# Amar Vashishth | CS17M052

33/CS/19/052

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## Education

| Program | Institution | %/CGPA | Year of Completion |
|---|---|---|---|
| M.Tech. CSE | Indian Institute of Technology Madras, Chennai | 7.09 | 2019 |
| B.Tech. CSE | Uttar Pradesh Technical University, Lucknow | 63.04 % | 2014 |
| XII (AISSCE) | BBL Public School, Bareilly (CBSE) | 88.40 % | 2009 |
| X (AISSE) | BBL Public School, Bareilly (CBSE) | 86.40 % | 2007 |

## Projects

- **Retrieving Nutritional Information of Indian Cuisines**
  *Master's Thesis and Project*
  - **Database Generation**: Multiple images of 400+ Indian Dishes, each considered as a separate class; Nutritional Information of each Indian Dish
  - **Object Localization**: Recognition of Indian dish within an arbitrary input image
  - **Quantity Estimation**: Finding quantity of an item from a given image
- **Ontologies**
  *Academic Projects*
  - **Creating Custom APIs**: Custom APIs for fetching NEWS from various websites
  - **Article Similarity**: Using Google NLP API to fetch keywords from an article and comparing the set of those keywords with that of others to compute the similarity between any two NEWS articles
  - **APIs Vs SparQL Endpoints**: Fetching ingredients of any cuisine along with images of its ingredients, using SparQL endpoints, here Wikidata was used
  - **Utilizing multiple SparQL Endpoints**: Amalgamating information retrieved from multiple SparQL endpoints to produce meaningful results
- **Wireless Communication**
  *Implemented two 5G protocols for beam communication*
- **Deep Learning**
  *Academic Projects*
  - **Image Classification**: Use of CNN to classify fashion-MNIST dataset into 10 classes
  - **Document Summarization**: Use of Bidirectional LSTM with attention mechanism, performed on WeatherGov dataset
- **Pattern Recognition**
  *Academic Projects*
  - **SVD and Polynomial Regression**: Image reconstruction using eigen vectors and Curve Fitting
  - **Bayes Classifier and Classifier evaluation**: Classification of linearly separable and non-linearly separable data. Using ROC curves to check how good our classifier is.
  - **Gaussian Mixture Models**: Density estimation using GMMs for real and synthetic data.
  - **Hidden Markov Models and DTW**: Isolated and connected digits recognition using HMMs, feature extraction for handwritten digits and usage of dynamic time warping for sequential digit data recognition.
  - **Kernel density estimation and One-vs-all classification**: Parzen Window, Fisher discriminant based classifier, Perceptron based classifier, Support Vector Machines, Neural Network
- **Robotics**
  *Academic Projects*
  - **Basic Navigation**: Obstacle Avoidance, Wall following, Signal Reading and Reactions. Video link
  - **Calculated movements and Navigation**: Positional Coordinate awareness, Path finding to reach specific position. Video link
- **Spam Filter** Link to Spam filter
  *Bachelor's Thesis and Project*
  - **Text Classification**: Emails were classified as spam or ham; using Bayes classifier
  - **Utility**: System used GMail APIs to fetch and move emails within a GMail account. Custom marked emails were used in supervised training of the classifier running remotely.

- **Extended a paper to create an Algorithm for setting up of a MAN Topology**
  *The Split Domination in Arithmetic Graphs, Published in Foundation of Computer Science, New York, USA*
- **Advanced Network Architecture Setup**
  *Manual installation and configuration of a router network, using CISCO Simulator.*
- **Faculty-Student Interaction Management System**
  *Created using PHP, MySQL and other web technologies*

## Technical Skills

- **Programming and Scripting Languages**: C/C++, Python, MATLAB, JAVA, C#, SQL, SparQL, PHP, BASH Shell Scripting, 8085 Assembly Language etc.
- **Web Technologies**: JavaScript(+jQuery etc.), PHP(+MVC framework = Codeigniter), Python(Flask framework), Apache Server
- **Simulator**: NetSim, Multisim (Circuit Design Suite) Power Pro, GNUSim8085
- **C#**: Development using Windows Presentation Foundation, Microsoft Speech API (SAPI 5.3): Recognition and Synthesis
- **Hands-on experience**: Wireshark, Corel Draw, Corel Photo Paint, Audacity, 3D Studio Max, Adobe After Effects, Photoshop, Lightroom etc.

## Course Work

- **Deep Learning**: Feed Forward Neural Networks, CNN, RNN, LSTM, Word2Vec
- **Pattern Recognition**: Gaussian Mixture Models, Bayesian Classifiers, One Vs All Classification, Parzen's Window, Neural Networks
- **Robotics**: Different parts used in a robot, Swarm Robotics, Genetic Algorithms
- **Artificial Intelligence**: Fuzzy Logic, Bayesian Inference, Hidden Markov Models, EM Algorithm, Sampling, Probabilistic Graphical Models
- **Ontologies**: RDF, OWL, SparQL, Triplestores, Turtle syntax, Description Logic

## Labs

- **Advanced Programming**: Implementing different algorithm paradigms and data structures
- **Digital Design**: Creation of different Circuits using various ICs
- **Robotics**: Learning using LEGO NXT
- **Advanced Networking**: Analysis of local network using Wireshark
- **Microprocessor**: Running Programs written in Assembly on 8085 microprocessor

## Positions of Responsibility

- **Teaching Assistant, July 2017 – December 2018, IIT Madras**: Served as Teaching Assistant for Introduction to Programming for three consecutive semesters
- **Teaching Assistant, January 2017 – June 2017, IIT Guwahati**: Served as Teaching Assistant for Theory of automata and formal languages, Instructed by Professor Diganta Goswami
- **Teaching Assistant, July 2016 – December 2016, IIT Guwahati**: Served as Teaching Assistant for Data Structure and Algorithms, Instructed by Assistant Professor Chandan Karfa