

Ashkan Alvand (Ph.D.)

Professional summary

I am a Research Scientist with proficiency in data science and quantitative research. I am driven to employ various methods to discover new insights and trends from human centered projects. I am eager to broaden my skill set and contribute to an innovative company with practical real-world applications.

Experience

Medical Image Analyst

Liggins Institute, (02/2023 – 09/2023, Full-time)

As a Medical Image Analyst, I was responsible for developing models to analyze MRI datasets to create evidence-based actionable insights for decision making . I deployed network models, performed data clerking and quality check, added integration tests, deployed various statistics (e.g.,AB testing), validated results, and tested models in production. I extracted and analyzed the result and prepared infographic reports to further investigate the model performance in different analytical platforms. I also maintained, managed and troubleshooted a cloud-based server (NeCTAR) including updating, installing and troubleshooting software. These are implemented via NeCTAR cloud, Linux Ubuntu server, Bash, Perl, Anaconda, docker engine, Python tools such as Nilearn, Scipy, Numpy, MATLAB tool boxes, SPSS, SAS, etc..

Quantitative Data Analyst

The University of Auckland, (07/2018 – 12/2022, Full-time)

As a quantitative research analyst, my responsibilities involved developing and implementing project plans, implementing data collection strategies through participant recruitment, interviews, tests, surveys and questionnaires, implementing network algorithms for data modeling, utilizing statistical techniques to analyze human recorded data and identify patterns and biomarkers. I led a multidisciplinary team to backtest different models and generate network models on medical imaging dataset. I also built a ubuntu server on a local HPC through configuration, OS installation, software installation, updating, maintaining and troubleshooting. My commitment to staying current with data analytic advancement and passion for human focused research contributed to my success. These projects were completed via utilizing Linux Ubuntu including scripting in Bash and anaconda environment, statistics in SPSS, MATLAB, Python packages (e.g., Nilearn), data cleaning using docker engine, Bash and Neuro tools and data modeling using network theory such as implementing community detection algorithms.

Projects

Clinical trial of preterm neonates (MR DIAMOND study)

Liggins Institute, Feb 2023 - Sep 2023

This project investigated effects of different interventions on structural integrity of the premature brain during neonate's development using MRI data. In this project, I developed BASH scripts by implementing python packages such as scipy, Numpy and

Profiles



Technical Skills

- Algorithms
- Big Data
- Computer Vision
- Data Analysis
- Data Visualization
- Mathematical Modeling
- MATLAB/Python/Bash/R/SQL
- Statistics
- SPSS
- SAS
- Times Series Regression
- Jupyter-Notebook/Anaconda
- Docker
- Git/SmartGit
- Network modeling/community detection
- Machine learning: SVM/KNN/NB
- MS Office: Word/PowerPoint/Excel/Outlook
- HTML/CSS
- Ubuntu
- Macintosh
- Adobe Photoshop/GIMP
- Survey/Questionnaire
- Nvivo
- Power BI

Soft skills

- Operation Research
- Problem Solving
- Project leadership/Human Subject Research
- Communication skills
- Data storytelling
- Project management
- Team management
- Coaching/Supervision

Pybids for data organization (i.e., BIDS), optimized data pre-processing (i.e., data cleaning) scripts using brain imaging tools (e.g., FSL, Freesurfer, etc.), modeled diffusion MRI data and analyzed statistical approaches on human-behavioral data using SAS and MATLAB tools, created MATLAB scripts for visualizing data and performed multivariate statistical analysis including permutation tests using MATLAB statistical toolbox and PALM in Ubuntu. I also managed and maintained a Linux server on NeCTAR cloud by upgrading the server, neuroimaging software and troubleshooting errors. This project resulted in completion of phase one (1/3) and detailed progress report and presentation to internal and external stakeholders.

Cohort study of preterm neonates (MOPED study)

Liggins Institute, Feb 2023 - Sep 2023

This project focused on identifying early changes in the brain development of moderate-to-late preterm babies, serving as a crucial marker for later developmental outcomes. I joined the project where it was still on its human participants recruitment (i.e., data collection) stage. In this novel project, I was responsible for assisting internal collaborators for MRI data collection, managing and organizing dataset in brain imaging structured format, debugging data cleaning and quality control scripts using BASH programming in Ubuntu, visualizing data using MATLAB and Python tools such as Nilearn, troubleshooting and problem solving data-based queries for internal and external stakeholders.

