

# DR. POUYA ATAEI

Big Data & AI Engineer | Computer Scientist | PhD in Big Data

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 polyhistor

 Pouya-Ataei



## Contribution to Australia's National Interest

I currently architect critical data infrastructure for Australia's National Electricity Market at Vector Technology Solutions. This infrastructure processes telemetry for Blue Current—a sovereign asset co-owned by the Queensland Investment Corporation (QIC)—serving 2.7 million smart meters. The serverless architecture I contribute to enables the grid stability required for Australia's Net Zero transition. Simultaneously, I develop machine learning solutions for infrastructure mapping (PSPS) in California, transferring global wildfire mitigation best practices to Australia.

With a PhD in Big Data (2024), I address the high failure rate of data projects through resilient distributed systems. My reference architecture, Terramycelium (2025), demonstrates processing of 771,305 messages with 0.0000148s latency, supporting Australia's low-emission technology goals.

## Academic Impact & Research Recognition

Google Scholar Metrics (as of December 2025)

h-index: 8

Total Citations: 173+

i10-index: 8

Publications: 17 peer-reviewed (journals, conferences, book)

Publication Venues:

IEEE Access (IF: 3.4) • Journal of Big Data (IF: 8.1) • Frontiers in Big Data (IF: 3.1)

Asia-Pacific Software Engineering Conference (IEEE) • American Conference on Information Systems

## Skills

Big Data Systems



Apache Kafka / Stream Processing



Machine Learning / Deep Learning



AWS, Google Cloud, Azure



TensorFlow / PyTorch



Kubernetes / Docker



Data Engineering



Terraform / Infrastructure as Code



Research Methods (Qual/Quant)



SQL / NoSQL Databases



Distributed Systems



Vector Databases / Elasticsearch



Software Architecture



Data Pipelines / ETL



Python



Statistical Analysis



Golang



Linux / Bash





## Work Experience

# Principal Data Engineer at Vector Limited

Auckland, New Zealand

 May 2025 - Current

- Architecting critical serverless infrastructure for Blue Current (National Electricity Market partner), processing 2 billion daily data intervals from 2.7 million smart meters to support grid stability.
  - Developing machine learning models for Proactive Power Safety Shutoff (PSPS) mapping in California (San Diego), applying adaptive algorithms to optimize grid resilience and wildfire mitigation.
  - Drive AWS cloud cost efficiency through best practices in Glue, Athena, S3, DynamoDB, and event-driven architectures.
  - Implement automated data validation, lineage tracking, and observability to maintain data quality and ensure compliance with regulatory frameworks.
  - Design and scale Diverge's data platform to support both real-time and batch energy analytics with a focus on performance, security, and cost-efficiency.
  - Architect and deploy energy data algorithms while ensuring efficient and scalable model inference integrated with Diverge's services.
  - Lead test automation strategies that embed data quality checks into CI/CD pipelines and foster an architectural culture that promotes iterative, autonomous development.
  - Mentor junior engineers, fostering a high-performance engineering culture aligned with the company's long-term technology vision.

Tech & Tools: AWS (Lambda, DynamoDB, S3, Glue, Athena), Python, Serverless Architecture, Data Engineering, Machine Learning, CI/CD, Event-Driven Architecture, Data Science

Engineering Manager at Invenco by GVR

Auckland, New Zealand

 Sep 2024 - May 2025

- Led the 'Engage' media platform, a high-throughput distributed system delivering real-time advertising content to a nationwide network of payment terminals across the US and APAC markets.
  - Serve as the principal architect for the entire 'Engage' domain, holding sole responsibility for architectural decisions and technical direction across all systems and services.
  - Design and implement event-driven architectures using Kafka and AWS EventBridge, enabling real-time data processing and system integration at scale.
  - Establish and enforce engineering excellence through comprehensive TypeScript guidelines, Clean Architecture principles, and Domain-Driven Design practices across all teams.
  - Implement Value Stream Management and Flow Framework methodologies to optimize delivery pipelines and enhance team productivity while reducing cognitive load.
  - Architect and implement advanced observability solutions using OpenTelemetry, significantly enhancing system monitoring and performance tracking capabilities.
  - Drive technical excellence through cloud-native architectures, leveraging AWS, Kubernetes, and Kafka for robust distributed systems.
  - Oversee development across diverse technology stacks including Node.js, Go, C#/.NET, and Snowflake for data warehousing solutions.
  - Guide architectural decisions and technology choices to support the organization's growth and scalability goals.

