Mohamed Elbanhawi (BEng Hons, PhD)

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Summary

Software Engineering Manager with 10+ years of experience leading cross-functional teams and building scalable distributed systems. Proven track record of delivering high-impact solutions in fintech and AI, with expertise in Go, Python, gRPC, temporal, K8s, cloud platforms (GCP, AWS), and microservices architecture.

Experience

Engineer Chapter Lead, ANZx; Melbourne, Australia — July 2024 - Current

- **Software Engineering Manager** in ANZ Plus Digital Banking - ANZ Bank's business transformation initiative.
  - ANZ is one of the top 4 banks in Australia, and top 100 globally, serving a quarter of the Australian public.
- Managed two cross-functional teams with 10+ backend engineers to deliver core lending capabilities to the bank.
  - Led the design, delivery, build and deployment of key distributed cloud native backend services using Go, Temporal, Kubernetes, gRPC & PubSub on GCP.
  - Consistently delivered features across both teams on time to achieve OKRs. Resulting in 10x YoY improvement in loan processing, with an industry record of 20 minutes for loan processing.
  - Delivered technical enhancements that improved system reliability, uptime & minimise risk exposure and MTBF.
  - Ensured compliance with technical governance frameworks for finance sector.
- Contributed to strategy, delivery and technical standards across the value stream and technical assets.
- Identified opportunities for enhanced delivery, technical strength & maintainability of the services using automation, generative AI and standardisation which were successfully adopted across the value stream.
- Mentoring, coaching, performance reviews and setting expectations for engineers in the team.
- Participated in hiring committee, conducted coding & design interviews and Engineering Capability reviews.

Technical Lead Engineer, ANZx; Melbourne, Australia — March 2023 - July 2024

- **Staff Software Engineer** in ANZ Plus Digital Banking - ANZ Bank's business transformation initiative.
  - Reduced loan processing by 70%-90% setting industry wide record.
- Designed, built and delivered core distributed cloud native services for home lending written in Go and Temporal for orchestration deployed on Kubernetes (GKE) hosted on GCP.
- Designed, built and delivered key gRPC services; aligned with ANZx standards for monitoring, logging, telemetry authorisation & authentication; to serve key channels within the banks including a mobile first customer experience.
- Scaled services from staff alpha version to platform serving 1+ million customers. Requiring cross team collaboration with over 10 other teams.
- Designed, built and delivered data products & assets using Dataflow, PubSub, Spanner & BigQuery on GCP.
- Contributed to engineering process and standards by writing RFCs, engineering solution designs, architecture increments, code style guide, testing standards, API design compliant with ANZx standards and google's AIP standards.
- Contributed to standardising temporal usage across the bank as part of the temporal working group, and temporal guild.
- Ownership of features from inception, design, build, deployment, end to end testing, security testing, activation & support.

Principal Software Engineer, Systema AI; Melbourne, Australia — March 2021 - March 2023

- Delivered SaaS AI products for e-commerce anonymous personalisation of product recommendations, search & discovery.
- Scaled services for millions of products daily recommendations, and product ingestion for 100+ Million scale.
- Built cloud native product feeds ingestion pipelines for million rows using Lambda, Glue, Pandas and Spark on AWS.
- Built streaming pipeline handling millions of daily events using Kinesis, DynamoDB, Firehose, Athena & Lambdas on AWS.
- Built core APIs for Search, suggest & recommendation using ECS and Flask/FastAPI on AWS.
  - Deploying SoTA CNN and NLP networks for image and text latent vector extraction.
  - Feature extraction and compression for feature embedding.
  - Bayesian model for click through rate and purchase likelihoods estimation.

Flight Lab Engineer, QinetiQ Australia; Melbourne, Australia — November 2019 - March 2021

- Managing multi-vehicle drone and robotics lab at the University of Melbourne (Ranked 1st in Australia, 31st worldwide at the time).
  - Engineering support, capability trials & enhancements including the design and build of software and hardware tooling.
  - Operational & Maintenance Planning Management.
  - Training & Supervision of researchers.
- Tools: C++ & Python on arm64 and STM32, PX4 firmware, middleware ROS1/2, docker, flask, mongo, AWS.

