## Sudeep Raja Putta


**Contact Information**

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**Research Interests**

Reinforcement Learning, Machine Learning Theory, Optimization and Algorithms

**Education**

**Indian Institute of Technology, Kharagpur** July 2012 to May 2016
Bachelor of Technology (Honors), Computer Science and Engineering
CGPA: 8.88/10.0

**Work Experience**

**Xerox Research Center India, Bangalore** June 2016 to present
Budding Scientist Mentor: Theja Tulabandhula, Ph.D
Machine Learning and Statistics group, Algorithms and Optimization group

**Publications**

1. **Sudeep Raja Putta**, Theja Tulabandhula "Pure Exploration in Episodic Fixed-Horizon Markov Decision Processes". *Extended Abstract at AAMAS 2017.*

**Research Experience**

**Pure Exploration in Episodic Fixed-Horizon Markov Decision Processes**
Research Project, Xerox Research Center India Sept 2016 to present

- Proposed an algorithm based on **PSRL** and **Pure Exploration Thompson Sampling** for Pure Exploration in episodic fixed horizon MDPs.
- Empirically showed that our algorithm achieves **Deep exploration** and requires fewer episodes to reach a fixed confidence level.
- Empirically showed that our algorithm achieves good posterior distributions within a fixed budget.

**Memory based Function Approximation**
Research Project, Xerox Research Center India July 2016 to present

- Proposed **Q-value approximation** heuristics using **K-Nearest Neighbour** regression and **LRU** memory.
- Implemented dynamic nearest neighbour searching using R-trees.
- Investigated the dependence of the performance of the agent on the LRU memory size using environments in **OpenAI Gym**.

**Human Activity Recognition in Temporally Untrimmed Videos**
Bachelor's Thesis Project, IIT Kharagpur July 2015 to April 2016

- Trained deep neural networks consisting of **convolutional layers** and **recurrent LSTM layers** for human activity recognition and detection in videos.
- Used a subset of the UCF-101 and Thumos'15 dataset to train and test the networks.
- Showed that using Dense optical flow images along with RGB frames gave higher accuracy than late fusion of optical flow and RGB features.

**Ambulance Response Time Optimization**
Research Project, IIT Kharagpur Nov 2014 to Jan 2015

- Modelled the problem of Ambulance Facility location in a city as a **Facility Location problem**.
- Created a graph using traffic and accident data collected from on the city of Bangalore.
- Used a Tabu search heuristic to find a set of locations to position ambulances, in order to reduce response time.

**Online Certification**

**Machine Learning Engineer Nanodegree, Udacity** June 2016
Capsotone Project : Human Activity Recognition Using Smartphones

## Research Internships

**Tracking Idea Evolution in Discussion Forums**
Cognitive Solution Group, IBM Research Labs, Bangalore — May 2015 to July 2015
- Developed heuristics for identifying the Ideas proposed in a forum and for tracking their evolution in form of a tree using **Latent Dirichlet Allocation**.

**Text Recognition using Bidirectional LSTMs**
Centre for Visual Information Technology, IIIT Hyderabad — May 2014 to July 2014
- Trained **Bidirectional LSTM** neural networks with a **CTC** layer for recognizing words from raw images of Indian language scripts.

## Awards

**Winner** of **Xerox Research Innovation Challenge 2015**
For the work done on **Ambulance Response Time Optimization**

**Runners up** at **Microsoft Code Fun Do 2015**
For developing the mobile app **Artify**, similar to Prisma

## Technical Experience

**Programming** — Python, C++, C, Java
**Packages** — Numpy, Scipy, Scikit-learn, Keras, OpenCV

## Presentations

Xerox Research Center India
- Pure Exploration in Episodic Fixed-Horizon MDPs — November 2016
- Introduction to Reinforcement Learning — September 2016

Deep Learning Reading Group, IIT Kharagpur
- Deep Learning for Activity Recognition — March 2016
- Training Deep Networks — March 2016

IBM Research Labs, Bangalore
- LDA and related Topic Models — May 2015

## Extra Curricular Activities

**Blogging about mathematics, machine learning and algorithms**
http://sudeepraja.github.io/blog/
Recent Posts:
- Bayesian Inference and the bliss of Conjugate Priors
- Multi Armed Bandits and Exploration Strategies
- Die rolls and Concentration Inequalities
- A Derivation of Backpropagation in Matrix Form

**Conducted a quiz on Computer Science for High Schoolers** — 12 Nov 2016
St.Paul's High School, Himayatnagar, Hyderabad