Dynamic Resource Scheduling in Forest Fire Situations in Sri Lanka

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INTRODUCTION

According to the gathered data from Disaster Management Centre, Regional forest officers and Fire Brigade of Colombo Municipal Council current procedure of controlling and extinguishing forest fires has number of weak points which have to be addressed immediately in order to minimize the damage caused by the forest fires. Allocation of the available resources in a competent and proficient manner at a time of disaster (real time) has gained huge attention among those weak points. Therefore this study focuses on exploring an approach to dynamically utilize the available resources during a forest fire situation in Sri Lanka.

A. Background

Addressing the issues related with the forest fires through information technology is getting huge attention over the world wide since early 1970's. According to the literature there are several approaches which have been developed in order to cope up with the forest fires. Among them the most frequent approaches occupied by the different countries are predicting and detecting of forest fire ignition, predicting of the forest fire spread and utilizing the resources during a forest fire situation.

B. Methodology

Design Science Research Methodology is adopted at the process of exploring a framework for the proposed solution in this study. Development of architectures for three different modules is focused on the phases of this research namely resource tracking, forest fire spread estimation and dynamic resource allocation.

Resource tracking module is concerned on tracing the available resources while the probable fire spread area is estimated through forest fire spread estimation module during the fire situation based on the four weather factors namely temperature, relative humidity, rain and wind speed. Through the resource scheduling module, the risk entities of the estimated area is identified and forest officers are responsible for generating the resource requirements for particular entities. Finally generated requirements are mapped with available resources according to the priority level considering the distance between resource location and requirement location.

The overall descriptive architecture of the framework along with the data flow in between the modules is presented as a diagram in figure 1.

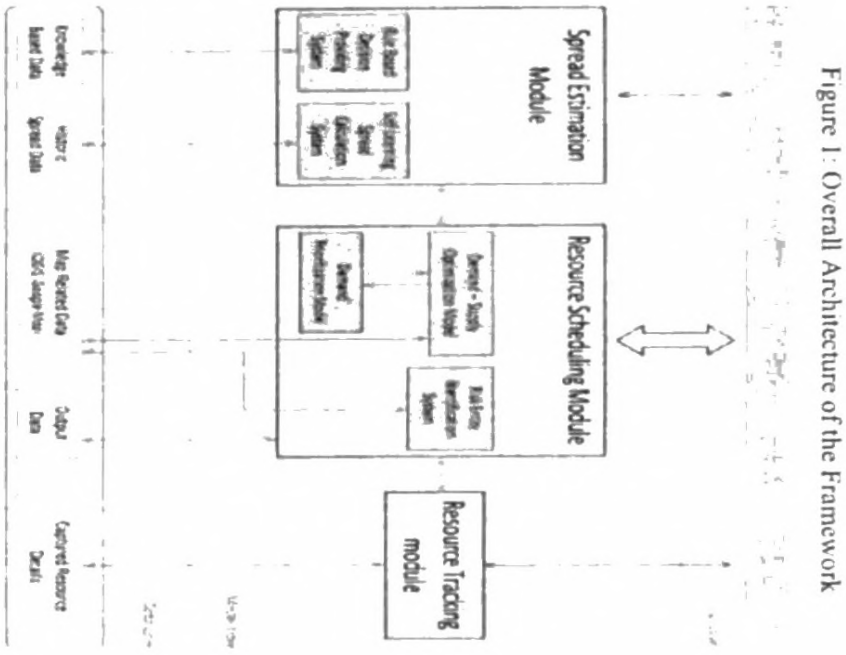

Figure 1: Overall Architecture of the Framework

C. Discussion

Since the forest fires situations are getting less attention from the respective authorities in Sri Lankan context this study can be considered as the initial approach of addressing issues of forest fires in Sri Lanka through Information and Communication Technology based approach.

However the lack of availability of the technology in order to capture the required data in Sri Lankan context draws constraints over the study. Thus proposed framework is built upon the several assumptions as mentioned below.

1. Details which are capturing from maps are considered as accurate and up-to date data.
2. Entire climate of studied area is equal. Therefore usage of generalized weather data of selected area can be applied to different locations in the particular area.

However the approaches and mechanisms followed over this study needs further discussions and improvements as the research still not in its matured stage. Thus the main intention of the authors of this study is to come up with an initial framework which can be sharpening over the time with the development of the technology.