Brain structural connectome study of children with APD

The University of Auckland, Aug 2021 - Feb2023

This project focused on identifying structural biomarkers in white matter brain network of children diagnosed with APD. For this project, I developed the project plan based on agile methodology and collaborated with cross-functional teams of 5 scientists. 1) I used python packages in anaconda, BASH scripting and neuroimaging tools to organize and convert raw MRI data (i.e, DICOM) into readable format (i.e., NIFTI) and structure them (i.e., BIDS) for preprocessing and quality control purposes. 2) I developed comprehensive pre-processing pipeline using BASH scripting, Docker engine, and brain imaging tools (e.g., FSL, Freesurfer, MRTix3) to clean diffusion MRI signals, 3) I applied mathematical framework known as graph-theory using MATLAB functions and Python tools (e.g., Networkx) for modeling structural brain network, 4) I utilized network approaches such as hub and rich-club detection to identify structural biomarkers in the data, 5) I used MATLAB statistical toolbox, SPSS and PALM to conduct non-parametric multivariate statistical tests including connectivity analyses, correlation analyses and permutation testing to generate actionable insights, 4) I utilized MATLAB and python packages (e.g., Matplotlib) to visualize processed data and I used Photoshop to generate figures and images for publications and presentations. This project resulted in 100% completion and was published in the journal of *Cerebral Cortex* and presented in an international conference (i.e., OHBM 2023) in Montreal Canada and internal seminars at the University of Auckland.

Functional connectome study of children with APD

The University of Auckland, Aug 2019 - July 2022

This project focused on identifying functional biomarkers in the brains of children diagnosed with APD. I developed the hypothesis, designed the project plan, managed the project and coordinated the multidisciplinary team of 5 scientists across a few departments in two universities. In this project, I independently 1) prepared research proposal, 2) wrote human participants ethics application with focus on ngā mātāpono o te Tiriti, 3) planned and deployed state-of-the-art MRI data collection strategies known as multi-band multi-echo acquisition, 4) warehoused data and carried out quality control on human-derived data using the docker engine and brain imaging tools, 5) implemented and developed data pre-processing method based on benchmarking strategies for fMRI dataset by focusing on efficacy and efficiency using MATLAB codes and BASH scripting, 6) Processed fMRI time series for extracting signal from noise 7) applied graph theory algorithms and node parcellation techniques for modeling brain functional networks

Education

PhD in Psychology	2018-2023
<i>The University of Auckland (UoA) Auckland, New Zealand</i>	
ME in Information Technology	2014-2016
<i>Azad University Garmsar, Iran</i>	
BE in Information Technology	2010-2014
<i>University of Mazandaran Babolsar, Iran</i>	

Awards & Honors

- Eisdell Moore Centre mobility grant 2k NZD (Nov 2022)
- Travel award from Child Mind Institute 1.2k USD (Sep 2019)
- Faculty of Science full tuition award 36k NZD (2018-2022)
- Ranking 1st among all enrolled master students (2014-2016)

Oral Presentations

- School of Psychology Talk series Nov 2023 , Auckland, NZ
- OHBM conference July 2023, Montreal, Canada
- School of Psychology Talk series June 2021, Auckland, NZ
- BRNZ conference April 2021, Queenstown, NZ
- In-House symposium Feb 2020, Auckland, NZ

Certificates/Training/Courses

- **Matlab:** Passed LinkedIn Skill Assessment
- **Linux:** Passed LinkedIn Skill Assessment
- **Bash:** Passed LinkedIn Skill Assessment
- **Photoshop:** Passed LinkedIn Skill Assessment
- **Ngā Paerewa Te Tiriti:** NZ Health, Nov 2023
- **Power BI: Dashboards for Beginners** LinkedIn. Sep 2023
- **Good Clinical Practice:** NIDA, Mar 2023
- **Introductory R workshop:** The UoA Nov 2018
- **Research Methods in Health:** The UoA, 2019
- **Biomedical MRI:** The UoA, 2018
- **Neuroimaging Course:** ICBS, April-June 2016
- **CCNP-Switching:** Cisco, June 2016
- **CCNA-Routing & Switching:** Cisco, Mar 2016

using MATLAB functions, 8) applied multiple community clustering algorithms such as Louvain, Leiden and Infomap and hub detection algorithms for identifying trends and connection using MATLAB and Python and C++, 9) implemented non-parametric multivariate statistical tests such as ANOVA, ANCOVA, GLM, permutation and correlation tests on human behavioral data using MATLAB, BASH and brain imaging tools (i.e., FSL) to derive inference and actionable insight, 10) visualized data using MATLAB visualization functions and Python (e.g., Panda, Matplotlib, Nilearn) tools, 11) Used Photoshop tools for generating dynamic images suitable for reports and presentation. This project resulted in 100% completion rate and was published in the journal of *Neuroimage: Clinical* and presented in an international conference (i.e., OHBM 2023) in Montreal, Canada and inter-departmental seminars.

