

# Varsha Kirani Gopinath

## Curriculum Vitae



*"All that we are is the result of what we have thought." –  
Buddha*

### Info

Born June 4th, 1991 at Sira, Tumkur (India)  
Address Våxtorpsgränd 10, Älvsjö 12573 Stockholm, Sweden  
Phone +46729347913  
e-mail varsha@kth.se

### Education

- 2014 - Present **Master of Science in Machine Learning**, *KTH Royal Institute Of Technology*, Stockholm, Sweden.  
2 year programme, majoring in Machine Learning and Computer Vision. Other important courses include: Artificial Neural Networks, Artificial Intelligence and Information Retrieval.
- 2010–2013 **Bachelor of Science in Computer Science Engineering**, *M.S.Ramaiah Institute Of Technology*, Bangalore, India.  
4 year programme majoring in algorithms, computer architectures and basics of programming languages and platforms. Other courses included part of this program were Graphics and Visualisation, Discrete Mathematics, Database Systems and Operating Systems

### Experience

#### Work

- 2013–2014 **Associate Software Developer**, *SAP Labs India*, Visualization Recommendation Team, Bangalore.  
I procured an employment as part of the Business Intelligence Team (of 22 members) at SAP Labs, India. I worked on a tool - Lumira (used by data analysts) which deals with vivid efficient visualizations of large input data sets focused on business economics. I work in a sub-team which analyses the input data and provides insights for it and recommends the most suitable visualizations. I have gotten exposed to Model-View-Controller software pattern of coding and writing efficient reusable codes. I have gotten introduced to the field of modern data analysis algorithms and techniques - which I find whets my academic interest. Working in a supportive corporate environment has also improved my teamwork skills and discussion-for-consensus capabilities.

#### Internship

- Feb 2013–June 2013 **ABAP Programmer**, *SAP Labs, India*, Team- Student Life Cycle Management, Bangalore.  
I did incremental development on a database product for Student-Life-Cycle-Management. Vital technical challenges were the understanding of the workflow of the entire product and growing agility in using Advanced Business Application Programming (ABAP) language.

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## Technical Skills

Languages C++, JAVA, PYTHON, SQL, MySQL, SQLITE Latex, Javascript, HTML5, CSS3, JQuery, C, C#

Tools Matlab, OpenGL, Visual Studio, Eclipse IDE, Netbeans IDE

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## Scientific Skills

- Artificial Intelligence
- Machine Learning, Advanced
- Artificial Neural Network
- Search Engine and Information Retrieval
- Applied Bioinformatics

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## Academic Interests

- Search Engine and Information Retrieval
- Visualisation
- Machine Learning
- Data Analytics and data mining
- Web Design

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## Projects and Abstracts

### An Agent to play duck hunt game using Hidden Markov Models(HMMs)

Artificial Intelligence With different species of birds flying around in certain pattern, the agent was supposed to classify the bird according to the species and predict its next move to shoot it down. Both prediction and classification was done using HMMs. Each bird was learned using Baum Welch Algorithm of HMMs and were placed in its species list. The classification of the new bird is done using forward algorithm.

### Improving Elevator Performance Using Reinforcement Learning

Machine Learning, Advanced Language used-C++.The challenge was to learn an optimum elevator operation policy from experience, in order to reduce the travel overhead and improve passenger service. We constructed an Artificial Neural Network to learn a map from the passenger demand scenario to the action sequence an elevator must take. We used Q-Learning for blah blah blah in blah blah blah to achieve blah blah blah. We also, simulated an elevator-calling system including a visualisation. (5 member team)

### Predicting Signal Peptides in Protein using Hidden Markov Model

Applied Bioinformatics The goal was to predict whether the protein contains signal peptide or not which is used in localization of proteins in the cell to do their job properly. This was supervised learning where the training data is real world data extracted from Ensembl's BioMart service. Each protein from training data is represented as Hidden Markov Model(HMM) and all the HMMs were converged using Baum Welch Algorithm by maintaining the proteins in two clusters(with and without signal peptide). The new unseen protein is classified using Forward Algorithm. I also used BioPython to extract the data into required format.

### Comparison of different methods for Search Engine of DavisWiki

Search Engine and Information Retrieval	For DavisWiki corpus, a search engine was built where one can search for documents which has main searching facilities like intersection query, phrase query, tf-idf ranked retrieval , page rank retrieval and combination of any two. The main intention was to learn different methods in search engine and information retrieval.
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### Generating Wardrobe Tips depending on Weather using Natural Language Generator

Artificial Intelligence	The aim was to build an application which gives wardrobe tips according to weather condition. We developed treebank trained statistical generator using context free grammar(CFG) and raw corpus to create probabilistic CFG (PCFG). Using this PCFG, different generators (Greedy, Viterbi,n-gram) produces sentences or phrases(wardrobe tip). We also implemented naive generator called probabilistic generator where sentences are generated according to probabilities of rules in PCFG at every step of treebank. Evaluation of the application was done using cross validation method where String-edit and BLEU methods are used. Human survey was also taken. (4 member team)
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### Self Organizing Map to solve Traveling Salesmen Problem using Artificial neural network

Artificial Neural Network	The challenge was to find the shortest path for the given number of cities. This was done using self organizing map (SOM) algorithm using artificial neural network. For various values of parameters (like neuron number, epochs, learning rate etc), SOM algorithm is analyzed.
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### Train systems using JAVA and SQL

Programming	A simple application of train system where both passengers and admin were able to get information about the trains like arrival time, departure time,complete route map and other info were made available. The main intention of the project was to explore JAVA functionalities and Database Management Systems.(2 member team)
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### Jumble Mumble, the word game in C#

Programming	It is a simple word game where user is given jumbled letters and asked to form multiple words. Scores were given according to length of the word and also weights on each alphabet. The whole application was done using C# and .Net assemblies using Visual Studio.(2 member team)
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### Building Node Intelligence in MANETs for Efficient Routing

Bachelor Thesis	As single protocol will not serve all the purposes required for communication in MANETs, switching between protocols can resolve this problem but builds up an overhead in the network as it need an external agent to monitor the environment and dictate to the network on which protocol should be chosen. Thus,the nodes present in the network can be made intelligent enough to sense its environment and select the suitable protocol ,that is , the switching can be done at the node level itself so as to reduce the overhead in the network and to make the routing more efficient. For real time scenarios and simulations we used NS2.35 simulator. AODV and DSDV protocols are considered. Node density and the pause time of the environment are taken as the cost metrics. At the learning phase, we learn about protocol which better fits at different scenarios. According to this result switching is done at node level to chose the protocol.(4 member team)
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## Publications

Building Node Intelligence in MANETs for Efficient Routing

year–year **degree or job title**, *institution or employer*, city, grade.  
description

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## Interests and Hobbies

I love any sport but I prefer Badminton and Table Tennis. I love social gathering and interested in spending time with people more. Love gaming and a big time NARUTO fan.