

Curriculum Vitae
Bhanu Teja Gullapalli
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CONTACT INFORMATION	Graduate Student University of Massachusetts Amherst, USA	<i>mobile:</i> +1-(413) 404-7791 <i>E-mail:</i> bgullapalli@cs.umass.edu bhanutejaiit@gmail.com
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RESEARCH INTERESTS	Machine Learning, Graphical Models, Learning Theory, Bioinformatics
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EDUCATION	Ph.D. in Computer Science, <i>University of Massachusetts, Amherst, USA</i>	Sep'18 - Present
	Masters in Computer Science, <i>University of Massachusetts, Amherst, USA</i>	Jan'17 - Sep'18 CGPA-4.0/4.0
	Bachelor of Technology in Computer Science, <i>Indian Institute of Technology(IIT), Guwahati, India</i>	Jun'11 - May'15 CPI-7.81/10

RESEARCH PROJECTS	Cocaine Craving Prediction <i>Guide: Tauhidur Rahman, Deepak Ganesan Dept. of Computer Sciences, UMass</i> Predicting the craving level of a drug patient by observing the ECG signal from on body sensors so that we can intervene the user before the drug is taken. Initial work is restricted towards laboratory setting where the environment is strictly controlled. Our initial question is whether ECG data just prior to taking a drug can be differentiated from ECG data through normal day. We would like to address this problem by throwing this as an classification problem. We then would like to proceed identifying the craving level. We plan to experiment with various traditional features of ECG as well as Unsupervised features of the ECG waveform.	Feb'18 - Feb'19
	Growing Tree-Structured Detector Cascade <i>Guide: Benjamin M. Marlin, Dept. of Computer Sciences, UMass</i> Developed a novel way to grow and find the optimal configuration of a tree structured cascade using the idea of neutral predictor. Tested on Mobile Health dataset, this method increased the accuracy and F1-Score significantly. Brought down the computational complexity from exponential to linear.	May'17 - Aug'17
	Community Detection Algorithms <i>Guide: Saswata Shannigrahi, Dept. of CSE, IIT Guwahati</i> Comparative study of behavioral based vs structural based community detection methods using goodness metrics- modularity and like-mindedness was performed. Then introduced two new algorithms- modified louvain method and like-mindedness maximization. Unlike louvain method, modified louvain increases both modularity and like-mindedness. Like-mindedness maximization is bottom-up hierarchical clustering approach which maximizes like-mindedness metric by discouraging the merging of big communities.	May'13 - Jul'14
	Custom Font Generation <i>Guide: Benny George, Samit Bhattacharya Dept. of CSE, IIT Guwahati</i> Font generation for user using geometrical properties of a curve. First, given input	Aug'14 - May'15

is interpolated into B-splines. Then we created a function between spline curves and characters. By using the input splines and function, generated all possible characters.

KEY ACADEMIC PROJECTS

Drug Target prediction using Deep Representation Learning *Jan'18-Present*

- Traditional methods had involved using naive representations for drugs and proteins which resulted in a low performance and the results were very hard to interpret.
- Using the idea of Graph convolution to represent the drugs, as they are more interpretable and stable. Protein sequence will be converted to a smaller vector representation using an LSTM, similar to word embeddings. The hypothesis is better representation guarantees better results.
- Finally, Using Attention Mechanism to better interpret the results i.e. which part of the protein interacts which part of the drug structure.

Improving the practical effectiveness of a best arm algorithm and extending it to top K arm in stochastic multi-armed bandit *Oct'17-Dec'17*

- Exponential gap, a best prediction algorithm guarantees good theoretical bounds but fails miserably in practical situations.
- By improving the elimination criteria, made it practically effective against current state-of-art best arm algorithms.
- This algorithm is then extended to Top K arm selection by changing the sampling rate. The sample complexity of this modified algorithm is better than the current state-of-art Top K arm selection algorithms.

