

# Navin Kabra

<https://punetech.com/navin>, [navin@smriti.com](mailto:navin@smriti.com).

Linkedin: <https://www.linkedin.com/in/navinkabra>

101B, Twin Towers, D.P. Road, Aundh, Pune, 411 007. Phone: +91 98220 20096

For the latest copy of this resume see: <https://punetech.com/resume/resume.html>. *While I am open to part-time consulting and advisory roles, I am not interested in a full-time job. Please do not contact me with job offers.*

## Summary

I am a software technology professional with 30+ years of experience in the industry. I am currently a co-founder and CTO at Reliscore.com, where we make software and content that enables employers to evaluate the hard skills of job candidates and employees via various online methods.

I'm on the Advisory Board of Innoviti (a Fintech company in the payments processing space), a volunteer with iSPIRT on the BADAL project, the Advisory Committee of NIDHI-EIR-PEP and NIDHI-PRAYAS-PC (Govt. of India initiatives in the innovation/incubation space) and a technology consultant at FinIQ (specializing in derivatives and other structured products). I am also an instructor at GenWise teaching high school students courses on diverse topics, including cryptography, game theory, blockchain technologies, critical thinking, and more.

In the past I've worked for large companies, and small; I've worked in India and in the US; I've seen a successful exit, and I've seen a dotcom failure; I've done product development, and I've done research; I've written consumer software, and I've written enterprise software; and I've been a developer, I've been an architect, and I've been a manager (but hated it).

I am currently interested in tech-enabled education and skills assessment, fintech—bitcoin/blockchain, and payments processing, and quant finance—and machine learning/deep learning. I'm still very much hands-on—I do a lot of programming myself, and I actively keep track of the latest developments in the field.

## Education

Ph.D. in Computer Sciences, University of Wisconsin–Madison, USA, June 1999.

Advisor: Prof. David J. DeWitt

Dissertation: *Query Optimization for Object-Relational Database Systems*

M.S. in Computer Sciences, University of Wisconsin–Madison, USA, May 1994.

B.Tech. in Computer Science, Indian Institute of Technology-Mumbai, India, May 1992.

## Professional Experience

*ReliScore.com, Pune, India,*

Mar 2012–present

*Roles: Co-founder and CTO*

ReliScore.com is a software platform that enables companies to identify suitable candidates by presenting challenges in relevant areas of interest, accompanied by job postings. We have technology to auto-evaluate responses of candidates in various domains including, programming, testing/QA, support, devops, system/database administration, and more. The same technology is also used by companies for ongoing assessments of employees to identify training requirements, pre- and post-training benchmarking, and also for programming contests for branding or employee engagement.

*iSPIRT, Pune, India,*

Mar 2022–present

*Role: Volunteer*

iSPIRT is a technology think-tank which works on building public goods in India, for example those based on the India Stack. I am a volunteer on the BADAL project, a Distributed Ledger for accelerating trusted commerce in India. The idea is to build a distributed ledger for privacy-preserving trustful commerce using ideas from the cryptocurrency world, especially Zero-Knowledge Proofs. It is proposed as an interoperable fabric underlying a future programmable economy across

large and small businesses to create high trust economy. We also look at the emergence of Central Bank Digital Currency (CBDC) which is one of the core money applications of this framework and global backdrop in Annexure. There are many other use cases being proposed from land records to decentralised clinical trials for blockchain and allied technologies in different areas of government and business<sup>1</sup> likewise, that can be implemented in BADAL.

*Innoviti Payment Solutions, Bangalore, India,*

July 2007–present

*Role: Advisory Board*

Innoviti is a software product company in the payments processing space whose primary products include a payments automation gateway for retail merchant businesses, and a dealer trade credit platform for SMEs.

I advise on multiple aspects of technology, including architecture, performance, security, as well as senior tech hiring decisions.