Tech & Tools: AWS, OpenTelemetry, Node.js, Kubernetes, Docker, Terraform, GitLab CI/CD, Microservices, Python, Bash, Vector Databases, TensorFlow

Development Team Leader - Cloud Architecture at Invenco by GVR

Auckland, New Zealand

July 2024 - Sep 2024

- Lead a cross-functional team in developing and maintaining cloud-based payment solutions, fostering innovation and continuous improvement.
  - Architect and implement scalable cloud services, ensuring high performance and security standards are met.
  - Created and implemented a comprehensive observability plan using OpenTelemetry, significantly enhancing system monitoring and troubleshooting capabilities.
  - Successfully scaled our terminal infrastructure to handle over 300,000 requests in under 30 minutes, dramatically improving system capacity and responsiveness.

- Drive adoption of modern software engineering practices, including microservices architecture and serverless computing.
- Collaborate with stakeholders to define technical roadmaps, balancing immediate needs with long-term strategic goals.
- Mentor team members, facilitating their professional growth and fostering a collaborative work environment.
- Spearhead the integration of DevOps practices, improving deployment frequency and reducing time-to-market for new features.
- Stay abreast of emerging technologies, evaluating their potential impact on the organization's cloud strategy.

Tech & Tools: AWS, Kubernetes, Kafka, OpenTelemetry, Node.js, Go, C#/.NET, Snowflake, Terraform, Docker, GitLab CI/CD, Python, Bash, Vector Databases, TensorFlow

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## Lead Development Architect at Idexx Laboratories

 Sep 2021 – July 2024

Auckland, New Zealand

- Stood responsible as one of the company's lead architects, taking part in critical technological decisions across different regions.
- Worked on an event-driven architecture using Kafka, deployed and tested an archetype with consultants from Confluent.
- Presented the company and engaged with representatives from Databricks, Heap, Apollo, AWS, Gitlab, Confluent, BizzDesign and others.
- Created a scientific methodology for software delivery.
- Introduced novel data-driven approaches to decision making.
- Designed infrastructure, applications and integrations on daily basis.
- Coached and mentored junior, intermediate and senior engineers, providing guidance on best practices, and best ways to learn.
- Supported various teams in various feature development through high-level models and also hands-on coding.
- Completed various leadership courses, including CASCADE, and practiced servant leadership principles, prioritizing team growth and well-being.
- Applied concepts from "Leaders Eat Last" and "The Servant" to foster a culture of trust and collaboration, leveraging Team Topologies and Domain-Driven Design to streamline communication and align team efforts.

Tech & Tools: Archimate, TOGAF, ADM, BDD, DDD, AWS, Kafka, Go, Graph, SQL ,Terraform, Kubernetes, Elasticsearch, Typescript

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## Tech Lead at Idexx Laboratories

 Jun 2021 – Sep 2021

Auckland, New Zealand

- Served as a key lead architect, driving critical technological decisions and strategies across various regions, emphasizing my pivotal role in shaping the company's technological landscape.
- Designed and deployed a distributed data layer, introducing a declarative client-driven API to enhance system flexibility and client interaction efficiency.
- Engineered an event-driven architecture leveraging Kafka, including the deployment and rigorous testing of a prototype in collaboration with Confluent consultants, showcasing my expertise in modern, scalable system design.
- Actively engaged in feature development, technical debt reduction, and incident management, contributing to continuous improvement in system reliability and development practices.
- Presented scientific approaches and innovative solutions across different teams to address existing challenges and develop new features, fostering a culture of continuous learning and cross-team collaboration.

Tech & Tools: Laravel, Terraform, AWS, Apollo, Go, Rust, Node, React, PHP, SQL, Kafka, Python, Kubernetes, Elasticsearch, Typescript

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## Senior Fullstack Developer at ezyVet

 Jul 2020 – Jun 2021

Auckland, New Zealand

- Elevated from Senior Frontend Developer to Frontend Tech Lead within Ezyvet, taking comprehensive responsibility for all frontend applications, demonstrating rapid professional growth and trust in my leadership and technical capabilities.
- Championed the integration of best practices and cutting-edge technologies into the team's workflow, significantly enhancing project outcomes and efficiency. Actively contributed to the development and refactoring of complex features, reinforcing the team's adaptability and technical prowess.
- Orchestrated a major refactor of the frontend codebase, quintupling its modifiability, performance, and security, which substantially boosted the application's reliability and user satisfaction.
- Spearheaded the recruitment process for new talent, playing a pivotal role in interviewing, onboarding, and mentoring new hires, thereby fortifying the team's capabilities and fostering a culture of continuous learning and improvement.
- Addressed critical engineering challenges in both the frontend and platform domains, implementing solutions that dramatically optimized our deployment pipeline—cutting build and deployment times from an average of 45 minutes to just 8 minutes, greatly accelerating product iteration cycles and enhancing team productivity.

