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Computing Rescue Wings using Online & Offline Service Support for Disaster Rescue

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Abstract

After the disaster events, the timely and targeted information will provide the provision and exchange it provide great help to the stricken population in difficult and complicated environments. A service-oriented system, report called as Rescue Wings, which provides emergency support to sufferers and rescuers in disasters. The system uses mobile services to acquire real-time information about the users and environment, and constructs service agents (servants) to provide active services for mobile users. To perform their functions, the servants frequently invoke a set of intelligent services of Rescue Wings, which can further access a number of public services from government and other public organizations. The (FRSP) is the most frequent request sequence patterns of Rescue Wings; it will develop a new bio-inspired algorithm for efficiently scheduling the requests to minimize the response delay.

Keywords: Disaster, Rescue wings, Frequent Request Sequence Pattern (FRSP), Delay.

Introduction

As we see theworldis facing increasing threats from natural and man-made disasters. We effectively plan and implement disaster rescue operations, the responders have to obtain as much detailed information as possible.We also expect that disaster and evacuation information should be transmitted to the affected population in a timely and accurate manner.Search and Rescue (SAR) is the search for and provision of aid to people who are in distress or imminent danger.

The general field of search and rescue includes many speciality subfields typically determine by the type of terrain the search is conducted over .On the one hand, the portability and ease of information storage and dissemination has enabled mobile devices to become one of the most viable means of communication with the population.On the other hand, cloud computing technologies enable configuring, scheduling, and

Coordination of shared resources via virtualization, and thus greatly facilitate communication between a broad range of public and private entities.

Rescue Wings deploys its client-side applications to mobile devices of end users, who can upload and maintain their profiles on the servers. When entering into the emergency mode, a service agent (servant), whose behaviors are defined by active service programs is instantiated for each Rescue Wings client (of a sufferer or a rescuer). Here the servants are responsible to actively collect the real-time information and monitor the states of the clients on the spot, and it provide the required services to assist and help the users in self protection, escape from that effected location, search and rescue (S&R), as well as mutual rescue. During the abnormal states, the servants can also remotely request ad hoc operations of the clients. Rescue Wings will access a number of public services to obtain rescue information, and provides a set of intelligent services for supporting the responders in different stages of the rescue operation. The purpose of this paper is threefold:

It present the architectural structure and working mechanism of Rescue Wings, it provide guidance and assistance for the construction of similar service-based systems.

It proposes an efficient heuristic algorithm for service request scheduling, it is crucial to the success of the system and can be useful for many other service scheduling problems.

Here the present simulation will results in the real-world applications of the system, the lessons learned

from which can benefit both the system developers as well as the disaster managers.

The remainder of the paper is structured as follows: Section 2 discusses related work. Section 3 presents the Problem Statement. Section 4 defines the Methodology and functionalities of Rescue Wings clients, servants, and rescue support services. Section 5 presents the Results which has Six Modules, and Section 6 concludes.

Related Works

Paper [1] describes about the spatial data which is crucial in disaster planning. However, decision makers are required due to reason dynamic, urgent and uncertain nature of disasters, few data and functionalities may be needed to when they used. To generate new spatial data and functionalities, quickly, from existing ones Web service composition provides a solution where spatial web services disaster planners can integrate.Open Geospatial Consortium Web Services (OWS) was proposed for automatic disaster planning solution. SPARQL languages is used to describe OWSs semantically. Resource Description Framework (RDF) approach based on the semantic annotation For RDF and SPARQL conceptual model for Artificial Intelligence (AI) planning is also proposed. based on the proposed conceptual model to compose semantic OWSs an AI planning algorithm was implemented. Through a case study in evacuation sheltering the reasoning of the proposed solution is investigated

The case study used for the proposed automatic composition approach can used for the efficiency of OWS integration and thereby increase the disaster management process.

In this approach, planners used automatic web serviceS composition for sheltering site selection.

The main drawback of the paper is,required details regarding the OWSs is not provided by metadata level.

Elan[2] et.al., has told aboutSeveral recent proposals for an "active networks" architecture advocate the placement for multicast transports, mechanism to foil service attack and so forth.. Thisaudable goal, however, has many problems and also pioneering efforts to solve some preliminary small scale industry problems. In this paper, they have proposed an different to networks that addresses a restricted and more tractable subset of the active-networks design space.

