Priyesh Vijayan

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RESEARCH INTERESTS

DEEP LEARNING: Graph Convolutional Networks • Structured prediction tasks
MACHINE LEARNING: Class imbalance • Semi-supervised & Multi-view learning • Active learning
SOCIAL NETWORK ANALYSIS: Node classification • Network Representation learning

EDUCATION

INDIAN INSTITUTE OF TECHNOLOGY MADRAS, CHENNAI
MS by Research in Computer Science and Engineering
Jan'15 - Oct'18 Expected |• CGPA: 8.4 / 10

SRI VENKATESWARA COLLEGE OF ENGINEERING | ANNA UNIVERSITY, CHENNAI
B.E in Computer Science and Engineering
Aug'09 - May'13 | CGPA: 7.29 / 10

EXPERIENCE

KLA-TENCOR, CHENNAI | Intern
June 2016 – Dec 2016 | Supervisor: Dr. Mohan Mahadevan & Prof. Balaraman Ravindran
Project: Defect identification in SEM images | An IITM-KLA Tencor Collaboration

- Involved in designing ConvNets and shared representation learning architectures specific to the problem

RISE-IIL, INDIAN INSTITUTE OF TECHNOLOGY MADRAS | Project Associate
July 2014 – May 2015 | Supervisor: Dr. Balaraman Ravindran
Project: Wafer data inspection | An IITM-KLA Tencor Collaboration

- Worked on extreme binary and multiple classes class imbalance classification problems to detect defects in wafers.
- Proposed models that handled class imbalance by leveraging semi-supervised, multi-view and active learning setups.

ERICSSON R&D | Research Intern
May 2013 – Aug 2013 | Supervisor: Shivashankar Subramanian

- Worked on learning from heterogeneous data sources for attributed networks.
- Proposed a Co-Training based framework for multi-label learning in multi-relational networks with multiple attributes.
- Worked on data analysis and alarm predictions with Telecom data.

GLOBAL OPERATIONS TEAM | PAYPAL | Intern
Dec 2011| Supervisor: Ms. Bhaduri Raju Naidu

- Developed a web application tool with J2EE and MYSQL for Resource mapping and Reporting

PATENTS

USER CATEGORIZATION IN COMMUNICATIONS NETWORKS | United States 20150236910
Work done during internship at Ericsson R&D | Collaborator: Shivashankar Subramanian

PUBLICATIONS AND PRE-PRINTS

HOPF: HIGHER ORDER PROPAGATION FRAMEWORK FOR DEEP COLLECTIVE CLASSIFICATION
Eighth StarAI workshop at IJCAI 2018 | arXiv:1805.12421
Collaborators: Yash Chandak, Dr. Mitesh Khapra & Dr. Balaraman Ravindran

F-GCN: FUSION GRAPH CONVOLUTIONAL NETWORKS
Fourteenth MLG workshop at KDD 2018 | arXiv:1805.12528
Collaborators: Yash Chandak Dr. Mitesh Khapra & Dr. Balaraman Ravindran

SSNMF: SEMI-SUPERVISED NON-NEGATIVE MATRIX FACTORIZATION FOR NODE REPRESENTATION LEARNING | Third Indian Workshop on Machine learning
Collaborators: Anasua Mitra Dr. Balaraman Ravindran

MULTI-LABEL COLLECTIVE CLASSIFICATION IN MULTI-ATTRIBUTE MULTI-RELATIONAL NETWORK DATA | IEEE/ACM ASONAM 2014
Work done during internship at Ericsson R&D | Collaborators: Shivashankar Subramanian & Dr. Balaraman Ravindran

GRID SCHEDULING USING IMPROVED PARTICLE SWARM OPTIMIZATION WITH DIGITAL PHEROMONES | IJSER 2012 Proceedings
Collaborators: A P Sarath Chandar & Dr. Doreen Robin

PROGRAMMING

LANGUAGES
Expert: Python, MATLAB
Intermediate: C++ • Java • C

LIBRARIES
TensorFlow

RECENT COURSES: 2015-2018

CS5011: INTRODUCTION TO MACHINE LEARNING | CS6310: ARTIFICIAL NEURAL NETWORKS | CS7015: DEEP LEARNING | CS6012: SOCIAL NETWORK ANALYSIS | CS6720: DATA MINING | CH5440: MULTIVARIATE DATA ANALYSIS |

AWARDS

PANICKKER AWARD | 2011-2012 | Institute level
This award is given to a pre-final year undergraduate student for exceptional academic performance and significant contribution to professional activities. It carries a citation, a rolling shield and a cash prize.

