Seeking an Optimum Route Based on Machine Learning and GIS During Hazard

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Abstract. Natural disasters can be characterized as a combination of natural hazards and vulnerabilities that threaten vulnerable communities that are unable to cope with their adversity. Flooding is the most prevalent and destructive natural disaster that have detrimental effects on human life (loss of life, injury), properties (agricultural property, development of yields, homes, and buildings), communications networks (urban infrastructure, bridges, roads, and railways), cultural heritage, and ecosystems. Moreover, according to estimates, almost 600,000 people in Sri Lanka are displaced by floods every year. Therefore, many people stay in refugee camps because lost their residence. The National Relief Service Centre (NRSC) plays a major role in the distribution of subsidies, and private sector agencies, media organizations, and citizens contribute to this. One of their primary goals is to reach the refugee camps carry subsidies expeditiously. But one of the biggest issues being that they were unable to supply them with subsidies quickly and unable to reach the camps that locate in highly affected and vulnerable areas as well. In this paper, the literature was focused on addressing the single effect of transportation caused by floods that faced Relief Services distribution. A combination of Machine Learning and the Geographical Information System (GIS) is the ideal area for achieving this challenge. Machine learning (ML) approaches have contributed significantly to the development of prediction Systems offering improved performance and cost-effective solutions over the past two decades to replicate the complex mathematical expressions of physical flood processes. Furthermore, the Geographic Information System (GIS) is one more gigantic area that uses in route optimization. GIS is used in that case is used to display information over the Earth's surface. The information could apply to a specific area, demographic, or geographical area. Machine Learning needs information and data from observation and real-world interactions. GIS is an authoritative system of record for such data. So, those algorithms used in machine learning finds the best possible route from a set of routes calculated using different GIS data sources (route analysis). The primary purpose of this literature is to propose an effective and efficient solution to a problem faced by distributors of relief services.

Keywords: *Route Optimization, Machine Learning (ML), Geographical Information System (GIS), Flood, Relief Services, Resettlement Camps*