Our approach, which we call "active services", advocatesthe placement of userdefined computation within the range of network similar to active networks, but not like active networks kept all of the routing and forwarding semantics of currentInternet architecture by avoiding the computation environment to the application layer.As there is no need to provide changes to internet architecture, there is no incrementa in todays internet. They have proposed— the Media Gateway (MeGa) service — that that uses this architecture. There are six key problems — service control, service attachment, service composition, service management, service location, and the definition of the service environment — and have solutions for these problems in the context of the MeGa service.To verify our design, they have used fielded MeGa on the UC Berkeley campus, where it has been used regularly for several months by real users who connect via ISDN to an "on-line classroom .Active services prototype provides a very flexible and programmable platform for intra-network computation that strikes a good balance between the practical constraints of incremental and flexibility of the active networks architecture deployment in the current Internet.Using Internet service model has support and active for putting agents within the network.

The main drawback of the paper iscomplex for implementation.

Paper [3] discusses aboutEmergency response organisations are faced with complex, unpredictable events with the risk of catastrophic losses. To assist emergency response organisations in responding to these events, new models must be developed and the traditional command and control structure of decision making must be revised to accommodate greater flexibility and creativity by teams. In this paper we propose the concept of decision support for improvisation in emergency management. The concept is based on the paradigm of operational risk management and is motivated by the observation that emergency response organisations must be prepared to improvise during response activities. The process of emergency response in light of this new concept is first discussed and opportunities for supporting the process identified. We conclude with a review of a project at the Port of Rotterdam, where we are currently assessing this new decision making approach for emergency management.It has some feature of Emergency response, operational risk management, improvisation, blackboard-based decision support.The main drawback of this paper is that its choices are frequently more expensive than those of the cost-aware approach.

Kweku-Muata[4] et.al., have discussed about event types (e.g. flood, earthquake, fire, theft, computer failure) that have implied for the operation of modern organization.All the organizations are liable to be influenced to a non-zero risk of experiencing out-of-course events, which can be natural or manmade .With respect to business operations ,this can lead to internal ''disasters''. Hence, for the effects of disasters critical need for planning and recovery strategies is required. Disaster recovery plans (DRPs) which aims at ensuring the organizations can function effectively during or after the Occurrence of disaster. As such, they own cost, performance, reliability, and complexity characteristics which make development and selection nontrivial.Quantitative decision-making techniques helps to solve many of the issues involved in Disaster Recovery. Consequently, rather than descriptive in this paper contribution is prescriptive in nature and they propose the use of mathematical modeling . This Mathematical Modeling has a decision support tool for successful development of a DRP. After arriving at a final DRP, here the decision-makers have to consider a number of options or subplans and must select a subset of these subplans for inclusion in the final plan. Kweku-Muata[4] et.al., presented a mathematical programming model which helps the decision maker to select among competing subplans, a subset of subplans which maximizes the ''value'' of the recovery capability of a recovery strategy. Authors used hypothetical situations to illustrate the technique which can be used to support the planning process.In this approach, for a disaster recovery plans it presented a mixed-integer of mathematical decision model for selecting subplans.MS/OR modeling can be used to provide strategic decision support for DRP selection.The main drawback of this paper is,it faceda mathematical modeling challenge.

In this paper[5] the authors have discussed about themajor goals used when developing complex Applications based on OGC Web Services (OWS) i.eFlexibility and reusability. Within the project OKGIS authors evaluated the suitability of the Web Service Orchestration (WSO) technology as possible solution for disaster management scenarios. Here authors presented an example of an evacuation scenario after a bomb has been found. This scenario included the need for emergency route planning. Authors evaluated the actions which is to be performed by the supporting system wherethe rescue workers can map onto a chain of service of basic OWS. The chain of service is represented as a BPEL document and can be executed in a web service orchestation engine, such as Oracle BPEL-engine. BPEL is a standard for service orchestration and means of Business Process Execution Language.The Big benefit is when using this standards is to develop a platform for disaster management .The results in a highly adjustable toolkit. In OK-GIS authors developed a spatial data infrastructure with the necessary server and client applications to support some typical use cases for the fire department.The main problems is the missing Simple Object Access Protocol(SOAP) support of OWS.

Problem Statement

Person in emergency will not be in position to inform rescue team on fly and wait for their help, perhaps he/she try to escape if they are conscious and know about emergency.More dangerous situations occur when person is unconscious or not able to take action against emergencyfor example physically handicapped person or old age citizen who can't step down immediately from emergency place. Considering other situation like person is not aware about emergency at all and he/she continues their work in hand; in such situation, detecting any emergency with help of sensors and reporting them to outside world, so that concern disaster team takes appropriate action to rescue the needy.

