VENKATESH VINAYAKARAO

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RESEARCH INTERESTS

Information Retrieval, Software Engineering and Program Analysis.

EDUCATION

Indraprastha Institute of Information Technology (IIIT) Delhi *Oct 2013 - Aug 2018*
PhD Overall GPA: 9.43/10
Advisor: Dr. Rahul Purandare. Industry Mentor: Dr. Aditya Nori.
Topic: Building Code Search Engines
Department of Computer Science and Engineering

Carnegie Mellon University *Aug 2002 - Dec 2003*
MS in Information Technology Overall GPA: 4.1/5
Specialization: Software Engineering
School of Computer Science

University of Madras *May 1996 - Apr 2000*
BE Computer Science and Engineering Percengate: 79%
Department of Computer Science and Engineering

EXPERIENCE [11+ YEARS IN SOFTWARE INDUSTRY]

Chennai Mathematical Institute Jan 2020 - Till Date
Lecturer

· Chennai Mathematical Institute is a centre of excellence for teaching and research in the mathematical sciences. Founded in 1989 as part of the SPIC Science Foundation, it has been an autonomous institute since 1996.
· **Role**: Research and Teaching.

Chennai Mathematical Institute Feb 2019 - Jan 2020
Visiting Fellow

· A visiting fellow is a post-doctoral teaching/research position at CMI.
· **Role**: Research and Teaching.

Indian Institute of Information Technology, Sri City Jun 2018 - Dec 2018
Assistant Professor

· IIIT Sri City is an institute of national importance, setting best-in-class technology education standards in India. The institute was setup by the Government of India - MHRD, Government of Andhra Pradesh and Industry Partners represented by Sri City Foundation as a Not-for-Profit Public-Private-Partnership.
· **Role**: Research, Teaching and Service.

Microsoft Research Cambridge Apr 2017 - Jul 2017
Research Intern

· InnerEye is a research project that uses state of the art machine learning technology to build innovative tools for the automatic, quantitative analysis of three-dimensional radiological images.
· **Role**: Porting the inner eye ML models to Azure cloud thereby delivering them as a service.

Microsoft India Development Center   Jun 2012 - Sep 2013
Senior Software Development Engineer

· Content Processing & Ranking for Microsofts Bing (search engine) team at the Search Technologies Center India.
· **Role**: Contributed as a Machine Learning Developer for the ranking (Relevance) team. This work involves preparing training sets, understanding content, feature extractions, tuning rankers and measuring their performance.

Yahoo!   Mar 2010 - Jun 2012
Principal Engineer

· Content processing yahoo! Yahoo aggregates several million feeds from several thousand providers across more than 40 countries.
· **Role**: As a content processing yahoo, I am responsible for understanding the grid based platforms and build solutions on top of them so that the raw content is processed and made available to front-end groups. Involves understanding/building platforms and writing enrichment workflows using Pig, Java and J2EE technologies.

Nokia   Aug 2007 - Mar 2010
Senior R&D Engineer

· To own and engineer tools for the personalization of Nokia phones. To work closely with the SDK (S60, Series40) team and provide appropriate tooling support using eclipse (RCP) framework.
· **Role**: Hands-on Development using Core Java, Eclipse Plugins/RCP and XML. Act as Scrum-master. Responsible for build setup (ant, cruise control) and fixes.

CoreObjects   Jul 2006 - Aug 2007
Principal Product Engineer

· To build and maintain robust License Management product under demanding schedules for an aggressive market. Used Java/J2EE.
· **Role**: As a project lead, involved in customer interaction, design discussions, plan, review, development, bug fixing, release management and people management.

HCL Technologies [CMM Level 5]   Oct 2004 - Jun 2006
Senior Technical Management Trainee

· To communicate with customers and lead the software development teams at the Core Technologies Division of HCL. Used Java, InfoPath along with some technical writing for GM.
· **Role**: Understand requirements, develop throw away prototypes using Java, InfoPath, and write requirement specifications.

Carnegie Mellon University   Aug 2003 - Aug 2004
Research Scholar

· Development of high performance conferencing module with major emphasis on customer interaction, requirements management and software architecture. Used Core Java and SIP.
· **Role**: End-to-end development.

Silverline Technologies [CMM Level 4]   Jul 2000 - Jun 2002
Software Engineer

· Several short-term projects (ranging from 3 months to 1 year long) in Java/J2EE for different domains and customers. Major responsibilities include implementation, reviewing specifications, suggesting new tools and procedures and facilitating all life-cycle phases.
· **Role**: Major responsibilities include implementation, reviewing specifications, suggesting new tools and procedures and facilitating all life-cycle phases.

TEACHING EXPERIENCE

Chennai Mathematical Institute   Feb 2019 - Present
Visiting Faculty

· **Course**: Information Retrieval
· **Course**: Program Analysis

IIIT Sri City   Jun 2018 - Jan 2018
Assistant Professor

· **Course**: Information Retrieval
· **Course**: Introduction to Programming (with C)

IIIT Delhi   Jan 2014 - Apr 2014
Teaching Assistant

· **Course**: Information Retrieval
· **Instructor**: Dr. Srikanta Bedathur

IIIT Delhi   Aug 2014 - Nov 2014
Teaching Assistant

· **Course**: Statistical Computation
· **Instructor**: Dr. Ashwin Srinivasan

BITS Pilani (Off Campus - HCL Technologies)   Aug 2005 - Jul 2006
Faculty/Supervisor

· **Course**: Software Architectures. As part of MS - Software Engineering course.

PUBLICATIONS

- Ridhi Jain, Sai Prathik Saba Bama, Venkatesh Vinayakarao and Rahul Purandare. A Search System for Mathematical Expressions on Software Binaries. In the Proceedings of the 15th International Conference on Mining Software Repositories (MSR 2018), Sweden.