Research Engineer, Cohda Wireless; Adelaide, Australia — July 2017 - November 2019

- Algorithm design for Connected Autonomous Vehicles (CAV) products key projects:
    - GPS denied positioning in [mines](#), [underground](#) car parks and [urban](#) canyons.
    - Navigation and obstacle avoidance in urban canyons [see demo.](#).
    - Co-operative high speed [platooning](#), perception and motion planning.
    - Wifi based vulnerable road user detection, tracking and avoidance.
- Agile software development in C++, Python, Matlab & ROS. CI/CD: Jenkins.
- Experiment & field trial design and execution for CAV products [see demo.](#).
- Product demonstration, field trials and technical talks at Robovis 2019, ITS world congress 2019, and ADVI conferences.
- Writing research and [white-papers](#), filing patents for generated intellectual properties.

Solutions Engineer, MEMKO Pty; Melbourne, Australia — September 2016 - July 2017

- Agile software development in VBA, Python & Java.
- Designed and built a multi-objective multi-variate optimisation algorithm for a Victorian manufacturer planning / formulation applications.
- Backend developer for on-site fleet technical management tool for an Australian airline.

Academic, RMIT University; Melbourne, Australia — July 2012 - July 2017

- Lecturer Industrial Systems Engineering (MANU 1381) –2016-2017
- Lecturer Engineering Unmanned Systems (AER2464) – 2016-2017
- Tutor Mechatronic Design (MIET 2631) - 2012-2017. Student Demo available on [Youtube](#).
- Supervisor Professional Research Project (OENG 1074-1075) - 2014-2017

Technical Support (Genius), Apple; Melbourne, Australia — December 2012 - September 2016

- Software and hardware technical support for macs OS, and iOS products.
- Frontline customer support.
- Apple certified mac technician.

Education

Doctor of Philosophy, 2013-2016 — RMIT University, Melbourne, Australia

- Thesis "Randomised Parameterisation Motion Planning for Autonomous Cars" defended in January 2016 ([watch](#)) and submitted in April 2016 and Passed in August 2016 (C1: highest level no changes required)
- Recipient of the Australian Postgraduate Award in 2013-2016.
- Recipient of Higher Degree Research Publication Grant in 2016.
- Published over 17 peer reviewed journals; [Google Scholar](#).
- Extra curricular activities:
    - Autonomous Drone Technologies — 2017 - Online at RMIT University see [interview](#).
    - AMAV Competition — 2017 - Online at [RMIT University website](#)
    - Defence Science and Technology Group Multi-rotor Grant- 2014-2015 - Chief Co-Investigator/Autonomy Lead
        - Media coverage [RMIT Youtube](#) and Field Testing [Youtube Link](#)
    - Defence Science and Technology Group Autonomous Ground Vehicles Competition— 2013-2015, Team Lead
        - Media coverage [Youtube Link](#) and Field Testing [Youtube Link](#)
    - IEEE Intelligent Transportation Systems Society Interview — 2015 - Online at http://itsp.cicei.com/?p=724
    - Autonomous Ground Vehicle Competition — 2014 - Online at [ABC News](#)
    - Drones for Good RMIT UAS Entry — 2014 - Online on [Vimeo](#) (Password: dronesforgood)

Bachelor of Engineering with 1st Class Honours, 2012 — RMIT University, Melbourne, Australia

- Graduated with First Class Honours with a GPA 4.0 out of 4.0 maintained a High Distinction Average.
- Thesis "Robotics Application in Remote Solar Pond Monitoring"
    - Lab Testing [Youtube Link](#)
    - Simulation [Youtube Link](#)
- Graduated on the vice chancellor's list.
- Received multiple awards for academic excellence.
- Extra curricular activities: SIEMENS FutuRIDE — 2012, DAQ programming (Media Coverage [online](#))

High School Diploma, 2007 — Riada Language School, Alexandria, Egypt

- Graduated Top of Mathematics Department with a score of 407.5/410 (99.4%).

