An internet of things system for urban flood monitoring and short-term flood forecasting in Colima, Mexico

Abdou Khouakhi1,2, Ian Pattison3, Jesús López-de la Cruz4, Oliver Mendoza-Cano4, Robert Edwards5, Raul Aquino6, Paul Lepper5, Victor Rangel7, Jose Ibarreche6, Ismael Perez6, John Davis5, Ben Clark5, and Miguel Martínez4

1Cranfield University, School of Water, Energy and Environment, Cranfield, UK
2School of Architecture, Building and Civil Engineering, Loughborough University, UK
3Institute of Infrastructure and Environment, Heriot Watt University, Edinburgh, UK
4Faculty of Civil Engineering, University of Colima, Mexico
5Mechanical Electrical and Manufacturing Engineering Loughborough University, Loughborough, UK
6Department of Electrical and Electronic Engineering, University of Colima, Mexico, Faculty of Civil Engineering, University of Colima, Mexico
7Telecommunications Department, Faculty of Engineering, the National Autonomous, University of Mexico

Urban flooding is one of the major issues in many parts of the world and its management often challenging. Here we present Internet of Things (IoT) approach for monitoring urban flooding in the City of Colima, Mexico. A network of water level and weather sensors have been developed along with a web-based data platform integrated with IoT techniques to retrieve data using 3G/4G and Wi-Fi networks. The developed architecture uses the Message Queuing Telemetry Transport protocol to send real-time data packages from fixed nodes to a server that stores retrieved data in a non-relational database. Data can be accessed and displayed through different queries and graphical representations, allowing future use in flood analysis and prediction. Additionally, machine learning algorithms are integrated into the system for short-range water level predictions at different nodes of the network.