Environment Monitoring for Crisis Management

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### Introduction

- **Motivation**
  - Many countries require large-scale emergency crisis monitoring systems, which are ideally supported by software services.
  - However, the run-time monitoring of web service compositions has been widely acknowledged as a significant and challenging problem.
  - Properties such as accuracy, flexibility, and robustness are crucial for crisis management systems.
  - Reliability and stability for service-oriented applications need to be improved.

- **Approach**
  - This dissertation monitors the current execution of services by analysing BPEL processes and environmental conditions through sensors.

### Implementation

- **Data Acquisition**: TelosB motes sense the temperature and send packages to a base station connected to the host through P2P WSN.
- **Data Analyze**: The host extracts and checks the information from packages it receives periodically, and decides to which crisis level the current environment belongs.
- **Resource Dispatch**: It invokes the web services through a BPEL engine according to the relevant crisis level.
- **Execution monitoring**: It monitors run time execution, warning when faults occur with the sensors, in Web services, or in BPEL process.

### Evaluation

- **Evaluation**
  - Precision, Scalability, Time performance, Memory performance

- **Results**
  - **(Pros)** This monitoring system is able to give correct responses for different crisis levels and system errors. On the other hand it has good time performance due to its run-time operation.
  - **(Cons)** However motes have limited memory and power. In addition monitoring is limited by physical proximity. These limit the scalability and Memory performance of the system.

### Discussion and Future work

- **This work presents a novel framework for service monitoring and environmental conditions monitoring in a crisis management scenario. The framework supports both practical environment monitoring and system execution monitoring. Furthermore it integrates some useful functionalities including resource management, log management, crisis level management and sensor management. They help in forming a flexible and robust monitoring system.**
- **Future Work**
  - To extend the scale of the system from one building to multiple cities.
  - To enrich the categories of web service and monitor information.
  - To extend the system so it is able to trigger the coordinate adaptation according to monitor information.

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