Tech & Tools: React, Typescript, AWS, Go, Laravel, Kubernetes, Terraform, PHP, Node

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## Fullstack Developer at Infosys

Auckland, New Zealand

 Feb 2020 - Jul 2020

- Deployed to Vodafone to take part in the development of a new E-shop.
- Began as a frontend developer, but I rapidly expanded my role to encompass CMS and backend development, demonstrating flexibility and a broad skill set.
- Was one of the main engineers that worked on the frontend and the e-commerce backend. The work included checkout processes, cart validation, product pages, and component design, along with optimizing SEO, implementing analytics, conducting UI and end-to-end testing, and driving integration projects.
- Worked on various legacy Oracle systems and written integration and anti-corruption layers.
- Collaborated closely with a diverse range of stakeholders on a daily basis, focusing on the development of innovative concepts, and the identification and resolution of bugs and defects, ensuring continual improvement and operational excellence.

Tech & Tools: React, Flask, DynamoDB, Jenkins, AWS, BigCommerce, Java, Python, Javascript

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## Frontend Engineer at Navigate Travel

Auckland, New Zealand

 Jun 2019 - Feb 2020

- Spearheaded the migration of three websites from WordPress to Gatsby, integrating React, Contentful, and Node (NestJS), successfully transitioning 900 blog posts with a keen focus on SEO optimizations and schema markups.
- Enhanced the performance and SEO of existing WordPress sites, implementing advanced optimization strategies to improve search engine rankings and user engagement.
- Developed a cross-browser, responsive web application that combines dynamic and static elements, delivering an exceptional user experience on all devices.
- Managed API concurrency issues, dynamically updating product prices, names, and descriptions to ensure real-time accuracy and responsiveness.
- Contributed to refining the company's SEO strategy, leading to measurable improvements in web visibility and traffic.
- Collaborated in the UI/UX design process, creating intuitive and user-friendly interfaces that enhance customer satisfaction and engagement.
- Leveraged emerging technologies in both front-end and back-end development, significantly increasing application performance and speed.
- Implemented a polyglot persistence architecture, enhancing system efficiency and scalability to support growing data demands and diverse data types.

Tech & Tools: Gatsby, Contentful, React, Node, Sass, Graphql, Netlify, Vercel, Gitlab Pipelines, AWS, Google Cloud

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## Founder, Lead Fullstack Developer at Pouyaraveshan Academy

Tehran, Iran

 Feb 2017 - June 2019

- Implemented servant leadership principles from "The Servant" to empower and uplift team members, creating a collaborative and growth-oriented environment, drawing from insights in the book "Leaders Eat Last".
- Optimized SEO strategies, achieving an average website position of 8.5 and a click-through rate (CTR) of 6.5%, significantly enhancing online visibility.
- Directed a team to launch an early version of our website's Accelerated Mobile Pages (AMP), resulting in a 70% increase in traffic.
- Conducted computer science and software engineering workshops, covering a wide array of technologies and empowering participants with new skills.
- Oversaw key operations including marketing, content creation, administration, student engagement, system development, and orchestration, driving comprehensive organizational growth.
- Regularly developed, maintained, and enhanced pouyaraveshan.org, ensuring an engaging user interface and robust backend functionality.
- Implemented and fine-tuned a Learning Management System (LMS), both improving client experience and streamlining organizational processes through automation.
- Implemented an online learning system using Adobe Connect and custom built backends. I have then integrated this system with our LMS, and POS systems.

Tech & Tools: ReactJS, NodeJs, Mongo, Adobe Connect, Mysql, PHP, Golang, C#, .Net Core, Java

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## Full Stack Developer at Cake Creative Digital Lab

 June 2015 - Nov 2016

Kuala Lumpur, Malaysia

- Engaged in diverse web development projects, including front-end design and e-commerce, enhancing system customization and exclusivity.
- Reduced rework by 22% and cut costs by 15% by engineering a reusable utilities library.
- Achieved high user experience scores across all web development projects, ensuring an intuitive and effective user interface.
- Optimized project performance to consistently meet or exceed a 95% Google Pagespeed score.
- Conceptualized and prototyped an average of 25 new product features annually, significantly contributing to product enhancement.
- Led the development of a website that garnered the 2015 Malaysia Website Award for outstanding UI/UX and structure.
- Played a key role in the full project lifecycle, from development and maintenance to deployment, emphasizing robust and scalable solutions.
- Collaborated with the development team to ascertain user requirements, formulate use cases, prioritize tasks, and draft comprehensive documentation.
- Conducted thorough analyses of web-based systems to identify and rectify defects, bolster performance, and fortify security measures.

Tech & Tools: Wordpress, Magento, Opencart, AngularJS, Vanilla JS, PHP, C#, .Net Core, Golang

## Workshop Assistant, Python Developer at Kidocode

Feb 2015 – May 2015

Kuala Lumpur, Malaysia

- Completed a 3-month internship, during which I facilitated Python, NoSQL, Cloud, and Web Development workshops at various universities in Kuala Lumpur, enhancing educational outreach and technology adoption.
- Diagnosed and resolved student's coding issues during workshop sessions, ensuring smooth and effective learning experiences.
- Played a role in the development of the company's loyalty campaign platform, coding various aspects from database to frontend.
- Engaged in youth education initiatives, teaching programming fundamentals through both hands-on (plugged) and theoretical (unplugged) methods, fostering early interest in technology.