Extending Learning-to-Optimize *Oct'17-Dec'17*

- Removing the hyperparameters in optimization algorithms of neural networks by trying to learn these hyperparameters at each step of the iteration.
- Using RNN whose input is the optimization algorithm's input, by inputting this RNN with all current standard optimization algorithm's input together with a goal to learn over these depending on the current position in function space.

Tags prediction for Stack Overflow questions using linear CRF *Mar'17-May'17*

- Using the idea of cascading, initial predicted tags are used as features for later predictions.
- Information present in body of post and code information if provided are treated differently. These two changes gave the best accuracy so far present on this dataset.
- Features considered here include user details, question information, time posted etc.

Optical Character Recognition Using Conditional Random Field(CRF) *Mar'17-Apr'17*

- Implemented chain structured CRFs to recognize English words from grayscale images.

- Implemented belief propagation for efficient inference and achieved 90% character-level accuracy

Heart Disease Prediction Using Graphical Models

Mar'17-Apr'17

- Modeled and implemented Bayesian Networks using various factors that could affect heart disease.
- Implemented maximum likelihood learning from scratch and achieved 81% accuracy

Disease candidate gene identification and prioritization

Feb'15 - Apr'15

- Disease Gene prioritization using HITS and Page Rank.
- Comparing and analyzing this with results of standard techniques like Toppgene and ENDEAVOUR.

Mini Projects

- Created a model based on General Full Factorial, and analyzed average download speeds of files in DC++.
- Implemented mini search engine which search for a phrase in large number of text file in order of length of phrase.
- Developed a compiler for a subset of C-like programming Language (LL1 grammar) using tools like flex and bison
- Built database application for hospital management.
- Implemented Z buffer algorithm to remove hidden surfaces for set of cubes, Sutherland-Hodgeman Polygon Clipping algorithm, scan filling algorithm.

PUBLICATIONS Deepak, T. S., Adhya, H., Kejriwal, S., **Gullapalli, B.**, & Shannigravi, S. (2016, July). A new hierarchical clustering algorithm to identify non-overlapping like-minded communities. In Proceedings of the 27th ACM Conference on Hypertext and Social Media (pp. 319-321). ACM.

WORK

Software Engineer

Jul'15 - Nov'16

EXPERIENCE

Samsung R&D Institute, Bangalore, India

Worked in Video Editor Team of Samsung camera. Primary work was in the applications-Video Editor(Pro/Lite), Highlight player, Slow Motion. Developed and implemented theme mode in Video Editor Pro which assists the user in creating stories (Available from S8 device onwards). Developed a camera based application which uses different composition tools to aid the user in taking good pictures.

Intern

May'14 - Jul'14

Samsung R&D Institute, Bangalore, India

Developed a simulation of OLSR (Optimized Link State Routing) Protocol for Tizen OS. Added APIs which extended the functionalities of the network

TECHNOLOGY SKILLS

Languages: C, C++, Python, Java, Assembly, SQL, Prolog, L^AT_EX.
Packages used: Numpy, Scipy, Theano

ACHIEVEMENTS

- Received Spot Award in Samsung R&D Institute Bangalore for providing good solutions and for coding skills
- Won first prize in an tech-fair at Samsung R&D Institute Bangalore
- Listed among top 0.3% students of 0.5 million appearing in Joint Entrance Exam, IIT-JEE 2011
- Secured 961 rank in All India Engineering Entrance Exam (AIEEE) 2011 taken by 1.2 million people.

COURSES

Theory: Machine Learning Theory, Optimization, Structural Complexity, Theory of computation, Discrete Maths, Data Structures, Algorithms, Probability and Random Processes, .

Systems: Digital Design, Computer Organization and Architecture, Operating Systems, Compilers, Databases, Computer Graphics, Multimedia Systems.

Artificial Intelligence: Artificial Intelligence, Machine Learning, Probabilistic Graphical Models, Computational Biology, Data Mining .

Labs: Databases, Compilers, Networks, Peripherals, System Software, Software Engineering, Systems Programming, Hardware.

EXTRA CURRICULAR ACTIVITIES

- Active member of SIGACT (Special Interest Group in Algorithms and Computation Theory), IIT Guwahati 2013-2015