESTS

Natural language processing, deep learning, computer vision, fuzzy logic systems

PROJECTS

Relation classification for clinical 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

Text readability analysis using language models Spring 2017
Guide: Prof. Ashish Anand, Dept. of CSE

- Developed an unsupervised approach for predicting text readability scores using different language models
- Implemented statistical and deep-learning models, for comparing results with vocabulary-based and syntactic approaches

Fault detection in manufacturing Spring 2017
Guide: Prof. Rashmi Dutta Baruah, Dept. of CSE

- Worked on feature selection for very high-dimensional data using Gradient Boosting, and representation of categorical features by a single numeric feature using STG and RDA methods
- Also proposed a meta-optimization of the evaluation metric using Bayesian optimization, as a post-classification step

Spatial Transformer Networks Fall 2016
Guide: Prof. Arijit Sur, Dept. of CSE

- Used STNs for object recognition and acitivity prediction from egocentric images, working with GTEA and Intel Egocentric Vision data sets

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

Research Engineer - Samsung R&D Bangalore July 2017 - Present
Manager: Vikram Mupparthi, AlterEgo (Smart Assistant)

- Part of the Context Engine module within the Smart Assistant team, and involved in developing a calendar manager that stores history and infers input based on prior context
- Built unit testing framework, and working on improving collaboration by adding user interaction points

Software Developer Intern - Microsoft India Summer 2016
Manager: Sarang Date, OEM-ECIT

- 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

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^{th} 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

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

Languages & Software: Python, C, C++, Java, C#, Tensorflow, Xamarin, MATLAB, Visual Studio, Eclipse, Android Studio, LaTeX
Operating Systems: Linux, Windows.

EXTRA-CURRICULAR ACTIVITIES

- Literary Secretary, Manas hostel (2014-2015)
- Member, National Service Scheme (2014-2015)
- Student Mentor, Counselling Cell, IIT Guwahati (2015-2016)