Effect of sleep deprivation on individual's pain threshold study

Depart of Exercise Sciences, the University of Auckland, May 2022 - Sep 2022

In this project, I collaborated with cross-functional stakeholders at the Department of Exercise Sciences to assist with data collection, data quality control and run human experimental tests using Python (Spyder IDE). This project resulted in completion of stage one (i.e., data collection) with 100% success rate.

Functional network study of MCI people

The University of Auckland, July 2018 - Apr 2021

This project focused on a longitudinal study involving individuals with Mild Cognitive Impairment (MCI) and Alzheimer's Disease. Within this initiative, my responsibilities included, independently creating data cleaning strategies for functional MRI data, processing MRI signals using MATLAB tools, Implementing data modeling methods graph theory algorithms (i.e., community detection, hub detection, etc.), conducting multivariate statistical tests on human-derived data to extract inferences and actionable insights, visualizing data using MATLAB tools, preparing comprehensive reports on project progression for presentation to both internal and external stakeholders. The project achieved a 100% completion rate and culminated in the form of a master's student thesis and the findings were presented at a national conference (i.e., BRNZ 2021) in Queenstown, New Zealand.

Intelligence correlation to brain structural changes in children with ADHD

ICBS Institute, Tehran, Iran. Dec 2016 - Jan 2017

This project aimed to uncover the relationship between Intelligence Quotient (IQ) scores and anatomical features in the brains of children diagnosed with ADHD. Throughout the project: I conducted a data cleaning procedure, known as data pre-processing, utilizing MATLAB, BASH, and neuroimaging tools, analyzed MRI signals using MATLAB, implemented statistical modeling (e.g., correlation analysis) on both human behavioral and MRI data to extract inferences and actionable insights, visualized the data using MATLAB tools for presentation and eventual publication. The project achieved a 100% success rate and was published in the journal of *Basic and Clinical Neuroscience*.

Screening Autism by biomarker Detection and Classification (Computer Vision)

ICBS, SBU, Tehran, Iran

Researched the application of supervised learning techniques such as KNN, SVM and NB for constructing classifiers for Autism disorder using network metrics. Achieved 92% precision in overall detection and classification of different network biomarkers in different ASD data sets. Conducted training, feature selection, and testing on various TensorFlow object and detection models. Presented insights and model recommendations for further development to the team.

RA & TA positions

Research Assistant

School of Psychology, the University of Auckland. 12/2022-02/2023

Research Assistant

Department of Exercise Sciences, the University of Auckland 05/2022- 09/2022

Graduate Teaching Assistant

School of Psychology, the University of Auckland. 03/2021- 07/2022

Research Assistant

School of Psychology, the University of Auckland. 07/2018-12/2021

Publications

- **Ashkan Alvand**, Abin Kuruvilla-Mathew, Reece P. Roberts, Mangor Pedersen, Ian J. Kirk, & Suzanne C. Purdy (2023). Altered structural connectome of children with Auditory Processing Disorder: A diffusion MRI study. *Cerebral Cortex*.
<https://doi.org/10.1093/cercor/bhad075>
- **Ashkan Alvand**, Abin Kuruvilla-Mathew, Ian J. Kirk, Reece P. Roberts, Mangor Pedersen, & Suzanne C. Purdy (2022). Altered brain network topology in children with Auditory Processing Disorder: a resting-state multi-echo fMRI study. *Neuroimage: Clinical*.
<https://doi.org/10.1016/j.nicl.2022.103139>
- Farnaz Faridi, **Ashkan Alvand**, Reza Khosrowabadi (2022). Brain Structural Correlates of Intelligence in Attention Deficit Hyperactivity Disorder (ADHD) Individuals. *Basic & Clinical Neuroscience*.
<http://dx.doi.org/10.32598/bcn.2021.2244.1>
- Milham, M., Petkov, C. I., Margulies, D. S., Schroeder, ..., **Ashkan Alvand**, ... & Messinger, A. (2022). Towards Next Generation Primate Neuroscience: A Collaboration-based Strategic Plan for Integrative Neuroimaging. *Neuron*.
<https://www.sciencedirect.com/science/article/pii/S0896627321007832>
- Milham, M., Petkov, C. I., Margulies, D. S., Schroeder, ..., **Ashkan Alvand**, ... & Messinger A. (2020). Accelerating the evolution of nonhuman primate neuroimaging. *Neuron*. 10.1016/j.neuron.2019.12.023

Languages

English
Persian