Methodology

Mobile Client Applications

A Rescue Wings provides two modes: normal mode and emergency mode. Under the normal mode, the user can visit the regular website of the Application through the client browser. There are three ways to switch the client to the emergency mode:

- The client an actively sends a request for help (RFH) to server. It is a single button operation of the mobile device.
- The Rescue Wings automatically identifies the client in a disaster-stricken area.
- The Client actively requests to be a rescuer in an emergency event.

Servant Functions

When a client is identified as a Victims in Disaster-stricken area, a servant is constructed based on the victims user profile .It also uses the frame-based approach to maintain the user instance that contains a set of basic properties from the user profile, a set of state properties inferred from the basic properties as well as real time information collected by the client application.

Rescue Support Services

To support victims in theevacuation or rescue operations,the servants need a number of services, most from ISS and a few from PSM. Move over, many services provided by ISS need to access public services from PSM. In an emergency event, one of the busiest components of Rescue Wings may be the Broadcaster, an agent that provides active service for broadcasting messages from the EMO to the servants.

RESULT

Various Steps Used In Proposed Methods:

VICTIM POST FOR HELP

In Figure 2People who are suffering in the disaster area, can use the "Rescue Wings" app through which they can ask for help. The users of the app are common people, any government officials, NGOs who would like to involve in the disaster management.As soon as, help seeker posts a help message, all other users will get a notification through the newsfeed while posting a help user needs to provide his contact number, name, message type of disasterthrough GPS the location will be posted.While posting, the user can click the surrounding picture, or can capture audio. Once the user posts all the details will be saved in the cloud server along with the time of post.

QUICK POST – ALERT METHOD

In Figure 3 and Figure 3.1 any user can send a quick alert regarding the disaster by clicking on the relevant icon. If GPS is enabled, the location of the disaster will be automatically detected. Otherwise, the user can enter the location manually. The quick post will also be visible to everyone in the news feed.

QUICK POST – REQUEST METHOD

In Figure 3.2 any user can send a quick request for basic exigencies such as food, shelter, transport etc. by clicking on the relevant icon. If GPS is enabled, the location of the disaster will be automatically detected. Otherwise, the user can enter the location manually. The quick post will also be visible to everyone in the news feed.

RESCUING THE VICTIM

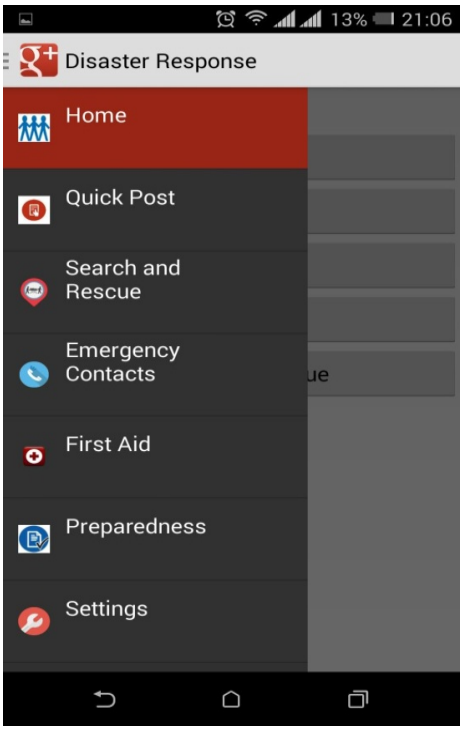
In Figure3.1 all the posts that has been posted by the help seekers will be visible in the Home page of our app. This post will be visible to everyone. Users who are interested to help the help seekers can view the post and check the location in Google Maps. Once the user attends the post the status of the post turns attended and notification sign turns yellow from red. As soon as the user attends the post, the server will calculate the estimated time to reach the place based on the type of disaster, and the post will be updated with the person's name and estimated time to reach. A push notification will be sent to the help seeker with the attendee's name and contact number.

SEARCH AND RESPONSE METHOD

In Figure 5 shows when a person is searching for his family, friends, relatives or any acquaintances during the disaster, he can post a request for search and rescue which includes the person's name, location and emergency contact number along with a message and a photo of the victim if possible. When anyone gets any information regarding the search post, they can reply back to the seekers and send the information.

INFORMATION MODULE

Figure 5 shows users can look for emergency contacts, disaster specific first aid and information regarding the preparedness for the disaster.



