

Abhishek Singh

• abhisheksing@umass.edu • +1 (413) 824-1385

EDUCATION

University of Massachusetts Amherst

Sep 2017 - May 2019

Master's in Computer Science

3.90/4.0 GPA

Coursework: Intelligent Visual Computing, Neural Networks, Artificial Intelligence, Robotics, Algorithms for Data Science, Applied Information Retrieval

Birla Institute of Technology and Science (BITS), Pilani, Pilani Campus

Aug 2009 - July 2014

Master of Science (Hons.) in Mathematics

8.18/10 GPA

Bachelor of Engineering (Hons.) in Computer Science

Coursework: Data Structures & Algo., Theory of Computation, Operating Systems, Database Systems, Prog. Lang. & Compiler Construction, Data Mining, Parallel Computing, Discrete Mathematics, Prob. & Stats., Algebra, Elementary Real Analysis, Topology, Measure & Integration, Functional Analysis, Optimization, Fuzzy Logic

WORK EXPERIENCE

➤ Software Robotics Corporation (Soroco), Bangalore

Junior Platform Engineer

Dec 2016 - Mar 2017

- **Database Authorization Layer:** Implemented a SSL certificate based authorization layer for accessing database by automation engines and other service entities thereby enhancing data security
- **Automation of Package Deployment:** Fully automated the install/update/uninstall process for automation engines by creating a RPM package of the database service, achieving zero downtime and reduced package deployment error-rate

➤ Citicorp Services India Pvt. Ltd. (Citigroup), Pune

Application Developer Supervisor, Citi Private Bank

Aug 2015 - Dec 2016

- **Message Center:** Developed a global messaging application for secure real-time client-banker communication with complete ownership of two web modules and one batch app. Improved scalability, reduced development time by requiring no code changes in the module, for one of the core and frequent use case of addition/modification of mailing templates. Enhanced security by eliminating persistent and non-persistent cross-site scripting vulnerabilities. Redesigned the application leading to 50% reduced message payload for calling Message Center services, improved space and time performance for sending mails to multiple recipients
- **Configuration Management:** Led the development of property management application to be used by all teams in Citi Private Bank. Implemented Java Messaging Service (JMS) for communication between java applications, Remote Procedure Calls (RPC) for Unix services from Java, Digest Authentication for exposed web services, and DynaCache (IBM Cache) for storage and retrieval of objects
- **Proof of Concept (POC):** Implemented multithreaded asynchronous techniques in Java for performance optimization of the messaging application, concurrent hits to web services for performance measurement, HTML to PDF conversion of dynamic web pages, dynamic PDF metadata modification

Application Developer, Citi Equities Technology

July 2014 - Aug 2015

- **KDB/Q Web Portal:** With complete ownership, designed and developed a three-tiered web portal that enhanced business intelligence for profit-loss, risk and latency reports for traders in Options Market Making.
- **Risk Report integration into Management Information System (MIS):** Delivered a stable solution that publishes risk data from KDB/Q services (database) to MIS (frontend in ASP.NET) for business managers in North America, making MIS one stop platform for all reports.
- **POC for health dashboard:** Created a dashboard using HTML5, JavaScript/jQuery, KDB/Q to monitor health and other vitals of all the Options Market Making Applications in real time, making it one of the key projects for the new development cycle.

➤ Amazon Development Center, Hyderabad

Software Development Engineer Intern

July 2013 - Dec 2013

- **Forecasting Tool:** Developed a VBA tool that predicts weekly ad-hoc vendor truck requirements at a warehouse, improving forecast accuracy and transit time of goods, and reducing business costs by 5-10%
- **Enhancements in Transit Time System:** Implemented APIs, UI tasks, and running/validation of a new Algorithm to be introduced

RESEARCH EXPERIENCE

- **Thesis:** Designed a certificate-less authenticated group key agreement protocol based on certificate-less public key cryptography using random oracle model, bilinear maps, and elliptic curve cryptography. Research paper published as *"Provably secure one-round certificate-less authenticated group key agreement protocol for secure communications"* in Wireless Personal Communications (Springer) 2015
- **Seminar:** Effectively defended my thesis work in front of esteemed faculty members of the Department of Computer Science and Information Systems, BITS Pilani and other students of the division
- **Award:** Won 'Departmental Research Incentive' (INR 25,000) from BITS Pilani for top three pieces of research by students under the thesis/seminar work

ACADEMIC PROJECTS

- **3D Deep Learning:** Implemented modules for 3d surface reconstruction from point clouds, convolution neural network based 3d shape classifier and eye detector
- **Neural Network Library:** Implemented a convolution neural network library including LSTM, RNN and k-nearest neighbour; built a CNN based binary classifier for ship/iceberg satellite images using transfer learning from the ensemble of VGG16, ResNet50, InceptionV3, InceptionResNetV2 and Xception
- **Artificial Intelligence:** Implemented A* to solve knight's movement on a chessboard and travelling salesman problem, created a sudoku solver as a constraint satisfaction problem
- **Robotics:** Working on a simulated robot which can play ping pong having 1 degree of freedom in eye, 1 shoulder 1 elbow joint and 3 degrees of freedom in base
- **Search Engine:** Built a toy search engine for documents with indexing, retrieval models like vector space, BM25, ranking the results and query processing capabilities
- **Compiler Construction:** Built a compiler for a custom-made C-like language including the Lexical Analyzer and the Semantic Analyzer
- **Mathematical Model of Unemployment:** Designed a model with non-linear ordinary differential equations to simulate the unemployment problem, analyzing stability of the proposed system using Mathematica

PROGRAMMING SKILLS

- **Programming Languages:** C/C++/Java/Python/VBA (proficient), C#(moderate)
- **Web Technologies:** HTML/CSS/JavaScript/Ajax/jQuery (moderate)
- **Web Services:** REST, SOAP (proficient)
- **Frameworks:** Spring, MyBatis, ASP.NET, Keras
- **Query Languages and Others:** SQL/Bash Shell/MATLAB (Proficient), KDB/Q/Mathematica/Weka (Mod.)