Brandon Birmingham

Data Scientist with a passion for innovation

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Education

July 2022	Doctor of Philosophy in Artificial Intelligence, University of Malta **Thesis**: "A Study on the Use of Keywords in a Graph-based Image Caption Generation System" Supervisor: Prof Ing Adrian Muscat
Sept. 2016	Master of Science in Computer Science, University of Malta **Dissertation**: "Predicting Spatial Relationships for Image Descriptions" Supervisor: Prof Ing Adrian Muscat
May 2015	Bachelor of Science (Honours) in Computing Science, University of Malta **Final Year Project**: "Smart Carving: Recovering Deleted JPEG Files" Supervisors: Prof Ing Reuben Farrugia & Dr Mark Vella

Training

Sept. 2017	iV&L 3rd Summer School on Vision and Language Integration in Cognitive Robotics The Ionic Centre, Athens, Greece
March 2016	iV&L 2nd Summer School on Integrating Vision and Language with Deep Learning Faculty of ICT, University of Malta

Academic Activities

Feb 2019 - June 2019	Tutor, University of Malta Assisting students throughout hands-on lab tuition in the area of Computer Modelling and Simulation and correcting students' assignments. **Topics**: Random Number Generation, Next Event Simulation, Linear Regression, Logistic Regression, Probabilistic Models
Mar 2019	Reviewer Workshop on Shortcomings in Vision and Language (SiVL) NAACL 2019, Minneapolis, USA, June 6, 2019
Oct 2016 - Nov 2016	Research Support Officer, University of Malta Conducting research in the area of automatic image captioning which involves the integration of Computer Vision and Natural Language Processing. This project involved the development of a Deep Learning model which combines language and automatically generated geometrical features to predict spatial prepositions. **Technologies**: Python, Keras
Oct 2015 - Jan 2016	Tutor, University of Malta Preparing and delivering C programming hands-on tutorial sessions for first year ICT University students. The tutorial sessions were intended to help students troubleshoot their code implemented in C as preparation for their study unit's assigned project **Technologies**: C

Work Experience

Jul 2017 - Mar 2019	**Senior Business Intelligence Developer at Eunoia** Responsible for the development, implementation and support of Business Intelligence solutions based on Microsoft technologies as well as for the overall engineering and implementation of a web-based financial consolidation application. **Technologies**: Microsoft SQL Server, MS SSIS, SSRS, SSAS, C#, ASP.NET MVC, Python
Dec 2016 - Jul 2017	**Business Intelligence Developer at PTL Ltd.** Responsible for the implementation of a web-based financial consolidation tool that supports a BI infrastructure for reporting and visualisation. **Technologies**: Microsoft SQL Server, MS SSIS, SSRS, SSAS, C#, ASP.NET MVC, Python
Jun 2012 - Aug 2016	**Software Developer at HOB** Full-stack Web developer responsible for an internal web application that serves as an internal project management tool. I was also introduced to one of the main products of the company, a secure VPN solution, in which I was responsible for the re-design and re-implementation of the IKE protocol of both client's and gateway's solution **Technologies**: Java, JSP, DB2, SQL, HTML5, CSS3, JavaScript, jQuery, Ajax, C, C++

Skills

Platforms:	Linux, Microsoft
Programming:	Python, Java, Scala, C#, C, C++, Assembly Language
Data Science:	Tensorflow, Pytorch, Pandas, NumPy, scikit-learn, SciPy, Matplotlib, Seaborn, NLTK, Jupyter Notebook
Web Development:	ASP.NET MVC, JSP, HTML5, CSS3, JavaScript, jQuery, Ajax, Selenium, SQL
Business Intelligence:	MS SQL Server, SSIS, SSRS, SSAS
Blockchain:	Ethereum, Solidity, Truffle

Research Interests and Areas of Expertise

Artificial Intelligence, Machine Learning, Deep Learning
Computer Vision, Natural Language Processing, Image Caption Generation
Data Science, Software Engineering, Web Development, Business Intelligence

Publications

Peer-reviewed:

1. **B. Birmingham**, A. Muscat. Multi Spatial Relation Detection in Images. *Spatial Cognition & Computation*, 0(0):1-35, 2021.

2. **B. Birmingham**, A. Muscat. Clustering-based Model for Predicting Multi-spatial Relations in Images. In *Proceedings of the 16th International Conference on Informatics in Control, Automation and Robotics*, Prague, Czech Republic, July 29-31, 2019.

3. **B. Birmingham**, A. Muscat, A.Belz. Adding the Third Dimension to Spatial Relation Detection in 2D Images. In *Proceedings of the 11th International Conference on Natural Language Generation*, pages 146-151, Tilburg, The Netherlands, November 5-8, 2018.

4. **B. Birmingham**, R. A. Farrugia, M. Vella. Using Thumbnail Affinity for Fragmentation Point Detection of JPEG Files. In *IEEE Proceedings EUROCON 2017-17th International Conference on*

Smart Technologies, pages 3-8, Ohrid, Macedonia, July 6-8, 2017. **(Best Student Paper)**

5. **B. Birmingham**, A. Muscat. The Use of Object Labels and Spatial Prepositions as Keywords in a Web-Retrieval-Based Image Caption Generation System. In *Proceedings of the 6th Workshop on Vision and Language*. Association for Computational Linguistics, pages 11-20, Valencia, Spain, April 4, 2017.

6. **B. Birmingham**, A. Muscat. Feature Generation and Selection for Predicting Spatial Relationships in 2D Images. In *Computer Science Annual Workshop 2016*, Faculty of ICT University of Malta, November 10-11, 2016.

7. A. Belz, A. Muscat, **B. Birmingham**, J. Levacher, J. Pain, A. Quinquenel. Effect of data annotation, feature selection and model choice on spatial description generation in french. In *Proceedings of the 9th International Natural Language Generation*. Association for Computational Linguistics, pages 237-241, Edinburgh, UK, September 5-8, 2016.

8. A. Muscat, A. Belz, and **B. Birmingham**. Exploring different preposition sets, models and feature sets in automatic generation of spatial image descriptions. In *Proceedings of the 5th Workshop on Vision and Language*. Association for Computational Linguistics, pages 65-69, Berlin, Germany, August 12, 2016.

9. **B. Birmingham**, A. Muscat. Predicting spatial relationships for image descriptions using combined vision and language features. *In the 8th Workshop in Information and Communication Technology*, Faculty of ICT University of Malta, July 8, 2016.

Press:

1. Nurturing a Community of Digital Leaders. I. Fenech (2020). *Giving images a voice*.

2. Times of Malta. **B. Birmingham** (2019, August 25). *Speaking the same language*.

Honors and Awards

- **2017**: Received the 2017 IEEE President's Coin of leadership
- **2017**: Best Student Paper Award in the IEEE EUROCON 2017
- **2015**: Computime Award for Completeness of Vision
- **2015**: Chamber of Engineers Award for Best ICT Project 2015
- **2015**: Second place in Game of Codes Programming Competition (Solo)
- **2013**: Second place in Game of Codes Programming Competition
- **2013**: Award for Matriculation Certificate graded 'A'
- **2010**: Special award for Academic Achievement

Certificates

- **2017**: Coursera Neural Networks for Machine Learning
- **2017**: Coursera Probabilistic Graphical Models Specialisation
- **2010**: ECDL Foundation Syllabus Version 5.0
- **2009**: Certificate of participation in the Malta Mathematics Olympiad