Rahul Ghosh

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3-M1G
Srachi Greenwood Elements
Near City Centre 2, New Town
Kolkata, West Bengal

Research Interests

Machine Learning, Optimization, Data Minning, Text Minning, Evolutionary Computation, Natural Language Processing, Computer Vision

EDUCATION

Bachelor of Technology, Electronics and Electrical Engineering
Indian Institute of Technology, Guwahati — JUNE 2016
CPI: 7.8/10

Senior Secondary Certificate
The Army Public School, Pune — MAY 2011
Percentage: 92.6%

Secondary School Certificate
The Army Public School, Pune — MAY 2009
Percentage: 93.8%

PUBLICATIONS

- R. Ghosh, N. Chaprana, M. Jain and A. K. Singh. "Intelligent Tizen Network Platform". Samsung Best Paper Award(SBPA), Samsung S/W Centre, HQ South Korea, 2017(under review).
- R. Ghosh, K. Ravi and V. Ravi."A Novel Deep Learning Architecture for Sentiment Classification,"3rd International Conference on Recent Advances in Information Technology (RAIT)/IEEE, 2016.
- V. Srikrishna, R. Ghosh, V. Ravi, and K. Deb."Elitist Quantum-inspired Differential Evolution based Wrapper for Feature Subset Selection," 9th Multi-Disciplinary International Workshop on Artificial Intelligence(MIWAI), Springer-Lecture Notes in Artificial Intelligence 9426, pg. 113-124, 2015.

PROFESSIONAL EXPERIENCE

Samsung Research and Development Institute — July 2016 – Present
Advanced Software Division, Delhi

- PREDICTIVE ANALYSIS SYSTEM — Feb 2017 – Present
  The aim of the research project was to provide Time Series event prediction and rule extraction from various supervised classifier models using machine sensor data to provide fault prediction on Samsungs digital appliances and further recommending diagnosis steps to reduce human effort. The project used the KIE workbench as the rule management engine where drool scripts were deployed as rules. Currently it has support for Samsung's Refrigerators and Air Conditioners.
- PROCEDURE ANALYSIS AND RECOMMENDATION — Aug2016 – Nov2016
  The aim of the research project was to develop a smart Customer Relation Management (CRM) engine that used NLP to extract the type of defect and then recommend relevant diagnosis steps for Samsung Visual Display units. Further we used clustering (Affinity Propagation) on top of the supervised

classifier (SVM) using word embeddings as features to detect new defects, establish a similarity between the existing known defects and recommend diagnosis steps for these new hidden defects.

- INTELLIGENT NETWORK PLATFORM May 2017 – Jun 2017
  We proposed a method for Network Traffic Prediction using Bayesian Networks and Long Short Term Memory (LSTM) Networks. The application of the above framework is to predict the bandwidth available by learning the time-series network usage pattern of Smart TV users and thus develop an efficient scheduler for sending the OTN (Over the network) software updates.

Institute of Development and Researchh in Banking Technology May 2015 – July 2015
Centre of Excellence in Analytics, Hyderabad

- FEATURE SUBSET SELECTION USING QUANTUM COMPUTATION AND EVOLUTIONARY ALGORITHMS
  In a Feature Subset Selection (FSS) problem, the objective is to obtain an optimal feature subset on which the learning algorithm can focus and neglect the irrelevant features. We proposed an elitist quantum inspired Differential Evolution algorithm for FSS. A wrapper formulates the FSS as a combinatorial optimization problem. The performance of the proposed algorithm was compared with that of the Binary Differential Evolution (BDE) on three datasets taken from literature. Owing to the inherent superior search capability, Quantum Differential Evolution (QDE) outperformed BDE on many counts namely, higher accuracy, less iterations, obtaining multi-modal solutions, obtaining feature subsets with minimal cardinality.
- CLASSIFICATION OF CUSTOMER REVIEWS USING DEEP LEARNING
  Sentiment classification is the process of determining whether a given text is expressing positive or negative sentiment towards an entity (product or service) or its attributes. We employed text mining involving steps like text pre-processing, dimensionality reduction using Restricted Boltzmann Machine and finally classification by machine learning algorithms to classify the customers' reviews.

PROJECTS

GLAND SEGMENTATION & CLASSIFICATION USING DEEP LEARNING Aug 2015 – Apr 2016
Bachelor Thesis Project, IIT Guwahati

- Along with Dr. Amit Sethi, we proposed a novel technique for gland segmentation using deep learning. The scheme involves training the dataset using a convolutional neural network having two convolutional layers and the final segmentation into gland or non-gland using logistic regression model. In contrast to the other techniques which are highly dependent on the gland structure such as presence of lumen or nuclei around the gland, our proposed method overcomes all these problems. The efficacy of the system has been evaluated by computing the validation and test error as well as other evaluation metrics like F1-score, dice index and jaccard index on the Warwick-QU dataset from the gland segmentation challenge contest at MICCAI-2015.

PCB FAULT DETECTION & CLASSIFICATION Mar 2016 – Apr 2016
Course Project, IIT Guwahati

- Developed an automated system for PCB fault detection and classification under the guidance of Prof M.K. Bhuyan using Scale Invariant Feature Transform (SIFT) features along with Support Vector Machine (SVM) as a classifier.

PATTERN RECOGNITION & MACHINE LEARNING Jan 2015 – Apr 2015
Course Project, IIT Guwahati

- Character recognition using Bayesian Classifier
- Facial Recognition using Principal Component Analysis and Fischer discriminant
- Image segmentation using K-Means clustering and Gaussian Mixture Models
- Corner detection using Harris Corner Detector and Edge detection using Canny edge detection with Non-maximal suppression.

WALL CLIMBING ROBOT Jan 2015 – Apr 2015
Design Project, IIT Guwahati

- Built a 4-wheeled robot with a high speed BLDC motor to create suction between the robot and wall.

COMPUTER SKILLS

PROGRAMMING : Python, C, C++, R, MATLAB, JAVA, Ruby on Rails, Javascript, Shell
TOOLS/FRAMEWORKS : Tensorflow, Theano, Caffe, Keras, OpenCV, LATEX, ArduinoUno Programming

COURSEWORK

- Embedded Systems & Computer Architecture
- Pattern Recognition & Machine Learning
- Digital Image Processing
- Computer Vision
- Probability and Random Processes
- Parallel Computing
- Algorithms and Data Structure
- Introduction to Computing (theory & laboratory course)
- Digital Circuits and Microprocessors (theory & laboratory course)
- Mathematics (Linear Algebra, Real Analysis, Multivariable Calculus, Complex Analysis)
- Data Scientist Toolbox and R Programming (Coursera)

ACHIEVEMENTS

- 99.6%ile IIT-JEE-2012
- 99.87%ile AIEEE-2012
- All India Rank of 534 ISAT-2012
- All India Rank of 6 International Master Mathematics Olympiad(IMM0-11)

POSITIONS OF RESPONSIBILITY

VOLUNTEER Dec 2014 – Dec 2014
Placement Cell, IIT Guwahati

- Worked as student volunteer and conducted the placement season of IIT Guwahati for the year of 2014.

EXAM COORDINATOR Jul 2012 – Jul 2012
Technothlon (Techniche), IIT Guwahati

- Conducted Technothlon (international school championship) in Pune, Maharashtra which saw a huge participation.