- Venkatesh Vinayakarao, Anita Sarma, Rahul Purandare, Shuktika Jain and Saumya Jain. ANNE: Improving Source Code Search using Entity Retrieval Approach. In the Proceedings of the Tenth ACM International Conference on Web Search and Data Mining (WSDM 2017), UK.

- Venkatesh Vinayakarao, Rahul Purandare and Aditya Nori. Structurally Heterogeneous Source Code Examples from Unstructured Knowledge Sources. In the Proceedings of ACM SIGPLAN Workshop on Partial Evaluation and Program Manipulation (PEPM 2015), India.

- Venkatesh Vinayakarao. Spotting familiar code snippet structures for program comprehension. In the Proceedings of the 2015 10th Joint Meeting on Foundations of Software Engineering, (ESEC/FSE 2015), Italy.

SELECTED TALKS

3rd Intl. Conf. on Computational Intelligence in Data Science, Chennai.　Feb 21st, 2020.
Code Variants Retrieval

· Code variants represent alternative implementations of a code snippet, where each alternative provides the same functionality, but has different properties that make some of them better suited to the overall project requirements. Developers routinely need to analyze existing code, find better reuse alternatives, and look to develop high-quality code that meets some desired properties. However, searching for such code variants over the web has several challenges. Existing text-retrieval models do not work well on source code. Expressing natural language queries on source code is an open problem. Many query terms in natural language have multiple surface forms in source code. We address this problem by perceiving source code as a collection of entities. In this talk, we present new techniques to search for code variants. The ability to perform semantic search over source code snippets assisted by developer knowledge in the form of discussion forum data opens up a new way to solve several important problems.

SRM University, Chennai.　July 31st, 2019.
The Mathematics behind Web Search Engines

· Mathematical models play a significant role in designing elegant products. In this talk, we discuss how web search engines work by diving into the vector space models. I will cover the necessary preliminaries and explain several use cases of search engines and the way various models lend elegance and efficiency. Towards the end, we shall discuss current trends in web search research.

Research Science Initiative - Summer Programme, CMI, Chennai.　May 28th, 2019.
The Magic of Models

· The journey from complex problems to beautiful solutions often requires us to take a stop at a station called models! Abstracting out unnecessary details helps us to focus on the core of the problem and therefore to find elegant solutions. In this talk, we apply our knowledge of vectors to model a real world problem that often occurs wherever we need to compare natural language (say English) sentences.

IIIT Sri City.　October 6th, 2018.
Principles and Practices Behind Building the Search Engines

· Search engines play a key role in our daily life. Yet, building a search engine is scientifically involved due to the sub-second response requirement on top of fetching only relevant content and fetching all relevant content. We discuss some principles and practices of building search engines in this talk.

IIIT Delhi.　April 11th, 2018.
Term Frequency and its Variants in Retrieval Models

· Term frequency models and term frequency weighing schemes have appeared in several variants while designing retrieval models for text. In this talk, we review the background, intuitions and formulations of some of the variants.

NIIT University, Neemrana, India.　September 24, 2017
Code Search - Challenges and Applications

· Searching for source code is challenging for several reasons. The naturalness of source code cannot be compared with that of natural languages like English. How does this impact indexing and querying? In this talk, I highlight the major challenges and research opportunities in this field.

Microsoft Research, Cambridge, United Kingdom. June 29, 2017
Porting InnerEye to Azure Cloud

· InnerEye is a research project that uses state of the art machine learning technology to build innovative tools for the automatic, quantitative analysis of three-dimensional radiological images. In this talk, I summarize my 12 weeks at Microsoft Research where I successfully migrated the InnerEye ML models to Azure cloud.

Doctoral Consortium, WSDM 2017, Cambridge, United Kingdom. February 6, 2017
Modeling Source Code to Support Retrieval-Based Applications

· Advances in text retrieval do not apply directly to source code retrieval because of the difference in characteristics of source code when compared to text. Here, I discuss the role of source code models in retrieval.

Panjab University, Chandigarh, India. March 24, 2015
Reflections from a PM Research Fellow

· My PhD is supported by Prime Minister's Research Fellowship Scheme. In this talk, first I give a glimpse of my research, then I discuss the challenges of doing PhD in India, and finally elaborate on ways in which PM fellowship helps in overcoming some of these hurdles.

IIIT Delhi, India. November 12, 2014.
Bayesian Data Analysis

· Bayesian data analysis provides us a framework to systematically approach our belief update process. Suppose we know nothing about the fairness of the coin, and we see four continuous heads in the first four flips, what should we infer about the coin? Is it biased towards head? Should we bet on another head again?

CERTIFICATIONS

CSM	Certified Scrum Master (Mar, 2006)
CNA	Certified Novell Administrator in Novell Intranetware 4.11 (Jan, 2000)
HDCNM	Higher Diploma in Communication and Network Management (Jan, 1999) (from Asset Intl., Chennai)

ACHIEVEMENTS

1. All India Rank 81 in CBSE-UGC NET exam, Nov 2017.

2. Awarded Google Travel Grant to attend WSDM 2017.

3. Awarded Prime Ministers Research Fellowship, in 2014.

4. "Best Technical Knowledge and Best Commitment to Work" from Carnegie Mellon University.

5. "Best Technical Paper" on Testing Frameworks from Carnegie Mellon University.

6. World topper (Brainbench) in ASP (in the year 2001).

7. All India III Rank in Semester II of Higher Diploma in Communication and Network Management from Asset Intl.

8. Scored 800/800 in Quantitative Aptitude Section of GRE.

9. School Topper in Higher Secondary.