Ayah M. Helal

CONTACT INFORMATION	ayah.helal@gmail.com
RESEARCH INTERESTS	Computational intelligence, Artificial intelligence, Data Mining, Machine Learning, Ant Colony Optimization, Particle Swarm Optimization, Genetic Algorithms.

EDUCATION

University of Kent, England

PhD. Computer Science, Nov 2020

- Research topic: *New Archive-based Ant Colony Optimization Algorithms for Learning Predictive Rules from Data*
  - My PhD. aim was to apply Ant-Miner classification algorithm to data stream mining. I introduced a new pheromone model to Ant-Miner algorithms to handle continuous attributes without discretisation procedure. This allowed the algorithm to be fast and preform on large data sets. Using the new pheromone model, I was able to successfully introduce Streaming Ant-Miner algorithm to tackle data stream mining. I compared my new approach to other stream algorithms using MOA (Massive Online Analysis) Machine Learning for Streams such as rule induction algorithm Ge-rules and very fast decision rules.
- Supervisors: Fernando Otero, Alex Freitas

American University in Cairo, Cairo, Egypt

M.Sc. Computer Science, Aug 2013

- GPA: 3.8 with honours
- UK Equivalent: Distinction
- Dissertation Topic: *Solving Quadratic Assignment Problem By Particle Swarm Optimization*
- Dissertation Advisor: Ashraf Abdelbar

Ain Shams University, Cairo, Egypt

B.Sc. Faculty of Computer and Information Sciences May 2008

- Grade: Good
- UK Equivalent: 2:2

WORK EXPERIENCE

- **Lecturer in Artificial intelligence**

  - University of Exeter   2021 to present
  - Working on grant for stream mining for credit card transactions. This is additional to teaching Artificial Intelligence and Nature Inspired Algorithms courses for undergraduates and masters students.

- **Research Associate**
  King's Collage London
  - Principal Investigator: Luc Moreau   2019 to 2021
  - Worked in a PLEAD project, which is aims to generate explanations that are provenance-driven and legally-grounded which allow the data subjects to trust the automated decisions and allow data controllers to comply with legal requirements.

- **Research Assistant**
  Department of Computer Science and Engineering
  American University of Cairo

  - Supervisor: Florin Balasa Ph.D   2014 to 2015
  - Memory management algorithms for Digital Signal Processing, Multimedia applications, Embedded Systems

- **Research Assistant**
  Department of Computer Science and Engineering
  American University of Cairo

  - Supervisor: Ashraf Abdelbar   2011 to 2014
  - Artificial intelligence, Neural Networks, Ant Colony Optimization, Particle Swarm Optimization, Genetic Algorithms

- **Software Developer**
  Omnivoyance

  - Software Developer & Founder   2011 to 2013
  - Developing a virtual trading web service that provided a real time watch screen and order book for the financial sector called BorsaLink

- **Software Developer**
  ESRINEA

  - Software Developer   2010 to 2011
  - Developing a customised GIS software.

JOURNAL
PUBLICATIONS

1. **Ayah Helal**, and Fernando Otero "Data Stream Classification with Ant Colony Optimization", *International Journal of Intelligent Systems*, 2022.

2. Niko Tsakalakis, Laura Carmichael, Sophie Stalla-Bourdillon, Luc Moreau, Dong Huynh, **Ayah Helal** "The dual function of explanations: why it is useful to compute explanations" *Computer Law & Security Review*, Volume 41, 2021.

3. Trung Dong Huynh , Niko Tsakalakis, **Ayah Helal**, Sophie Stalla-Bourdillon, Luc Moreau "Addressing Regulatory Requirements on Explanations for Automated Decisions with Provenance—A Case Study", *Digital Government: Research and Practice*, 2021.

4. Khalid M Salama, Ashraf M Abdelbar, **Ayah Helal** and Alex A Freitas "Instance-based classification with ant colony optimization", *Intelligent Data Analysis*, 2017.

5. **Ayah Helal**, and Ashraf M. Abdelbar "Incorporating Domain-Specific Heuristics in a Particle Swarm Optimization Approach to the Quadratic Assignment Problem", *Memetic Computing*, 2014.

CONFERENCE
WORKSHOP

1. Niko Tsakalakis, Laura Carmichael, Sophie Stalla-Bourdillon, Luc Moreau, Dong Huynh, **Ayah Helal** "Explanations for AI: Computable or Not?", 2020, 12th ACM Conference on Web Science Companion.

PEER-REVIEWED
CONFERENCE
PUBLICATIONS

1. **Ayah Helal**, James Brookhouse, Fernando EB Otero "Archive-Based Pheromone Model for Discovering Regression Rules with Ant Colony Optimization", 2018 IEEE Congress on Evolutionary Computation (CEC).

2. **Ayah Helal** and Fernando Otero "Automatic design of ant-miner mixed attributes for classification rule discovery", Proceedings of the Genetic and Evolutionary Computation Conference, 2017.

3. **Ayah Helal**, Enas Jawdat, Islam ElNabarawy, Donald C Wunsch and Ashraf M. Abdelbar "Integrated particle swarm and evolutionary algorithm approaches to the quadratic assignment problem", 2017 IEEE Symposium Series on Computational Intelligence (SSCI).

4. **Ayah Helal** and Fernando Otero "A Mixed-Attribute Approach in Ant-Miner Classification Rule Discovery Algorithm", Proceedings of the Genetic and Evolutionary Computation Conference, 2016.

5. **Ayah Helal**, Enas Jawdat and Ashraf M. Abdelbar "Three Variations of a Particle Swarm Optimization/Tabu Search Approach to the Quadratic Assignment Problem", 2015 IEEE Congress on Evolutionary Computation (CEC).

6. **Ayah Helal** and Florin Balasa "Multithreaded Signal-to-Memory Mapping Algorithm for Embedded Multidimensional Signal Processing", 20th International Conference on Control Systems and Computer Science (CSCS) , 2015.

PROGRAMMING
LANGUAGES

- C, C++, C#, SQL, Java, Flex, Matlab, Python, Cilk plus

LANGUAGE

Fluent in English and Arabic.