Patents

- Khan, M., & **Elbanhawi, M.** 2019. Systems and Methods for Automatically Training Neural Networks (AU2019202088A1; EP3547215A1; US2019294966A1).
- Alexander P., Khan, M., Buetefuer, J. & **Elbanhawi, M**., Perera, K. & Robinson, L. 2020. A Method and System for Estimating Range Between and Position of Objects Using a Wireless Communication System. (AU2019205008A1; EP3594712A1; US2020018816A1).
- Alexander P., Khan, M., Buetefuer, J. & **Elbanhawi, M**., Perera, K. & Robinson, L. 2020. A Method for Estimating the Position of an Object (AU2019226114A1; EP3617735A1; US2020077238A1).

Publications

Full list and citations available online at [Google Scholar](#) / [ResearchGate](#). Featured journal Articles listed below:
- ELBANHAWI, M. & SIMIC, M. 2014. Sampling-Based Robot Motion Planning: A Review. Access, IEEE, 2, 56-77.
- ELBANHAWI, M., SIMIC, M. & JAZAR, R. 2015. Continuous Path Smoothing for Car-Like Robots Using B- Spline Curves. Journal of Intelligent & Robotic Systems, 1-34.
- ELBANHAWI, M., SIMIC, M. & JAZAR, R. 2015. In the Passenger Seat: Investigating Ride Comfort Measures in Autonomous Cars. IEEE Intelligent Transportation Systems Magazine
- ELBANHAWI, M., SIMIC, M. & JAZAR, R. 2015. Improved Manoeuvring of Autonomous Passenger Vehicles: Simulations and Experiments. Journal of Vibration and Control/JVC
- ELBANHAWI, M., SIMIC, M. & JAZAR, R. 2015. Randomised Bidirectional B-Spline Parameterisation Motion Planning. IEEE Transactions on Intelligent Transportation Systems
- ELBANHAWI, M., SIMIC, M. & JAZAR, R. 2016. Receding Horizon Pure Pursuit Lateral Vehicle Control. Journal of Vibration and Control/JVC
- ELBANHAWI, M., et al. 2017. Enabling Technologies for Autonomous Drone Operations. Progress in Aerospace Sciences

Internships

QC Engineer, Tieco; Melbourne, Australia — April 2012 - June 2012
- Revising customer order drawings and prepare work orders for incoming jobs.

Schlumberger; Abu Dhabi, UAE — January 2012
- Engineering intern at the Drilling and Measurements department.
- Completed Phase 1 induction for field engineers, Online Interactive Learning program (OIL) & Schlumberger Injury Prevention Program (SIPP 2).

ABB; Cairo, Egypt — December 2012
- Completed Robotics Training on ABB Robots, ABB RobotStudio & ABB RAPID programming.

Mantrac; Alexandria, Egypt — August 2010 - September 2010
- Engineering intern in servicing Caterpillar diesel generators.

Awards

Higher Degree Research Publication Grant, 2016 — RMIT University
Australian Postgraduate Award, 2013 — RMIT University
Head of School Prize, 2013 — RMIT University
Final Year Manufacturing & Engineering Management Project Prize, 2013 — RMIT University
Manufacturing & Engineering Management Final Year Prize, 2013 — RMIT University
Hardchrome Engineering Award, 2012 — RMIT University and Hardchrome Engineering
Certificate of Merit for Academic Excellence, 2009, 2010 - Arab Academy for Science and Technology
Full Acceptance Scholarship, 2007 — Arab Academy for Science and Technology
Certificate of Merit for Charity Contributions, 2007 — Riada Language School

Skills

- Programming Languages: Go, Python, C++,
- Cloud Platforms: Google Cloud Platform (GCP), Amazon Web Services (AWS)
- Technologies: Kubernetes, Docker, gRPC, Temporal.
- Databases: DynamoDB, MongoDB, Redis, RDS Aurora, MySQL, Spanner, Big Query.
- DevOps: CI/CD, Github Actions, Git, Terraform
- ML and Data Engineering: CNN, NLP, TensorFlow, PyTorch, Pandas, Spark
- Leadership: Engineering Management, Team Leadership, Cross-functional Collaboration & Mentoring.