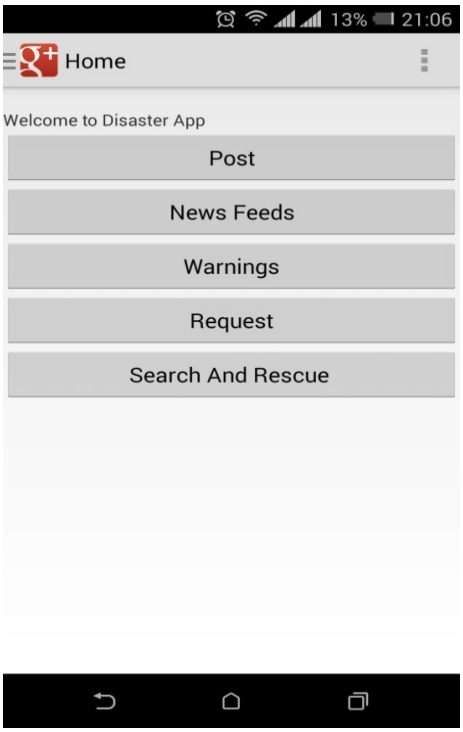


Figure 1 : Initial setup of the Rescue Wings app

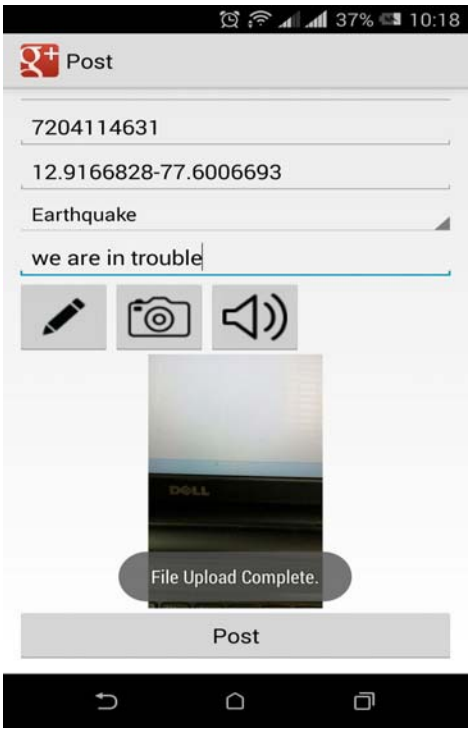


Figure 2 : Shows the victim posting request for help

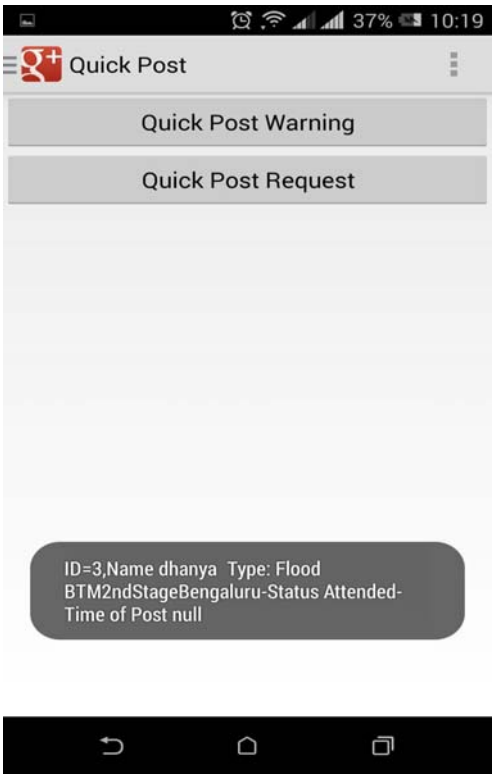


Figure 3 :Shows victims Quick Posts.

Figure 3.1 : Shows the victim Quick Post Warning.

SERVICES

- User can post message.
- Server generates the message id.
- User can click environmental pictures and send it to server.

- User can record the voice and send to the server.
- User can send quick post.
- User can request for their needs like food , clothes etc.
- Servant can view the list of the requests.
- Servant can attain the post.
- User device can find the coordinates in x-y plane when there is no internet.
- User location should be send to the servant.