*FinIQ, Pune, India,*

May 2007–present

*Role: Technology Consultant*

FinIQ is a banking software product company, specialising in pricing, dealing & processing of treasury & wealth management structured products, supporting FX, forwards, options, accumulators, TRF, equity linked, range accruals, baskets, structured notes, credit linked, IR linked, IRS, CDS, equity swap, cash equity (incl corporate actions), mutual funds and unit trusts, regular and exotic bonds, DCI with workflows for retail, commercial, private wealth as well as corporate banking can be automated including client pricing request, electronic pricing (via models or multi-dealer links), order management, trade capture, documentation, settlement, mid life event processing, redemption and accounting. FinIQ customers include 25 banking groups all over the world (75 banks).

I am a consultant and advisor for various aspects of technology, including architecture, performance, security, mentoring juniors, as well as skill enhancement, learning and development.

*Venture Center Science Business Incubator, Pune, India,*

March 2017–present

*Role: Advisory Committee Member, NIDHI-EIR-PEP, NIDHI-PRAYAS-PC*

NIDHI - National Initiative for Developing and Harnessing Innovations - is an umbrella programme conceived and developed by the Department of Science & Technology (DST), Government of India, for nurturing knowledge-based and technology-driven ideas and innovations into successful start-ups. PRAYAS - Promoting and Accelerating Young and ASpiring innovators & startups - is a programme that provides grants and a platform to idea-stage entrepreneurs with a physical product offering, who require support for prototyping. EIR - Entrepreneur in Residence - is a programme that provides a stipend, mentorship, office and lab space to young and innovative entrepreneurs for pursuing a promising technology business idea. The idea is to inspire the best talents to be entrepreneurs, to minimise the risk involved in pursuing start-ups, and to partially set off their opportunity costs of high paying jobs. Venture Center is a Government of India initiated science/technology business incubator, housed in NCL-Pune, providing services to entrepreneurs and startups offering products and services exploiting scientific expertise in the areas of materials, chemicals and biological sciences & engineering. Venture Center is a Programme Execution Partner (PEP) for the NIDHI-EIR programme, and a Prayas-Center (PC) for the NIDHI-PRAYAS programme.

I am a member of the committees of both - the NIDHI-PRAYAS-PEP and NIDHI-EIR-PC programmes - and am involved in selections of the entrepreneurs/startups and monitoring progress on a regular basis.

*GenWise, Bangalore, India,*

April 2018–present

*Roles: Teacher, Mentor*

GenWise offers middle- and high-school students introductory courses in new and emerging disciplines through high quality mentors from around the world with expertise in a diverse spread of

contemporary areas and the ability to teach engagingly. The focus is on creating life-long learners who love to explore beyond their formal curriculum.

At GenWise, I've been teaching a number of courses in areas that I find fascinating: Modern Cryptography, Game Theory, Cryptocurrencies and Blockchain Technologies, and Defense Against the Dark Arts (which is an introduction to critical thinking, and inoculation against fake news), and more.

*PuneTech.com, Pune, India,*

Dec 2007–present

*Roles: Founder and Chief Editor*

PuneTech.com is a hyper-local news-magazine that caters to the technology professionals and entrepreneurs in Pune, India. PuneTech covers the companies, user groups and organizations, people, technologies, news and events related to technology in Pune. PuneTech also organizes offline events, maintains the tech events calendar for Pune, and is generally a forum for the community to interact, find customers, collaborators, co-founders, employees and other interactions. With 3000+ subscribers, a linked-in group that is the largest Pune-related group on linked-in, and 10000+ highly targeted visitors per month, PuneTech has become one of the most important technology platforms in Pune.

*BharatHealth.com, Pune, India,*

Mar 2009–Mar 2012

*Roles: Co-founder and CTO*

BharatHealth.com is a software-as-a-service offering targeted towards doctors and patients with long-term medical conditions. It is currently being used by doctors and patients in Pune, India.

*Tap 'n Tap, Pune, India,*

May 2009–Dec 2011

*Roles: Consultant and Advisor*

Tap 'n Tap builds modular software products (apps, platforms, and cloud-based solutions) for the Android ecosystem that allow OEMs, manufacturers, operators and retailers to ship enhanced versions of the Android OS to strategically differentiate themselves from other players.

