

Fabrizio Miano

Research Fellow in Data Science

Overview

By the end of my PhD I won a grant to work on an AI project: the development of an algorithm capable of selecting interesting images within a given dataset. I have spent 4 months working for Deckchair.com developing such an algorithm. In particular, two of the approaches that have been developed are; a statistical tool that exploits the structural similarity index (OpenCV, skimage); a machine learning tool (Scikit-Learn, keras, Tensorflow) for image classification. The project was timely delivered. As a Research Fellow in Data Science, I have moved to a new project: action recognition i.e. the classification of an action that is present in a given video. During my PhD the main skills I have developed are related to dealing with high-rates and high-volumes of particle-particle collisions data collected with the ATLAS detector at CERN, Geneva. Signal extraction algorithms, signal-over-background optimisations (Python) modelling of regions of control (C++), and estimation of uncertainties (MS Excel) were at the heart of the analyses I have carried out. Ultimately, I have developed a monitoring tool (Python) for the ATLAS Inner Detector Trigger that employs the creation and the management of a database.

Contacts

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Profiles

LinkedIn
University Profile
gitlab.com/fabriziomiano
fabriziomiano.wordpress.com

Computing

Python, C++, HTML, Bash, \LaTeX ,
Machine Learning,
Monte Carlo simulations,
MS Word, Excel, PowerPoint,
Mac OS, UNIX, Windows

Volunteering

HiSPARC,
#ScienceOnBuses,
Brighton Science Festival,
CERN Master class

Teaching

Associate Tutor of Classical
Physics and Electromagnetism;
Properties of Matter

Languages

Italian Mother tongue
English Fluent
Spanish Fluent
French Basic

Research Experience

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| 2018–Now | University of Sussex
<i>Research Fellow in Data Science</i>
Brighton, UK | <ul style="list-style-type: none">• Development of an AI tool capable of performing action recognition (neural networks: CNN, DNN)• Seek companies to work with on specific challenges• Exploration of potential collaboration with other areas of research:<ul style="list-style-type: none">– Evolutionary and Adaptive Systems Research Group– Data Science Research Group– Industrial Informatics and Signal Processing Research Group– Sensor Technology Research Centre |
| 2018 | University of Sussex
<i>Junior Data Scientist - Placement in collaboration with Deckchair.com</i>
Brighton, UK | Detailed involvement: <ul style="list-style-type: none">• Development of a statistical tool to detect interesting images within a dataset using Structural Similarity Index analysis (OpenCV, Scikit-Learn);• Design of a machine learning tool to perform feature extraction via k-Means clustering (Scikit-Learn) and image classification using SVM, Keras, and Tensorflow (Inception V3); |
| 2014–2018 | University of Sussex - CERN
<i>Doctoral Position</i>
Brighton, UK / Geneva, Switzerland | <ul style="list-style-type: none">• Developed Python code to perform multi-variable signal-over-background optimisations to define signal-enriched regions to enhance signal contribution while discriminating against background• Modelling of main backgrounds using custom C++ framework• Data-Driven estimation of an <i>irreducible</i> background and evaluation of related theory uncertainties (C++, Python, Excel)• Participation in the development and commissioning of vertex reconstruction algorithm (C++)• Validation of the changes to the used framework before release• Monitoring of the performance of the tracking efficiencies• Development of a monitoring tool (Python) to display the results of the monitoring (plots, tables) on a web page (HTML) |

2013–2014	Università degli Studi di Catania <i>MSc INFN-funded project</i> Monte Carlo simulations of protons emission and space-time characterisation in heavy-ion collisions	Catania, Italy
	<ul style="list-style-type: none"> • Developed C++ code to simulate physical distributions of the emission of protons from a nuclear source of a given size and life-time • Validation of the simulations • Deduction of the geometrical size and life-time of a nuclear source created in a heavy-ion collision at intermediate energy using data collected with the LASSA detector of the NSCL, Michigan, US. 	

Education

2015–2018	PhD in Experimental Particle Physics <i>Optimisation studies and data-driven background estimation in searches for the supersymmetric partner of the top quark with the ATLAS Detector at the LHC</i>	University of Sussex, UK / CERN, Switzerland
2009–2014	MSc in Experimental Nuclear Physics <i>Protons emission and space-time characterisation in heavy-ion collisions</i>	Università degli Studi di Catania, Italy
2005–2009	BSc in Physics <i>Study of neutrons spectra emitted by Am-Be and Pu-Be radioactive sources</i>	Università degli Studi di Catania, Italy

Communication Skills

2017	15' Conference Talk <i>Searches for direct production of third generation squarks with the ATLAS detector</i>	Phenomenology 2017, Pittsburgh, PA, USA
2016	Conference Poster <i>The Design and performance of the ATLAS Inner Detector Trigger for Run 2 collisions at $\sqrt{s} = 13$ TeV</i>	ICHEP 2016, Chicago, IL, USA
2015	Poster <i>Search for direct pair production of the top squark in all-hadronic final states in pp collisions with the ATLAS detector</i>	STFC HEP Summer School, Lancaster, UK
2014	20' Graduation Talk <i>Emission of protons and space-time characterisation in heavy-ion collisions</i>	Università degli Studi di Catania, Italy

Awards

2018	Fellowship STFC Impact Acceleration Account	University of Sussex, UK
2018	Grant DISCnet	University of Sussex in collaboration with Deckchair.com
2016	Grant Doctoral Overseas Conference Grant for Postgraduate Researchers	University of Sussex, UK
2015	Scholarship 4-year STFC-funded PhD scholarship in collaboration with CERN	STFC, UK
2013	Scholarship 1-year INFN-funded scholarship in collaboration with LNS	INFN-LNS, Italy

Publications

Articles in peer-reviewed journals

Performance of the ATLAS trigger system in 2015

The ATLAS Collaboration

The European Physical Journal C 77.5 (May 2017) p. 317. 2017

Search for a scalar partner of the top quark in the jets plus missing transverse momentum final state at $\sqrt{s}=13$ TeV with the ATLAS detector

The ATLAS Collaboration

JHEP 12 (2017) p. 085. 2017

Search for dark matter produced in association with bottom or top quarks in $\sqrt{s} = 13$ TeV pp collisions with the ATLAS detector

The ATLAS Collaboration

The European Physical Journal C ICHEP2016 (2016) p. 856. 2016

Search for the Supersymmetric Partner of the Top Quark in the Jets+ E_T^{miss} Final State at $\sqrt{s} = 13$ TeV

The ATLAS Collaboration

CERN Document Server (2016). 2016

International peer-reviewed conferences/proceedings

The design and performance of the ATLAS Inner Detector trigger for Run 2 LHC collisions at $\sqrt{s} = 13$ TeV

F. Miano for the ATLAS Collaboration

Proceedings, 38th International Conference on High Energy Physics (ICHEP 2016): Chicago, IL, USA, August 3-10, 2016