WATER INFORMATICS SCIENCE & ENGINEERING
EPSRC CENTRE FOR DOCTORAL TRAINING

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PROPOSAL

Event management and Post Event Response Planning for Intelligent Water Networks

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Rationale

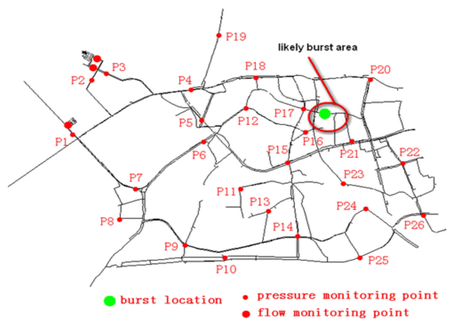
The water industry in the UK and worldwide faces considerable challenges in making use of real-time data collected in water distribution networks. The industry has a pressing need to use this data to improve response to various events in pipe networks (e.g. pipe bursts or equipment failures).

Background

United Utilities (UU) has developed, together with University of Exeter, the Event Recognition System (ERS). ERS is a novel technology that can efficiently manage the first and second stage of event management timely and reliably, using statistical and artificial intelligence techniques.

1. Detection ✓

2. Location ✓



3. Response ?

Objectives

The present study will focus on answering the following questions:

1. What is the best way to respond to various events that may occur in a water distribution system?
2. How can optimal operational interventions be identified and in a timely and automated way?
3. How should the identified response strategies be presented to the control room operator so that he/she can make an effective ultimate decision on how to cope with each event?

Methodology

The currently missing response methodology/technology will initially be based on the information and other data generated by the ERS. The steps of this methodology are the following:

1. Initial literature review on the topic of response to a failure event in water distribution systems. This will be accompanied by the general review of UU business.
2. Collection and initial processing of existing data and definition of suitable case studies.
3. Development of the overall framework for event management, to define key stages in the event management process. This will take into account the existing processes typically found in UU and other water companies.
4. Development of methodology for optimal event response. This will aim to address the trade-off between the cost of the interventions and the impact reduction.
5. Development of a prototype decision support type tool, which will identify the best way to visualise, i.e. present the relevant information to a decision maker in the operating room.
6. Testing and verification of above on historical, engineered and real-life events. If possible, the ultimate testing and verification will be done on real-life events, i.e. in complicated networks.
7. Investigation into possible routes for companywide implementation and rollout of new methodology.
8. Thesis write up

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