Umair Mateen Khan

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Summary

I have over **9 years** of programming experience, and I am familiar with a range of object-oriented, procedural, functional, scripting, and mark-up languages. I have over **4** years of experience of delivering real world end-to-end projects in data sciences, computer vision**,** and **machine learning**. I have been **tutoring** various courses in **University of Otago** for 4 years.

I am used to dealing with large, complex data structures and have experience with a range of scientific and mathematical techniques, including **optimization problems**, **linear algebra**, and **statistical learning** methods.

I have a **PhD** in **Computer Vision and Machine Learning** from the University of Otago, New Zealand, having already completed my Masters in Image Processing at NUST Pakistan. My PhD research is about finding emergent patterns in large-scale image datasets using unsupervised learning approaches.

Projects

Retail Audience Measurement Platform (RAMP)
This project keeps tracks of customers in a physical retail store. It detects the number of persons entered in a store, extracts their age and gender, tracks the locations where they spent time. The projects uses state of the art deep learning based methods to detect pedestrians and faces.

AI powered Programmatic DOOH Advertising Platform
The project makes a traditional Digital Out Of the Home (DOOH) media programmatic using AI based features. An Ad is triggered according to the age-group, gender of the person looking towards a digital display. Engagement levels are tracked while the viewer is looking towards an Ad. It also measure the emotions during and after the Ad has been played.

Production Optimization of a Fertilizer plant using machine learning and Artificial Intelligence.
This project involves discovering hidden patterns in data using statistical and machine learning techniques. These are used to generate recommendation that are used to optimize Urea and Ammonia Production. The techniques used in this problem are classification, regression and recommendations models.

Pot Leakage Prediction for an Aluminum Smelter Plant
The project involved predicting when a pot is going to leak. Pot leakage is one of the worse problem that a potline can face. Earlier prediction allows taking corrective measures to avoid leakage. The techniques used are classification models.

Prediction of Student's Grade
This system predicts a student's grade by observing class and exams performance at a very early stage of a semester. Teachers and counselors then work with the student to alleviate the issues that the student is facing. This is done using prediction modeling using regression.

Object Recognition System - This project uses computer vision strategies to identifying and recognising (labelling) an object in a large dataset of images. The system was based on identification and recognition of landmark building facades in Oxford and Paris city but the techniques can be applied to various objects e.g**. cars, pedestrians, faces, or number plates etc.**

- A computer algorithm is trained for each kind of object that needed to be recognised. During this phase the algorithm extracts important characteristics from the training object.
- The system recognise objects in each image and label them accordingly using learned knowledge.

Image Retrieval System - This project uses information retrieval strategies applied to images for retrieving images similar to a query image.

- Each image is represented in a popular Bag-of-word form and inverted indexes are maintained for fast retrieval of similar images to a query image.
- The system returns top ranked images and geometric verification is performed if needed.

Images, Pattern Miner - This project uses data mining techniques to find emergent semantic patterns in an image dataset of one million images.

- Emergent patterns are image features that co-occur together more often than expected in the entire image data set.
- Data mining algorithms for finding frequently & rarely occurring patterns were implemented in C++ and Java.

Finger Print Matching System - This project involved research and development of a finger print matching system in Matlab using the image processing toolbox.

- The system extracts minutiae and ridges information from a fingerprint.
- During the verification phase the extracted information is used to recognise a matching fingerprint.

Professional experience

April 2019 – Present	Wizdojo Technologies
Position:	Founder and Chief Executive Officer (CEO)
Business areas:	AI, Data Science, Machine Learning, Computer Vision Services
Responsibilities:	Working in Python using OpenCV, Dlib, Tensorflow, pyTorch, Café and various other libraries. Responsibilities include: • Leading a team of computer vision and ML engineers • Working with the team to make sure projects are delivered on time and within budget and exceeding customer • Pre-sale, HR and Marketing
Jan 2018 – May 2019	Advertelligent Pvt. Ltd. (Incubated @ NIC LUMS, Lahore)
Position:	Co-Founder and Chief Technology Officer (CTO)
Business areas:	AI powered DOOH advertising and retail audience analytics using videos.
Responsibilities:	Working in Python using OpenCV, Dlib, Tensorflow, Café and various other libraries. Responsibilities include: • Managing a team of computer vision and web developers • Research and development for product related features e.g. facial detection and recognition, pedestrian detection and tracking, age and gender, and people concentration heat maps. • Designing experiments and test bench to evaluate product performance • Supervising product installation at client side • Doing pre-sale i.e. Presenting products at various forums.
September 2017 – April	Engro Digital, Pakistan
Position:	Data Science Consultant
Business areas:	Industrial Optimization Using Machine Learning and Artificial Intelligence
Responsibilities:	Responsibilities include:

