**PhD Project Proposal**

School of Electronics, Electrical Engineering and Computer Science

& ECIT Global Research Institute

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| **Proposed Project Title:**  **A Smart Data Analysis System for Food Safety based on Pattern Recognition** |
| **Principal Supervisor: Dr. Georgios Karakonstantis (ECIT) Second Supervisor: Dr. Tassos Koidis (IFGS)**  **(Third Supervisor: Jesus Martinez-del Rincon (ECIT))** |
| **Project Description:**  In today’s agri-food industry, rapid real-time analysis of chemical and micro-biological contaminants is necessary to evaluate the quality and safety of the food products. Current solutions are either costly to implement and require trained personnel with substantial investments or are non-fit for purpose. The advent of smart connected sensors (Internet-of-Things) and the progress in data analytics and data mining could provide a viable low cost alternative that could help in detecting a number of critical parameters during food processing. The purpose of this project is to develop a novel sensing platform combing state-of-art sensors for collecting necessary set of data which will then be processed by a central computing system. The data will be analysed using cutting edge multivariate pattern recognition techniques for identifying features of potential contaminants. Essential part of the project will be the improvement of the sensitivity and selectivity of the determined analytical parameters with emphasis on the energy efficient realization of the employed data analysis algorithms. Applications would include detection of pathogens in meat processing facilities (abattoirs), in the control of fermentation of coffee and tea and the quality evaluation of certain food products by the retailer and potentially the consumer.  The project will involve the integration of at least 10 interchangeable electronic sensors with a central embedded system, which will be responsible for pre-processing the collected data and forwarding them to a server based data analytics platform. The system will be validated against existing methods in the mentioned applications in terms of efficacy, energy efficiency and potential deployment in environments of food handling and processing. The developed end-to-end framework will facilitate the widespread use of IoT in food industry and allow retailers and consumers to benefit from the increased food quality and safety, transparency between the supply chain, and enhanced data security and servicing speed provided by the targeted deployment at the Edge.    The PhD studentship will be based at the Data-Science and Scalable Computing Centre (DSSC) of the Queen’s Global Research Institute of Electronics, Communications and Information Technology (ECIT) and the project will be developed in close collaboration with the Institute for Global Food Security (IFGS). |
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