Poster: Emergency Management Using SHERLOCK

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1. INTRODUCTION

Emergency management has attracted the focus of mobile computing research in the last years due to the flexibility that it provides in critical scenarios. The lack of a pre-existing infrastructure or even a communication breakdown are important issues that mobile computing can deal with. In addition, Semantic Web techniques to handle the data in these scenarios, such as knowledge representation and reasoning, have been proven useful.

In the SHERLOCK project [1] we are developing a general system to provide users with interesting Location-Based Services (LBSs) that can help in emergency management. SHERLOCK executes on mobile devices and leverages their communication mechanisms to exchange information among them. The system uses: 1) ontologies and semantic reasoners to handle knowledge about LBSs and interesting objects, and 2) mobile agents to balance CPU consumption and communication load.

2. APPROACH

Thanks to its flexibility, SHERLOCK can handle emergency scenarios when provided with knowledge about them. For example, let us imagine that there has been a traffic accident in a secondary road (see Figure 1):

1. An emergency call is issued by drivers of cars involved or cars themselves. SHERLOCK's ontology defines that emergency calls trigger a request for assistance to emergency units in the area (defined in the ontology as police units, medical units, etc.). If the accident occurs in an area without 3G coverage, then SHERLOCK creates a network of agents that try to find any emergency unit nearby. The mobile agents jump from car to car and they find a police station nearby.

2. The police station receives the call with information about the accident (cars involved and their locations). The corresponding authority executes the service to manage an emergency that is defined in its local ontology as asking hospitals and fire stations near the accident to send units to a specific location and obtaining the real-time location of emergency units assigned to the accident (i.e., ambulances, firetrucks, etc.).

3. Coordinators of the hospital and fire station nearest to the accident receive the request for assistance through SHERLOCK and send ambulances and firetrucks. The ontology defines that obtaining pictures/videos of the accident would help coordinators to estimate the magnitude of such an event (i.e., number of cars involved, smoke, fire) and the kind of resources needed.

4. SHERLOCK triggers a request for pictures/videos to devices near the accident. A network of agents move to devices with cameras near that location and ask them to take pictures/videos which are sent to incoming emergency units to be prepared in advance and to coordinators to evaluate if more units are needed.

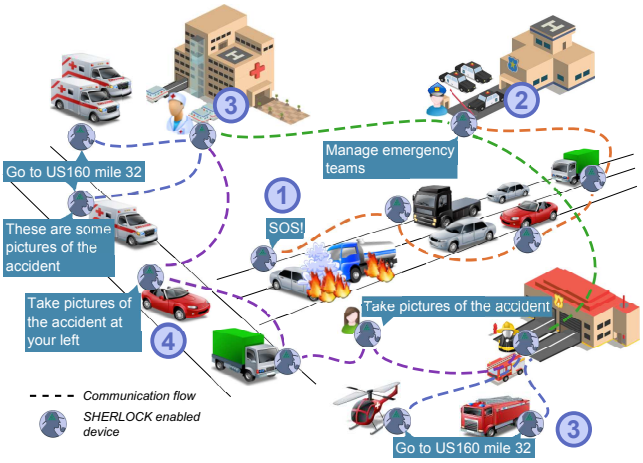

Figure 1: Emergency management scenario.

Therefore, SHERLOCK's flexibility in terms of the services offered (ontologies defining new services can be incorporated on the fly) and the execution of these services (wireless ad hoc communications are used when 3G is not available) are useful for emergency management. A prototype of the system and more information are available at [2].

Acknowledgments

Work supported by TIN2013-46238-C4-4-R and DGA-FSE.

3. REFERENCES

[1] R. Yus, E. Mena, S. Ilarri, and A. Illarramendi, *SHERLOCK: Semantic Management of Location-Based Services in Wireless Environments*, Pervasive and Mobile Computing, 2014.

[2] SHERLOCK. `http://sid.cps.unizar.es/SHERLOCK`.

MobiSys '15 Florence, Italy
ACM 978-1-4503-3494-5/15/05.
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