- Analyzing data using descriptive and inferential statistics
- Discovering hidden patterns in data using statistical and machine learning techniques
- Creating classification and regression models to perform predictive and prescriptive and predictive analytics.
- Generating recommendation to increase production
- Domain knowledge about Urea, Ammonia, Aluminum Smelting production plants

October 2015 – July 2017	Theta Systems Ltd, **New Zealand**
Position:	Data Scientist
Business areas:	Data Science and Business Intelligence
Responsibilities:	Working in R, Python, and Azure ML Studio to analyse data and discover hidden patterns in data. These patterns are used to perform predictive analytics. Responsibilities include:

- Analysing data using descriptive and inferential statistics
- Discovering hidden patterns in data using **statistical and machine learning techniques**
- Text processing and **Natural language processing**
- Creating **classification and regression** models to perform **predictive analysis**
- Object classification using TensorFlow and CNTK **deep learning** library
- **Pre-sale:** Giving presentations to customers and blogging engagements

Mar 2015 – October 2015	Theta Systems Ltd, **New Zealand**
Position:	Graduate Developer
Business areas:	R & D
Responsibilities:	Working Veracidata (a data quality tool for data warehouses) to further the product's development by adding new advanced features mainly in the area of automated data profiling and usability enhancements to allow customers to more easily create rule sets. Responsibilities include: Responsibilities include:

- Research: Open source tools for data profiling. This task compared tools to show their pros and cons.
- Developed a standalone application that allow using all the SSIS data profiling capabilities.
- Import the XML result file imported into the MicroStrategy reporting tool to quickly view the results

2013 – 2014	University of Otago, **New Zealand**
Position:	Research Assistant (Part time)
Business areas:	R & D
Responsibilities:	Working Veracidata (a data quality tool for data warehouses) to further the product's development by adding new advanced features mainly in

the area of automated data profiling and usability enhancements to allow customers to more easily create rule sets. Responsibilities include:
Responsibilities include:

- Involved in research and development of a Mobile patient reporting system called as IBDSmart in collaboration with Dunedin hospital and Department of information science. It is an iOS App that assists patients in reporting their health condition to a nurse via email.
- Research and develop a project called Augmented Reflection Technology (ART) system in collaboration with Dunedin hospital and Department of information science using Unity3D and OpenCV.

2011 – 2014	University of Otago, **New Zealand**
Position:	Tutor (Part time)
Business areas:	Teaching
Responsibilities:	Worked as a Tutor for the following courses

Courses Tutored:

- COMP112 (Web Development and Digital Media)
- COMP160 (General Programming in Java)
- COMP212 (Advanced Web Development)
- SURV102 (Computational Methods in Surveying)

2006 – 2011	NESCOM, Pakistan
Position:	Software Engineer
Technologies:	VC++, C#, Labview and Matlab
Responsibilities:	Worked as Head of Department

Responsibilities include:

Research and development of software testing systems for various hardware

Domain Knowledge

- ✓ Life Insurance
- ✓ Education
- ✓ Television and Media
- ✓ Fertilizer
- ✓ Aluminum Smelting
- ✓ Public sector
- ✓ Retail
- ✓ Advertising

Education

Year(s)	Institution	Details	Qualification
2017	University of Otago	Computer Vision and Machine Learning	PhD
2009	NUST, Pakistan	Software Engineering	MS
2005	Bahria University, Pakistan	Software Engineering	BS

Courses and Certification

- ML **Nanodegree** program at Udacity.com
- Intro to **Hadoop and MapReduce** course at Udacity.com
- Data Warehouse Concepts: Basic to Advanced concepts at Udemy.com
- Learn Microsoft Power BI Desktop: The Basics at Lynda.com

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Awards and Achievements

- **Mentor,** and **technical experts** at **Microsoft** Data Platform Hackfest, NZ
- Mentor, and technical experts at GenesisEnergy Hackathon, NZ
- Otago University International Postgraduate Scholarship for my Ph.D. in NZ
- Callaghan Innovation R&D Career Grant, NZ
- ICT Research and Development Endowment Fund for my Masters, PK

Research Publication

- Khan, Umair Mateen, et al. "Emergent Properties from Feature Co-occurrence in Image Collections." *Pattern Recognition (ICPR), 2014 22nd International Conference on*. IEEE, 2014.
- Khan, Umair Mateen, Brendan McCane, and Andrew Trotman. "Emergent semantic patterns in large scale image dataset: A datamining approach." *Digital Image Computing Techniques and Applications (DICTA), 2012 International Conference on*. IEEE, 2012.
- Khan, Umair Mateen, Brendan McCane, and Andrew Trotman. "A feature compression scheme for large scale image retrieval systems." *Proceedings of the 27th Conference on Image and Vision Computing New Zealand*. ACM, 2012.