Tech & Tools: Django, NumPy, Matplotlib, AngularJS, Mongo, Python

## 🎓 Education

B.S.C in Software Engineering (Dual Degree)	Staffordshire University	Jan 2012 – April 2015
B.S.C in Software Engineering (Dual Degree)	Asia Pacific University of Technology	Jan 2012 – April 2015
M.S.C in Software Engineering	Staffordshire University	September 2015 – Feb 2017
PhD in Computer Science	Auckland University of Technology	Feb 2019 – September 2024
Nano Degree in Data Architecture	Udacity	Dec 2022 – Feb 2023

## ✿ Certificates

PyResearcher - Sixty Hours (Python - MongoDB - NumPy - Matplotlib - Pandas)	Pycademy	April 2015
MCPS: Microsoft Certified Professional	Microsoft	October 2015
MS: Programming in HTML5 with JavaScript and CSS3	Microsoft	October 2015
Data Streaming Engineer	Confluent	December 2025

# Publications

## Books

- *The nexus methodology: A trenchant approach toward big data.* (2017).

## Journal Articles

- Terramycelium: A reference architecture for adaptive big data systems. (2025). *Journal of Big Data*.
- Cybermycelium: A reference architecture for domain-driven distributed big data systems. (2024). *Frontiers in Big Data*.
- Impact of big data analytics on business performance: A systematic literature review. (2024).
- Filtering useful app reviews using naive bayes—which naive bayes? (2024). *AI*.
- Ethics of software programming with generative ai: Is programming without generative ai always radical? (2024). *arXiv preprint arXiv:2408.10554*.
- Application of microservices patterns to big data systems. (2023). *Journal of Big Data*.
- The state of big data reference architectures: A systematic literature review. (2022). *IEEE Access*.
- The hype of emerging technologies: Big data as a service. (2017). *Int. J. Control Theory Appl.*
- Security and privacy challenges in big data era. (2016). *International Journal of Control Theory and Applications*.

## Conference Proceedings

- Why Big Data Projects Fail? A Systematic Literature Review. (2024).
- An Overview on Testing Big Data Applications. (2024), In *Proceedings of ninth international congress on information and communication technology*.
- Towards a domain-driven distributed reference architecture for big data systems. (2023), In *Amcis 2023*.
- NeoMycelia: A software reference architecturefor big data systems. (2021, December), In *2021 28th asia-pacific software engineering conference (apsec)*.
- Big Data Reference Architectures: A Systematic Literature Review. (2020), In *2020 31st australasian conference on information systems (acis)*. IEEE.
- Evaluating Major Issues Regarding Reliability Management for Cloud-based Applications. (2017a).
- The big data ecosystem and its environs. (2017b).

## International Recognition & Awards

- **AAIS ACIS Attendance Scholarship**  
Australasian Association for Information Systems 2024
- **AMCIS 2024 Registration Scholarship**  
Association for Information Systems (AIS) 2024
- **2015 Malaysia Website Award**  
Outstanding UI/UX and Structure 2015

## Professional Memberships

- **IEEE Computer Society**  
Academic Contributor Jan 2021 - Present
- **Association for Information Systems (AIS)**  
Academic Contributor May 2019 - Present

## Peer Reviews

Invited reviewer for 15+ international journals and conferences (22+ reviews, 2011–2024):

Premier Journals:

- IEEE Transactions on Knowledge and Data Engineering (TKDE)
- Nature Communications (Springer Nature)
- IEEE Access
- PeerJ Computer Science
- Systems Engineering (Wiley)

**Conferences:**

- ICSE 2025 - International Conference on Software Engineering
- ECIS - European Conference on Information Systems (2011, 2024)

## Presentations Delivered

- |   |                           |
|---|---------------------------|
| • International Conference on Control, Electronics and Computer Technology - ICCEIT 2017, India     | 2017                      |
| • International Conference on Control, Electronics, and Computer Technology - ICCECT 2017, Malaysia | 2017                      |
| • Australasian Conference on Information Systems - ACIS, New Zealand                                | 2019                      |
| • American Conference on Information Systems - AMCIS, USA   | 2020                      |
| • Asia-Pacific Software Engineering Conference - APSEC, Taiwan                                      | 2021                      |
| • Kafka and Terraform Meetup - Confluent, New Zealand   | 2023                      |
| • Geekle- World Global React Conference   | Multiple (Latest in 2023) |
| • American Conference on Information Systems - AMCIS, USA   | 2024                      |
| • Other Conferences and Meetups   |                           |