Utkarsh Simha

Resume

Education

2012–2016 **Bachelor's in Computer Science**, *PES Institute of Technology*, Bangalore.
Cumulative GPA – 8.64
Major average GPA – 8.84

Experience

Work

Jun–Aug 2015 **Summer Research Intern**, Carnegie Mellon University, Pittsburgh.
Worked under Prof. Bhiksha Raj and Prof. Rita Singh
Worked on Deep Learning in Speech Recognition for CMU Sphinx

May–Aug 2014 **Summer Intern**.
Worked under Prof. Suresh Govindarajan, Dept. of Physics, IITM
Worked on Enumeration of Solid Partitions

Jan–May 2016 **Software Engineering Intern**, Citrix R&D, Bangalore.
Worked on implementing and optimizing screen sharing techniques on WIndows

Publications

Nov 2015 **Standards based Integration of Advanced Key Management Capabilities with Openstack**, IEEE CCEM 2015, Bangalore.
D. Sitaram, S. Harwalkar, S. Iyer, S. Jha, U. Simha

Research

Jun 2015-present **Deep Learning in Speech Recognition for CMU Sphinx**.
Interned at Carnegie Mellon University, Pittsburgh

Problem To enhance speech recognition system architecture by using Deep Learning methodologies to gain higher accuracies

Approach Replace existing Gaussian Mixture Model (GMM) with Deep Neural Networks (DNN) to predict the states of the Hidden Markov Model (HMM) corresponding to a phoneme, as DNNs have shown to outperform GMMs.

Task To implement a DNN using *Theano* and *Python*, train it on speech corpora to learn the features in the speech utterances and predict the corresponding states of the HMM. Used techniques such as *autoencoders*, *sparse autoencoders*, *dropout*, *momentum* etc. for better training. Performed hyper-parameter optimization using *Optunity* by implementing *k-fold cross validation*.

Status Successfully implemented a DNN employing Deep Learning techniques which produced high accuracies upon testing on speech corpus.

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Github profile

May-Aug 2014 **Enumeration of Solid Partitions**.

Interned under Prof. Suresh Govindarajan of Dept. of Physics at IIT Madras

Problem Enumerate solid partitions and higher dimension partitions for d dimensions and upto n numbers

Approach Use C++ and implement data structures for storing numbers, to improve efficiency

Task To implement Bratley-McKay algorithm in C++ to produce better performance on the generation of partitions. Performed optimizations that led to higher throughput

Status Generated partitions upto $d = 5$ and $n = 25$ efficiently

Jul 2014-Nov 2015 **Standards based integration of Advanced Key Management Capabilities with Openstack**.

Worked under Prof. Dinkar Sitaram and Prof. Sudheendra Harwalkar of the Centre for Cloud Computing and Big Data at PES Institute of Technology. Worked in affiliation with IBM India Software Labs, under Sreekanth Iyer and Shiv Jha

Problem To integrate Openstack and enterprise security key lifecycle managers, such as IBM Security Key Lifecycle Manager, using standardised protocols such as Key Management Interoperability Protocol

Approach Use a server-side plugin architecture to translate requests received by Barbican(the key manager for Openstack) to KMIP requests and forward it to interfaced enterprise key lifecycle manager

Task To develop an architecture and perform integration. Set up and configured client and server to communicate with each other using KMIP protocol. Studied call flow and debugged the problems posed by nascent code support to ensure smooth communication takes place

Status Successfully demonstrated an end-to-end scenario for key operations. Submitted a white paper based on the project at IEEE International Conference on Cloud Computing and Emerging Markets 2015 which was accepted for poster presentation.

Jan-May 2015 **Implementing named parameters for C++**.

Worked under Prof. N S Kumar, a visiting professor at Dept. of Computer Science and Engineering, PES Institute of Technology

Problem To implement support for named parameters in C++

Approach Using a parser to translate code consisting of named parameters to code where the parameters are in-order and acceptable by C++ compiler. User can pass keyword arguments in the form of key value pairs separated using the delimiter ":"

Task To Implement a parser that uses C++ STL and regex to identify function calls with named parameters and populate appropriate data structures. Used STL constructs such as map, multimap, vector to efficiently store and retrieve parsed tokens

Status Successfully tested on extensive test cases to verify the working of the implementation

Oct 2014-Feb 2015 **User interface for Star-Hopper results in KStars**.

Worked on KStars (an open-source desktop planetarium) as part of Season of KDE, an outreach program hosted by KDE (desktop environment for Linux)

Problem To build an elegant user interface to extract and display results from Star-Hopper feature of KStars and provide functions to operate on the results

Approach Based on the MVC architecture, build a front-end to capture the user input, call the back-end to perform the calculations and display the results in an an efficient UI. Merge the dialog-box into the existing open-source codebase

Task To develop a UI front-end which queries the back-end, retrieves the results, displays the results and provides functions for them. Used C++ and Qt framework for implementation.

Status Successfully implemented the user interface and deployed into the open-source repository of KStars

Co-Curricular Experience

Nov 2015 ***Cloud Computing in Emerging Markets***, an IEEE International Conference on Cloud Computing, *Poster presenter and Delegate*

Feb 2014 ***conf.kde.in***, a conference on KDE, *Delegate*

Nov 2012 ***foss.in***, a conference on open-source software, *Delegate*

Nov 2014 ***Brainwaves***, a hackathon organized by Societe Generale Bank

Mar 2014 ***Hack59***, a hackathon organized by Yodlee at RVCE

Nov 2013 ***#code***, a hackathon organized by Student Nokia Developer community at PESIT

Oct 2014 ***Season of KDE***, open-source contribution outreach program

Feb 2014 ***Botrio Swarm Robotics Workshop*** - successfully built a line following bot

Technical Skills

Research Themes	Deep Learning, Applied Machine Learning, Artificial Intelligence, Artificial/Deep Neural Networks, Natural Language Processing
Programming Languages	C++, C, Python, Java, Javascript, PHP, Bash shell script
Libraries	Theano, numpy, scipy, TensorFlow, C++ Standard Template Library, Boost C++ Library
Frameworks	KDE, Qt, jQuery, Bootstrap
Domains	Machine Learning, Natural Language Processing, Artificial Intelligence, Unix/Linux systems, Data structures and Algorithms, Cloud Computing, Web Development, Big Data

Extra Curricular

- Passionate about trekking. Trekked to Everest Base Camp during summer 2009, Dzongri during summer 2011 and Manmahesh during summer 2008. Core member of One Tribe India, a startup to provide budget treks around Bangalore
- Ardent interest in music. Play the piano, guitar and flute
- Enjoy playing sports such as Football, Basketball and Table Tennis
- Pursuing photography as a hobby
- Amateur Astronomer. Member of the Bangalore Astronomical Society. Co-owner of a 17.5" Dobsonian telescope

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