My role was to help build out their India-based development team, including key responsibilities in hiring, on-boarding of employees, and mentoring and guidance to the juniors and smooth handover

*Veritas (Symantec at that time), Pune, India,*

Aug 2002–Dec 2007

*Roles: Senior Researcher; CTO's Staff*

I was a part of *Symantec Research Labs (SRL)*, which builds prototypes of emerging technologies to determine whether they can be productized. Some of the projects I was involved in: 1) the use of statistical techniques to analyze corporate communications data (*i.e. e-mail*) for preventing leakage of sensitive data, 2) the use of data-mining algorithms to automatically detect configuration anomalies and other mistakes in large enterprise data-centers, and 3) the application of information retrieval algorithms to automatically detect variants in malware samples. In some projects, I had a hands on role where I did everything from the conceptualization and design, to the actual implementation and programming. In other projects, my role was more architectural - setting the direction, guiding the team, resolving conflicts, and evangelizing the idea across the company. I also worked in Symantec India's CTO office on various programs to increase technical vitality in the company, to foster innovation, to improve the patents programme, and to mentor and guide junior engineers.

*Quiq Incorporated, Madison, Wisconsin, USA and Pune, India,*

Feb 2000–Jun 2002

*Role: Senior Product Architect and Principal Developer*

Quiq Inc. was a company that provided software and services for Internet based Customer Support and eCRM (Customer Relationship Management). I was responsible for the design and implementation of the core search engine used in the product suite. We devised a novel index structure that incorporated both relational as well as text data. It provided for dynamic updatability (to reduce scheduled downtime), partitioned and replicated parallelism (for high availability), recoverability (from crashes as well as media failure), and support for a large number of simultaneous users.

*Teradata Corporation (NCR Corp. at that time), Madison, Wisconsin, USA, Mar 1998–Jan 2000*  
*Role: Module Architect and Project Leader*

Worked on the Teradata Object-Relational DBMS (TOR), a scalable, parallel, object-relational database management system. I was involved in various aspects of the architecture of the system, and design and development of individual features. Specific work includes: sole responsibility for design and implementation of user-defined functions (UDFs) in TOR, and of views in the query language; project leader of 2-person and 3-person teams to design and implement generalized user-definable aggregate operators in TOR, and design of text and spatial “data-blades” based on third-party software.

*University of Wisconsin–Madison, Wisconsin, USA, Jun 1993–Feb 1998*  
*Role: Research Assistant*

Part of the team that designed and developed the Paradise Scalable Object-Relational DBMS. I worked on the project from its inception until it was acquired by Teradata Corporation (part of NCR at that time) in 1998. I had full responsibility of a number of modules of the software including the query parser, the optimizer, and parts of the scheduler. In addition, I worked on various aspects of the system including the extended data-types, the client interfaces, and the system catalogs.

*University of Wisconsin–Madison, Wisconsin, USA, Sept 1992–May 1993*  
*Role: Teaching Assistant*

Conducted lectures and discussion sessions on Numerical Methods, Data Structures, and Introductory Pascal.

*Indian Institute of Technology–Mumbai, India, Sept 1990–Dec 1991*  
*Role: Teaching Assistant*

Conducted discussion sessions for an introductory computing course for college freshmen.

### **Selected Patents**

I am an inventor on 18 US Patents, 2 European Patents, and 1 Japanese Patent, filed as part of 3 different companies. Here are some selected ones:

“Method and apparatus for generating configuration rules for computing entities within a computing environment using association rule mining” with Neeran Karnik and Subhojit Roy. *US Patent Number 1998252, European Patent Number 8051028, Japanese Patent Number 2009048611.* Assigned to Veritas Technologies.

“Method and apparatus for detecting web-based electronic mail in network traffic” with Basant Rajan and Chirag Dalal. Assigned to Veritas Technologies.

“Coherency of replicas for a distributed file sharing system” with Anindya Banerjee *et al.* Assigned to Veritas Technologies.

