A TRUST EVALUATION MODEL FOR CROWDSENSING DATAIN HUMANITARIAN NEEDS ASSESSMENTIN EMERGENCY SITUATION

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Abstract

Pervasiveness of mobile devices with built-in sensors fused with online social networks (OSNs) has given rise to exciting technologies like Mobile Crowdsensing (MCS) and Human as a Sensor paradigm (HaaS). Smart devices and humans can sense, gather, analyse, connect and share information with each other over a network to facilitate a common sensing task. These technologies are utilized in the field of crisis management to alleviate the problems such as data acquisition and volunteer management. Extensive research has been conducted regarding crowdsensing for emergency management to ease interaction between victims, volunteers, crisis managers, relief organizations and government authorities. During initial stage of a crisis, humanitarian aid needs assessment is critical for estimating the degree of assistance needed by victims and the access of rescue agencies to the affected population. However, in many instances humanitarian aid doesn't reach the affected areas in time or doesn't fulfil the needs of victims correctly. Victims present in the disaster area can best gauge their needs and provide information to relief agencies about their needs and needs of neighbouring communities. This data is crucial to rescue organization in accurate and efficient aid distribution among victims of disaster areas. Main challenge with the contributedaid needs data is the trustworthiness of aid request dataanddiscerning what factors influence the trustworthiness of aid request data. Recent approaches have used reputation and voting based methods for trustworthiness of crowdsenseddata. We have proposed a similar approach to measure the trustworthiness of emergency need requests generated by a crowd of affected population based on the voting method. Novelty in the measurement of trust score for a need request is in the form of consideration of proximity of voter, role of users, existing reputation score of initiators and voters and any similar requests in vicinity. Multiple scenarios are explored that include multiple simulations to find out which factors most influence trustworthiness of any needs request. Through simulation of these scenarios we have demonstrated the effectiveness of our trust measurement approach to efficiently identify most important needs requests in a disaster situation. We found out that proximity of voters and similar request in vicinity of a needs request highly influenced the trust score of needs requests.

Keywords: Crowdsensing, mobile crowdsensing, trustworthiness, reputation, needs assessment, humanitarian aid needs assessment.

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