Figure 3.2: Shows the victim Quick Posts request

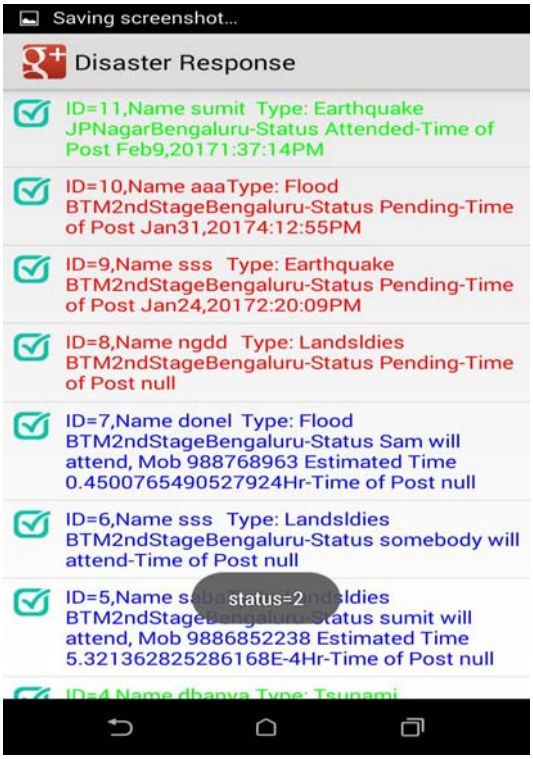


Figure 4 : Shows the rescuers Getting Involved

Figure 5 : Shows the Emergency Contacts.

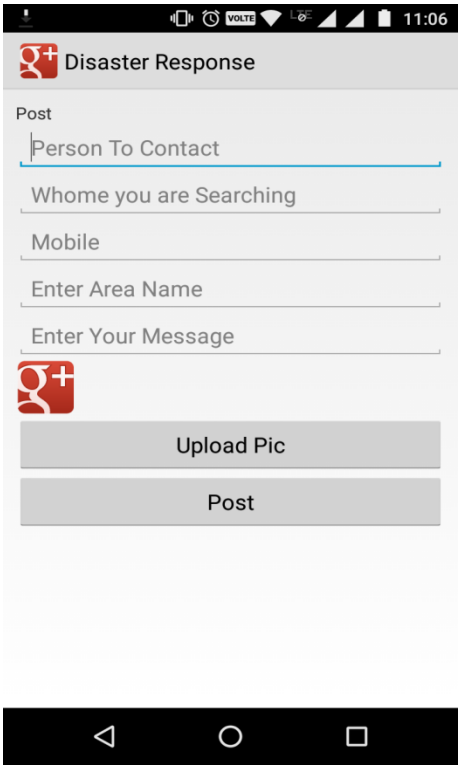
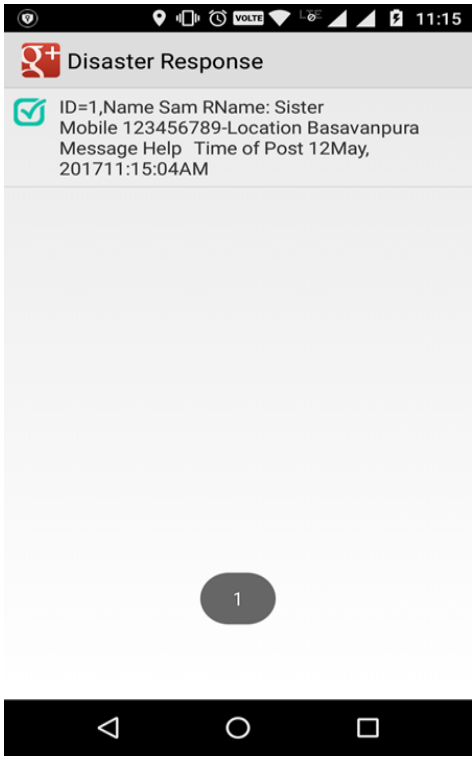


Fig 6: Shows Search and Rescue

CONCLUSION

Rescue Wings, is a service-oriented system for assisting sufferers and rescuers in disaster rescue operations. It consists ofanynumber of servants for communicating with the client users or victim, a set of internal intelligent support services, and a number of wrappers for accessing public services. For efficiently scheduling the requests for Rescue Wings services, we develop a new heuristic algorithm based on BBO and local search, which outperforms some state-of-the-art scheduling methods. Rescue Wings has been testedon two rescue drills, and applied to the 2013 Ya'an Earthquake. The results show that the system contributes greatly in assisting the users and improving the rescue efficiency.Rescue Wings are now attracting more and more users, which makes us pay more attentions in



Improving the scalability and diversity of services for disaster rescue support. We are currentlydeveloping more customized and personalized functions for the Rescue Wings client applications, and promoting the existing service scheduling and algorithms to support more concurrent requests without degrading the response time. We also plan to extend the Rescue Wings services by utilizing/integrating sensing services of the Internet of Things. We expect that Rescue Wings could have a broader application and play a more important role in future disaster rescue operations.

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