CONFERENCES & SUMMER SCHOOLS

ORAL PRESENTATION International Conference on Emerging Trends, ICET | 2012
POSTER PRESENTATIONS Eighth Statistical Relational learning Workshop at IJCAI 2018
RBC-DSAI Workshop on Recent Progress in Data Science & AI, IITM | 2017
MICROSOFT SUMMER SCHOOL ON MACHINE LEARNING, IISC | 2015
DEEP LEARNING SUMMER SCHOOL, IIIT-H | 2016

EXTRA CURRICULAR

PROGRAM COMMITTEE MEMBER FOR CODS-COMAD 2018
SUBREVIEWER FOR AAAI 2017
FIRST RUNNER UP| IBM THE GREAT MIND TECH QUIZ | 2011 | Regional
WINNER | MY IDEA PROGRAM INSTITUTE LEVEL | 2011 | Institute level
ORAL & POSTER PRESENTATION | 2012 | My Idea Program Regionals
SEMI-FINALIST | INNOVATION DAY | 2011 | Institute level
NATIONAL SOCIAL SERVICE (NSS) AND ROTORACT MEMBER | 2009-2013
Actively participated in social welfare activities for the betterment of the rural area near by our college

TEACHING

ACM INDIA SUMMER SCHOOL ON DATA SCIENCE | June 2018 | National level
TA for 5 lab sessions on Machine learning
COMMUNICATION SKILLS MENTOR | 2010-2012 | Institute level
Designed and conducted interactive English improvement sessions for students from rural background
C-TRAINING TUTOR | 2011-2012 | | Institite level
Taught C Programming for M.C.A and junior B.E students

OFFICES HELD

CHAIRPERSON | SVCE-ACM STUDENT CHAPTER | 2012-2013
GENERAL SECRETARY | ASSOCIATION OF COMPUTER ENGINEERS (ACE) | 2011-2012
RESEARCH COMMITTEE HEAD | SVCE-ACM | 2011-2012
LIBRARY COMMITTEE REPRESENTATIVE | 2011-2012
EXECUTIVE MEMBER | ACE | 2010-2011
CLASS COMMITTEE MEMBER | 2010-2011
CLASS REPRESENTATIVE | 2009-2010
BOYS HOSTEL REPRESENTATIVE | 2009-2010

EVENTS ORGANIZED

STUDENT CO-COORDINATOR | NATIONAL LEVEL PROGRAMMING CONTEST, NLPC | 2012
First of its kind from our college which saw a participation of 491 students.

ORGANIZER | ASIA LEVEL PROGRAMMING CONTEST, NLPC | 2012
It was an online contest, where other student chapters from Asian countries participated
COORDINATOR | INTERRUPT, CS DEPT SYMPOSIUM | 2012
Well organized with interesting set of events which attracted 4 times the crowd as that of the previous year
ORGANIZED LECTURES: | 2009-2012
Membrane computing workshop, various guest lectures on Web 2.0, TCS, FGPA and Android
ORGANIZED C-TRAINING CLASSES FOR CS AND M.C.A DEPT. | 2012

CERTIFICATIONS & TESTS

TOEFL: TEST OF ENGLISH AS A FOREIGN LANGUAGE | 106/120
GATE: GRADUATE APTITUDE TEST IN ENGINEERING | 97.433 PERCENTILE
COURSERA: ANDREW NG'S MACHINE LEARNING COURSE [100%] | 2013
IBM CERTIFIED DATABASE ASSOCIATE, DB2 9 FUNDAMENTALS [85% - #1 IN COLLEGE] | 2011
IBM CERTIFIED DEPLOYMENT PROFESSIONAL, TIVOLI DIRECTORY SERVER V6.3 [90%] | 2012
COGNIZANT CERTIFIED STUDENT | 2012

FEW RESEARCH PROJECTS

IS LARGER (MULTI-HOP) NEIGHBORHOOD INFORMATION USEFUL ? | JAN-MAY'15

- Existing works for relational learning typically dismissed the use of higher-order neighborhood information
- I showed that higher-order information such as nodes' structural roles and community information were useful in achieving improved performance for protein function prediction.

