Ali Farzanehfar

PH.D STUDENT

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Education

Imperial College London   *London - United Kingdom*

PH.D IN COMPUTATIONAL PRIVACY AND COMPUTATIONAL SOCIAL SCIENCE   *Dec. 2016 - Present*

- **Computational Social Science**: Studying the impact of AI on competitive insurance markets
  - **Aim:** Understand the effect of AI pricing models on consumers, firms, and markets
  - **Technical challenges:**
    - Gathering realistic insurance models from students, actuaries and, insurance firms
    - Legal and ethical obstacles in using proprietary pricing models in research
    - Construction of a model collection platform
  - **Project takeaways:**
    - Developing the logic behind the analytics framework (**Python data science stack)**
    - Managing a team of four researchers (2 more senior to me) in designing and implementing our experiment
    - Maintaining contact with insurance companies and lecturers to allow timely model collection

- **Computational Privacy**: Examining call detail records to quantify the degree of anonymity in trajectories
  - **Aim**: Using 1M call detail records, build a model to study the re-identifiability of a data set with 60M call detail records
  - **Technical challenges:**
    - Parsing raw mobile phone metadata in a workable format
    - Discovering a simple, explainable model of the re-identifiability of human mobility data
    - Developing a scalable implementation (**Python**) of the model to allow generation of 60M synthetic trajectories
    - Helping verify mathematical limits of the model developed by other team members
  - **Project takeaways:**
    - **Policy impact**: anonymization techniques do not scale for mobility data
    - Publication in a peer-reviewed journal (Royal Society Interface) **awaiting decision**
    - Managing a team of three researchers

University of Cambridge   *Cambridge - United Kingdom*

MASTERS IN APPLIED MATHEMATICS   *Oct. 2015 - Jun. 2016*

The Part III of the mathematics tripos at Cambridge is designed to enable students from a wide range of backgrounds to apply concepts in applied mathematics to their respective fields. My focus was on quantum information theory and field theory.

University of Southampton   *Southampton - United Kingdom*

MASTERS IN PHYSICS WITH PARTICLE PHYSICS (**FIRST CLASS HONOURS**)   *Oct. 2011 - Jun. 2015*

- Particle Physics
- Studies in numerical and computational methods (C++, Python, ROOT)
- Photonics based laboratory work (Optical cooling technologies and methods)

Oxford Brookes University   *Oxford - United Kingdom*

INTERNATIONAL FOUNDATION DIPLOMA IN LIBERAL ARTS (**FIRST CLASS HONOURS**)   *Feb. 2011 - Sep. 2011*

Experience

Opportunity International   *London - United Kingdom*

DATA SCIENCE CONSULTANT / ALGORITHM DESIGN   *Jun. 2018 - Dec 2018*

Children in many sub-Saharan African countries rely on private schooling. When their parents cannot afford the fees they seek loans. Due to a lack of a credit score, securing these loans is very difficult.

- **Aim:** Use existing bank loan data to develop a credit scoring algorithm to expedite and optimise the lending process
- **Technical challenges:**
  - Data cleaning: bank loan data from developing countries is often missing data, has incorrect data, or is not machine readable
  - Algorithm development using state of the art machine learning techniques (**Python data science stack**)
  - Explainability of the score: developing an analysis pipeline that can be easily explained to loan officers on the ground
  - Ensuring that the algorithm is flexible enough to accept new input with different attributes for retraining
- **Project takeaways:**
  - **Impact**: reducing the loan decision process from **3 weeks to 1 day**
  - Hands-on experience within a fast-paced small firm dedicated to a social cause
  - Explaining progress to the (nontechnical) client over the entire period
  - Managing the software development team in charge of implementing the web-interface for the product
  - Regular follow-ups after the project to help with small tweaks to the product

The CMS Experiment, CERN
Meyrin - Switzerland

RESEARCH ASSISTANT FOR THE CMS ELECTROMAGNETIC CALORIMETERY GROUP
Sep. 2014 - May. 2015

CMS is one of the two main detectors at CERN. The CMS Calorimeter is responsible for measuring the energy of electrons and photons (light). The calorimeter had been registering anomalous readings indicating impossibly high energy levels. This was bad as it created too much noise and rendered much of the data from CMS unusable.

- **Aim:** Discover the root cause of the CMS anomalous signals and propose a solution to mitigate their impact.
- **Technical challenges:**
  - Learning the CMS CERN software framework (**ROOT**)
  - Obtaining physical samples of the sensors installed within the detector for isolated laboratory experiments
  - Identifying the signature of anomalous signals
  - Translating that signature to multiple different markers usable at different stages of the data collection process
- **Project takeaways:**
  - **Impact:** successfully aiding the CMS experiment to operate at full capacity, allowing the **delay of a €5M upgrade for 5 years**
  - Experience working as part of a global collaboration of scientists
  - Building large-scale Monte Carlo simulations of the scintillation process for electron gamma decay (**C++**)
  - Award for top research dissertation for students on placement (**top 1% of class**)

Matter-Wave Interferometry Group, The University of Southampton
Southampton - United Kingdom

INTERNSHIP ON THE THEORY TEAM
Jun. 2014 - Sep. 2014

The aim of this project was to understand the basics of how to measure the interaction between a particular quantum mechanical framework (the Schrödinger-Newton model of wave function collapse) and gravitational effects of the mass that would result from the superposition principle applied to a large molecule.

Martial Arts Instructor / Capoeira
Southampton - United Kingdom

UNIVERSITY OF SOUTHAMPTON
Oct. 2012 - Sep 2014

- Founding the Southampton University Capoeira Society
- Helping students grasp the cultural and technical aspects of the Brazilian Martial Art Capoeira as part of the Student Union.
- Managing and maintaining a lively and friendly environment to enable the growth of the Capoeria society (**still active today**)

Publications and Talks

The limits of anonymization and the future of privacy
European Commission - Brussels

THE EUROPEAN COMMISSION CONNECT DIGITAL SUMMER SCHOOL
2019

On how human behaviour bounds privacy
FCA - London

FCA SESSION ON PRIVACY
2019

Solving artificial intelligence's privacy problem.
(Special Issue 17), pp.80-83.

THE JOURNAL OF FIELD ACTIONS. FIELD ACTIONS SCIENCE REPORTS
2017

Honors & Awards

2016 - 2019	**PhD scholarship**, Spread over 3.5 years of research valued at a total of £130,000.00	*Imperial College London*
2015	**For final thesis**, Best Masters thesis by a research student	*Southampton University*
2014	**For Academic Merit**, £22,600 awarded towards tuition fees	*Southampton University*

References

Available upon request