Assem Alsawy Abdel Hak

Technology Centre:	CeADAR
Academic Mentor:	Dr. Susan McKeever
Company Partner:	Manna
Company Mentor:	Mr. Alan Hicks.

Dr. Assem has completed his PhD (2014) in Artificial Intelligence at Cairo University (Egypt), MSc (2010) in Computer Sciences at Cairo University, and a BSc (1993) in Mathematics at Ain Shams University - Egypt. Assem worked as Lecturer at Faculty of Science, Cairo university (Egypt) (2014-2016), he conducted a research period as data science leader in ARVision Company- Canada, (2016-2019). Assem also worked as Assistant professor in Ahram Canadian University (Egypt) (2019-2021).

Academic Mentor: Dr. Susan McKeever

Dr. McKeever is a senior lecturer in the School of Computer Science at Technological University Dublin City Campus and a PI with CeADAR. She has successfully managed the delivery of multiple CeADAR collaborative research projects. Her research focus is on machine learning, with particular focus on deep learning for text, image and video data which is a direct overlap with Assem's proposal project. Dr. McKeever has a proven record of research management and delivery with CeADAR member companies, including management of licensed CeADAR demonstrator projects and a pool of innovation voucher and feasibility projects. Dr. McKeever is co-supervising on PhD funded schemes with UCD, DCU, Trinity, UCC, Maynooth and NUIG,

Host Institution: Technological University Dublin [TU Dublin]

TU Dublin is the largest producer of computer science graduates in Ireland. It provides a high quality environment and infrastructure to support research projects, including the Directorate of Research and Enterprise, Graduate Research school, research finance facilities, technology transfer office and funded research centres.

Technology Centre/ Technology Gateway: CeADAR

The CeADAR team at TU Dublin have been onsite for 7 years and are now in Phase II of their operation. The CeADAR group provides the ideal hosting arrangement for collaborative industry work. They are already hosting Marie Curie research fellows, their core "business" is collaborative research with industry, and they have full support of technology transfer processes. They provide an in-built dissemination and knowledge exchange environment.

Industry Partner: Manna

Manna is a technology company that will supply drone delivery solutions to fast food companies. Given its profile as a leading company in a new technology area, Manna are ideally situated to make use of leading-edge research related to drone delivery. As Assem's research on resolving drone flight and item delivery issues, Manna's requirements and cooperation will provide an ideal environment for achieving the research objectives of the Marie Curie project. Manna have inhouse technical skills combined with business needs and real data. In addition, they are leaders in the field of drone technology, having built their own fail safe drones capable of carrying weights suitable to their target service. Manna understand and appreciate that these complex problems require collaboration between commercial and academic institutions to solve as they bind both real world and theoretical thinking.

Alan is the Chief Technology Officer (CTO) and one of the founding team members at Manna. He leads Manna´s technology function and team, and sets the direction and future vision of the platform. There are many intriguing problems to solve in the drone space which is why the skies are not already full of drones. This is also what makes the area so technically interesting. As part of this role, he manages and mentors the business and software development of staff who are working on their initiatives in this domain. He also leads Manna's software development activities.

Alan is an experienced technology leader who specialises in distributed systems and Internet technologies. He has built and led distributed teams of engineers working on cutting edge technology systems. Alan began his career co-founding a technology start-up, which created online systems for educational institutions. Alan holds a BSc in Computer Science and an MSc in Advanced Software Engineering. He has extensive mentoring and tutoring experience from his previous career work at both CarTrawler and Griffith College Dublin (GCD). At CarTrawler, he mentored individuals in particular those that participated on in the internal graduate program. At GCD he lectured BSc students and mentored final year project students.

Assem's project

"Enabling delivery by autonomous drone through the use of deep learning technologies for advanced computer vision applications"

Unmanned aerial vehicles commonly termed "drones" are increasingly being used to enable and support applications by increasing safety, reduction of environmental impact and being more efficient as a result of air access. Examples of how drones can be used include rescue zone investigation, agricultural crop and livestock monitoring and as in the case of this project, delivery of products.

This project focuses on the routing, flight, landing and dropping loads aspects of using drones for delivery of fast food to customers. To support these use cases, drones need to be able to chart their own course from point of origin to destination, as well as more generally be able to figure out the most efficient path with the least cost. Such a drone must avoid fixed obstacles, such as buildings and trees, and moving obstacles such as birds and other drones, all in a variety of weather conditions.

Also, automated drones require high precision control of positioning, especially during landing and take-off. Computer vision supported by the application of deep learning techniques is at the heart of enabling this autonomous behaviour. Secondment partner, Manna, provides an industry view of the problem and access to real world data. This collaboration allows to overcome the gap between the research results and industrial needs, and allows the testing of the prototypes in real situations to get accurate feedback.