HOW TO REDUCE THE HYPERPARAMETERS FOR GRAPH EMBEDDING METHOD ? | DEC'16-FEB'17

- Existing Random walk (RW) based methods require numerous hyperparameters to learn node embeddings.
- I proposed to a Graph Language Model (GLM) with RNNs that learned to predict shortest path between nodes.
- Embeddings learned with GLM incorporated depth information and avoided hyperparms required for biasing the RW. The proposed method fared similar to or better than SoAs.

ARE EMBEDDINGS SUFFICIENT FOR THE END TASK? | FEB'17-MAY'17 | TEAM: YASH CHANDAK

- Embeddings alone does not provide finer control to model information diffusion in networks
- We classified nodes by modeling information propagation to the nodes from all of their k-hop shortest paths.
- The GLM can be perceived as a Data Structure with embeddings as data and DFS or BFS walks as it operators. We demonstrated that modeling paths explicitly instead of node structure improves node classification task

GATED ATTENTION PROPAGATION (GAP) KERNELS? | JUNE'17-AUG'17 | TEAM: YASH CHANDAK

- Existing models use fixed weights for combining node and neighborhood information and moreover assume all neighbors are equal.
- We proposed mechanisms to learn a gating function to combine node and neighborhood information and as well learn an attention function to reweigh the edge weights.

HOPF: HIGHER ORDER PROPAGATION FRAMEWORK | SEP'17-NOV'17 | TEAM: YASH CHANDAK

- Showed that the popular Weisfeiler-Lehman Kernels suffered from Node Information Morphing.
- Proposed Iterative differentiable graph kernels that exploited label information and scaled beyond memory limitations of differetiable kernels
- Proposed Node information preserving kernels and Fusion graph kernels that effective captured information from multiple hops.
- HOPF is a highly scalable mini-batch implementation with sparse operators. The models achieve a Superior state of the art results on 11 datasets from different domains.

SEMI-SUPERVISED CLUSTERABLE NODE REPRESENTATIONS | SEP'16-NOV'17 | TEAM: ANASUA MITRA

- Explored the much-ignored clusterability aspect of Semi-supervised learning (SSL) for learning representations.
- We proposed a semi-supervised model to learn cluster invariant representations for nodes of similar labels.
- With extensive experimentation on 8 datasets, we showed that explicitly learning clusterable representations provide better quality cluster and also achieves superior classification performance.

FASHION ATTRIBUTE DETECTION AND SIMILAR CLOTHING RETRIEVAL. | JULY-DEC'15

- Used ConvNets to classify attributes of images.
- Build a KD tree based retrieval system to find similar clothes in real-time.

A HYBRID FILTERING APPROACH FOR RECOMMENDER SYSTEMS USING CLUSTERING FOR CHAINS. | UG FINAL YEAR PROJECT | NOV'12-MAY'13

- Unlike typical recommendation system that used ratings instead of rankings. We built a ranking based recommendation system that clustered users' ranking (POSets/Chains)
- We proposed a social network based content boosted Collaborative filtering (CF) model using clustering for chains.

- Built a music recommendation system for my classmates. The proposed approach proved to be better than the conventional Clustering for chains based CF by 25%.

VERIFICATION OF ASYNCHRONOUS BEHAVIOR OF SPIKING NEURAL P (SNP) SYSTEM USING PETRI NETS | Sep'12-Nov'12 | TEAM: Sarath Chandar AP

- Dynamic Petri Nets, unlike SNP systems, are well studied concurrent mathematical models with good analysis tools.
- In order to take advantage of the established DPN to study SNP systems, we proposed an algorithm for conversion of SNP systems into Dynamic Petri Nets.