

Application of Geographical Information System (GIS) in Accident and Hotspot Analysis

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Traffic accidents are one of the main issues that cause sudden deaths and head injuries all around the world. It is observed that with increasing population rate the use of vehicles has also been increased. Many factors that lead to accidents which include road design, road environment, drivers' skills, street racing, driving while using cell phones. Each year 1.3 million people die in traffic accidents globally and about 20 to 50 million people get injured. According to the annual report of World Health Organization in 2015 traffic accidents were responsible for 8.1% of deaths and are considered as 3rd leading cause of deaths in Iran and 1st cause of death among people aged 15 to 45, therefore Traffic and Crashes Management and Preventions are considered as capabilities of GIS in transportation.

However in modern transportation after a rescue demand the



crash site and specifications are imported in the GIS and then the routing of some factors including traffic jams, obstacles, physical characteristics of routes, the shortest time possible are announced to rescue teams.

This article basically determines the application of GIS in the accident and hotspot analysis. So the question arises that what basically GIS is? GIS is a "framework for gathering, managing and analysing the data. It analyses spatial location and organizes layer of information into visualization using maps and 3D scenes". Usually researchers

combine GIS and statistical models to evaluate the risk of road accidents. Li and Zhang (2007) reported how GIS and advanced statistical models can be used. Data preparation, segmentation and screening are performed in GIS. Spatial tools are used to determine the hotspots and analyse the accidents spatial phenomena. There are locations where clusters of accidents of specific type of accidents occur? Some spatial tools includes:

1. Moran's I statistics

A tool that measures spatial dependence of the accident location

2. Kernel's density

It is a spatial data analysis of ARC GIS program. It is used for determining the risk spread of accidents.

Many studies use GIS tools to show the location of accidents on a digital maps and analyse the hotspot of traffic accidents. There is a great diversity in the number of accidents data records and of the factors used.