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Date of Birth: 23rd May, 1979

Work Experience: January 2003 – Till Date.

Present Designation: Technical R&D Senior Principal (Sr. Manager)

Highest Academic Degree: PhD (IIT, Delhi)

Current Employer: Software Engineering Research Team, Accenture Labs, Accenture, Bangalore

Honorary Role: Adjunct Faculty (Rank: Professor), Indian Institute of Information Technology (IIIT), Guwahati

Academic Background: Computer Science & Engineering, specializing in Natural Language Processing (NLP) / AI since 1999 till date

Trivia: (a) 220+ granted US patents (one of the top-10 ever most prolific inventors in India), and 85+ research papers mostly in top-tier conferences **(b)** pioneering inventor of the QR-coded payment system (invented in 2010-2011, research paper published in 2013) – the first ever to pioneer in India, that had established the basis for today's QR-code based online payment ecosystem

Career Summary

I have worked across research and product development and implementation of various system, analytics, business intelligence and artificial intelligence applications. My expertise is in out-of-the-box technical thinking for strong business impact, and new product incubation. My deep expertise in research and innovation is well-demonstrated via the 220+ granted US utility (technical) patents where I have been an inventor and 85+ research papers, mostly in top-tier fora, that I have co-authored.

My work experience spans across R&D (VERITAS Software / Symantec Corporation), Development (Microsoft) and Research (IBM Research, Accenture Labs). My academic background is a combination of Natural Language Processing (NLP) / Artificial Intelligence (AI) and Social Network Analysis (SNA). However, in work, along with numerous projects with varying nuances in the technical areas of AI, NLP and SNA, I have cross-cut into Cloud Technologies, Software Engineering (both from Research and Development perspectives), Sustainable AI in Cloud, Networking / Messenger and Availability. And I have led the incubation of several products and features across ideation, development and operationalization.

In the worldwide research stage, my present responsibility of Area Chair in ACL Rolling Reviews (spanning all of ACL, NAACL and EMNLP conferences among others), program committee membership of every single top-tier NLP conference (ACL, NAACL, EMNLP, Coling, EACL, LREC and others) as well as other top-tier AI conferences (AAAI, IJCAI, ICPR, ECIR) among others, demonstrate my recognition in research. Sustained streamlining of the innovation as I kept working in industrial research / R&D, working with teams that take those innovations forward to business, demonstrate my capability in and track-record of translating innovation into IT Business.

My inventions and innovations have often stood out as significant value-differentiators, throughout my career. I had been selected for the title **IBM Master Inventor**, which is a prestigious title in IBM, only given to very few (between 1%-2%) of the researchers with strong invention track record with significant impact sustained over a long duration of time.

WORK EXPERIENCE SUMMARY

At Present: Accenture (Tech Labs), as Technology R&D Senior Principal (Senior Manager)

June 2020 – Till Date

- **Functional:** As a Senior R&D Manager (Sr. Principal) in the Accenture Labs, Accenture's main corporate technical research lab, my recent responsibility has been to create and seed a specialized R&D team with focus in certain technical areas, mostly around blue-sky agentic AI-powered differentiator ideation and development, but tying back to Accenture's business as value differentiators (justifying high-value contracts). I presently (directly + indirectly) lead a team of 8 researchers in the Software Engineering R&D Team.
- **Technical (Present):**
 - **Foundations of Agentic Infrastructure for Operations:** I lead the design and implementation of agentic infrastructure for operations, enabling autonomous planning, execution and optimization across infra lifecycle, within Accenture Labs. I build models that fuse telemetry with operational aspects (such as engineering for non-determination, human agency/delegation & workforce, accountability/governance architecture, sustainability, security in the newer extended surface, alignment and behavioral safety, etc.).
- **Technical (Past):** In my earlier years in Accenture Labs, I pioneered several incubations.
 - **Agent-powered software PoC development:** This work creates a mechanism of auto-generating proofs of concept using Agentic AI, wherein natural language conversation-based customer requirements are translated to proof-of-concept software solutions using a chain of AI agents, that in turn are orchestrated by AI agents, with intermediate human-in-the-loop intervention for guiding and validating the pathway.