“Adaptive Caching for a Distributed File System” with Dilip Ranade and Radha Shelat. Assigned to Veritas Technologies.

“Global monitoring and statistics collection for a plurality of computing nodes” with Radha Shelat *et al.* Assigned to Veritas Technologies.

“Efficient distributed transaction protocol for a distributed file sharing system” with Anindya Banerjee *et al.* Assigned to Veritas Technologies.

“Unified Database and Text Retrieval System.” with Raghu Ramakrishnan, Uri Shaft and Vuk Ercegovic. Assigned to Quiq Incorporated.

“Method and apparatus for evaluating index predicates on complex data types using virtual indexed streams.” with Jignesh Patel. Assigned to NCR Corporation.

“Method and apparatus for parallel execution of trigger actions” with 4 other inventors. *U.S. Patent Number 673,2084, European Patent Number 1111516* Assigned to NCR Corporation.

See the US Patent Database more of my patents.

### **Ph.D. Thesis Research**

*Dynamic Query Optimization in Database Query Processing:*

Designed and implemented *Dynamic Re-Optimization*, an algorithm that dynamically detects sub-optimality of a query execution plan during query execution and improves performance by re-optimizing the query. Statistics are collected at key points during the execution of a complex query, and are then used to optimize the execution of the query, either by improving the resource allocation for that query, or by changing the execution plan for the remainder of the query. To ensure that this does not significantly slow down the normal execution of a query, the Query Optimizer carefully chooses what statistics to collect, when to collect them, and the circumstances under which to re-optimize the query.

*Extensible Query Optimization:*

Designed and Implemented OPT++, a tool that uses an object-oriented design to simplify the task of implementing, extending, and modifying an optimizer. Building an optimizer using OPT++ makes it easy to extend the query algebra (to incorporate new query algebra operators and physical implementation algorithms in the optimizer), easy to change the search space explored, and also easy to change the search strategy used. Furthermore, OPT++ comes equipped with a number of optimization techniques and search strategies that are available for use by an Optimizer-Implementor. Conducted a performance study that validates the design of OPT++ and shows that in spite of its flexibility, OPT++ can be used to build efficient optimizers.

*Query Optimization in Object-Relational Database Systems:*

Used OPT++ to implement and study a number of different optimization techniques and search strategies and how they interact with each other. Implemented a number of search strategies including dynamic-programming (System-R style), Simulated Annealing, Iterated Improvement, Two-Phase Optimization, and A\*. Implemented a number of optimization techniques to handle join enumeration, expensive predicates, reference-valued attributes, path indexes, set-valued attributes, abstract data-types with methods, and spatial operations. For each optimization technique, studied how effective it is, and how it is affected by the choice of search strategy.

### **Refereed Publications**

“Mass Collaboration: A Case Study” with Raghu Ramakrishnan *et. al. International Database Engineering and Applications Symposium (IDEAS-04)*. Coimbra, Portugal, July 2004.

“The QUIQ Engine: A Hybrid IR-DB System.” with Raghu Ramakrishnan and Vuk Ercegovac. *International Conference on Data Engineering*, Bangalore, India, March 2003.

“Opt++: An Object-Oriented Design for Extensible Database Query Optimization.” with David J. DeWitt. *The VLDB Journal*. Volume 8 Issue 1, January 1999.

“Efficient Re-Optimization of Sub-Optimal Query Execution Plans.” with David J. DeWitt. *Proceedings of the 1998 SIGMOD Conference*, Seattle, Washington, June 1999.

“Building A Scalable GeoSpatial Database System: Technology, Implementation and Evaluation.” with the Paradise Team. *Proceedings of the 1997 SIGMOD Conference*, Tucson, Arizona, May 1997.

“Client-Server Paradise.” with David J. DeWitt, Jun Luo, Jignesh M. Patel and Jie-Bing Yu. *Proceedings of the 20th VLDB Conference*, Santiago, Chile, September 1994.

*References available upon request.*