- **Control panel for LLM/Gen AI:** This work focuses on creating a control plane (model switchboard) for employing appropriate ML/AI model for inferencing while minimizing cost and carbon expenditure and maximizing quality (joint optimization).
 - **Contracts as graphs (using AI):** This work proposes representing contracts as actionable graphs and then executing the graphs on demand of contract execution.
 - I incubated the **Privacy Preserving Computing** research at Accenture Labs from the standpoint of software systems, application architecture and incorporation of machine learning (ML) / artificial intelligence (AI) within such architecture, spanning over edge, via cloud, to secure enclave based computing, ensuring privacy (in parallel to security) of data and models at the levels of collection / building, storing, transfer (network) and execution (processing)
 - I incubated the Labs' research work on **Digital Twins for Hybrid Clouds** and applications running on such clouds. I have led in creating and managing distributed workloads on hybrid clouds, from the viewpoints of disposition and ongoing re-optimization, while jointly optimizing for performance, complying with regulatory requirements (e.g., GDPR etc.), tuning for privacy, and remaining sensitive to carbon impact (sustainability) as well as client-provided business constraints.
 - I have also ideated and led the implementation of ground-level technology for green, sustainable AI, using container lifecycle management techniques.
- **Technical directions:** I have had to lead the team over a multitude of applications of AI in software engineering such as creating fast and low-cost inferencing architecture for software solutions and cloud continuum solutions, offline analytics of, as well as inference-driven forecasting for, cloud operations using digital twins and ML inferencing techniques, privacy-preservation techniques and technologies, including but not limited to edge and hybrid clouds, distributed clouds, federated machine learning, secure enclaves, container-based code and data transfers, and so on. I have led my team to use several hybrid cloud stacks for implementation of hybrid clouds. I have led my team to certain AI approaches for creating distributed AI/ML with privacy preservation. I have led my team towards certain green/sustainable AI techniques.

Present Honorary Role: Indian Institute of Information Technology (IIIT), Guwahati

January 2021 – Till Date

- **Functionality:** I am also appointed as an Adjunct Faculty in IIIT Guwahati, on an honorary basis, with a **full Professor** rank.
- **Coverage:** Here, I have engaged in academic activities for the subject Natural Language Processing (NLP), and teach a course on NLP in the spring semesters. I am also advising 3 PhD research scholars at the moment, for the institute.

IBM (IBM Research), as Senior Software Engineer & IBM Master Inventor

May 2007 – June 2020

- **Functionality:** At IBM Research India, I used to conceptualize novel technology ideas, architecting and implementing them with the rest of the team, and delivering them to the clients (internal and external, as applicable). During my tenure at IBM Research, I had worked in the areas of:
 - o Social network analysis
 - o Mobile analytics
 - o Mobile money (I was the first ever technical ideator & incubator of QR-code based payments in 2010, and developed the first-ever PoC, before it became popular and the business was eventually dominated by other companies – “competitors” – since 2011 – seeding from what I had ideated, and a team of mine had built along with me)
 - o Application performance scaling

I had technically led several projects, spanning across mobile analytics solutions, human eye gaze estimation & tracking, social network analysis, natural language processing and some computer visions. Sometimes, the projects have involved members across IBM business units and across continental boundaries.

- **Technologies:** My work in IBM Research had spanned across a number of tools, technologies, computer scientific specializations and programming platforms. Working on Linux and at times Windows, I had used C, C++, Java, Linux shell scripts, Keras (for deep learning), Microsoft Powershell, awk, sed, Python and PHP for programming, and DB2 and MySQL for databases. Some tools that I used, among many, are Mallet (natural language processing), Weka (machine learning), graph processing tools (social network analysis involves a lot of graph theory), exposure to Android mobile app platforms and WebSphere, mobile notification services and many other tools.

Microsoft (India Design Center), as Software Design Engineer (Developer)

October 2005 – May 2007

- **Functionality:** Design, architecture and implementation of MSN Live Communication Server, which was a server-side part of the then-popular MSN Messenger. This component was a pain-point that my

colleagues in the company were hesitant to take upon. I took the challenge, redesigned the original architecture, implemented the system that made the process 700% faster than the original, and it led to a massively positive impact on the dollar income of Microsoft MSN Messenger.

- **Technologies:** The product involved programming in C# on DotNET, and used MS SQL at the back end and IIS at the front end.

VERITAS Software (later merged with Symantec Corporation) India, as Software Engineer

April 2003 – October 2005

- **Background:** This was the job that I had on-campus from IIT Bombay. I had stood first and had landed the first official A-grade job in entire IIT Bombay in my batch, across every department, and that was this job. So I was landed in a highly specialized innovation group.
- **Functionality:** I was assigned to a specialized micro-team under the VERITAS Cluster Server, with the name New Products Initiative. As a rather unconventional and very highly regarded job in the company, with the project lead, one of the senior-most technical directors across all of VERITAS over the world and the senior-most person in the entire India division of VERITAS, which was the #5 company in terms of turnover at that time, and only two other team members, my job was to define and explore new and innovative product paths and prototypes, and create roadmaps for the entire VERITAS Cluster Server (VCS) team to move forward with.
- **Technologies:** My work in VERITAS had spanned across a number of OS platforms including Linux, Windows, Solaris, HP_UX and a bit of IBM AIX, for providing high-availability failover and instant application switchover. As part of competition exploration, I had programmed VCS to embrace and extend Microsoft's Cluster Server (MSCS). I had single-handedly created an end-to-end C++ object-oriented API interface for the C-based VCS to work on APIs. In the final part of my tenure, I had made contributions to the Linux and Solaris kernels for stateful application migration, a concept that was almost entirely novel in the industry back in 2005.

Tata Consultancy Services (TCS) Research Lab, IIT Bombay, as Research Associate

January 2003 – March 2003

- This was a 3-month contract with TCS Research Lab in IIT Bombay, as a Research Associate, researching natural language processing problems, appointed under the TCS Lab by Prof. Pushpak Bhattacharyya. I had completed my M. Tech requirements earlier than scheduled, and hence my Prof (Guide) had offered me with this job to extend my already-significant research outcomes in my MTech in Computer Science, IIT Bombay, before joining my campus offer that I had received from the industry.

Visiting/Honorary Teaching Roles and Works:

I have held Visiting Faculty roles in several universities/institutes in the past, notable ones being Symbiosis Institute of Computer Studies and Research Pune (2003-05), EMPI Management Institute Delhi (2009-13), South Asian University Delhi (2013) and my current Adjunct Faculty (Professor) role in IIIT Guwahati (Jan 2021 – till date). I have delivered numerous lectures and have conducted other activities in many universities, including IIT Bombay (as a TA), IIT Kanpur, IIT Mandi, IIITM Gwalior, IIIT Guwahati (before I was an Adjunct Faculty member there), several NITs and a large number of other universities.

EDUCATION

- PhD in Information Technology in IIT Delhi, October 2019 (done in parallel to my office work, while I was working in IBM Research). Thesis title: *Modeling Correlation between Social Connections, Topics and Information Diffusion on Social Media*. Technical area of PhD: NLP (information extraction, sentiment analysis, information flow modeling), graph applications.
- M. Tech, Computer Science and Engineering, IIT Bombay, January 2003 (class topper for some part of the course). Technical area of MTech thesis: NLP (machine translation).
- B. E., Computer Science and Engineering, Jadavpur University Kolkata, 2001. Technical area of BE thesis: NLP (machine translation).
- M. S. in Psychology (Counseling and Therapy) – IBMS Chittoor 2004 (done in parallel to my office work, when I was working in VERITAS Software India). Specialization (Thesis): Industrial Psychology.

SOFTWARE SKILLS

- Operating Systems: Linux, some Solaris, some Windows
 - Languages: C, C++, core Java, Python, Linux shell scripting, awk, sed
 - Additional exposure to languages: C#, PHP, Windows Powershell, JSP, ASP, VB, Java Script, HTML
 - DBMS: IBM DB2, MySQL, and programming on JDBC, MS-SQL (exposure)
 - AI Tools/Libraries: Keras, Stanford NLP Toolkit, PyTorch, LangChain/LangGraph (Agentic)
 - Other Misc Tools: Java Servlets, Object Oriented Design Patterns, Weka, Mallet, Excel, Android, Unix Internals, CVS, SVN, Multithreading, TCP/IP, Keras, Socket Programming (Unix)
 - As a teacher: I teach the theoretical side of Natural Language Processing (classic NLP) in IIIT Guwahati at present. In the past, I have taught Data Structures and Algorithms, Mobile Computing and Databases as a Visiting Professor in Masters level courses in Sybiosis (Pune), South Asian University (Delhi) and as a TA in IIT Bombay.
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