



Clustering Analysis of Traffic Accident Risk in Turkey

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Dear Editor in Chief

Traffic accidents and the deaths, injuries and material damage caused by these accidents still occupy their place as one of the most important problems in Turkey. Because every year more than 500.000 traffic accidents happen and of these accidents 5.000 end up in death and 160.000 results in injuries. In 2012, 1 294 634 traffic accidents happened in Turkey and 3750 people were killed in these accidents while 268079 people were injured (1).

Considering where they take place, traffic accidents are seen to be affected by various factors. To determine these factors accurately, traffic accidents should be analyzed separately as in-town accidents and highway accidents. In this study, provinces in Turkey were clustered using data about traffic accidents happening outside the cities in the year 2012. Both classical k-means and

fuzzy c-means clustering techniques were used for clustering analysis. Clustering analysis of the provinces was conducted according to these risk rates that are determined as health risk and traffic risk rates. The purpose of this study was to determine cities similar to each other in terms of health and traffic risk rates in traffic accidents happening in the provinces.

The findings of the study indicate that the provinces with highest rates of health and traffic risk were those with low population density, poorly developed and in general, they were the provinces in rural areas. The fact that death and injury rates were low in urban areas was attributed to the fact that roads in these places were better, that vehicles were new as income level of people was higher and that these places had rehabilitation and emergency relief centers (2-6).

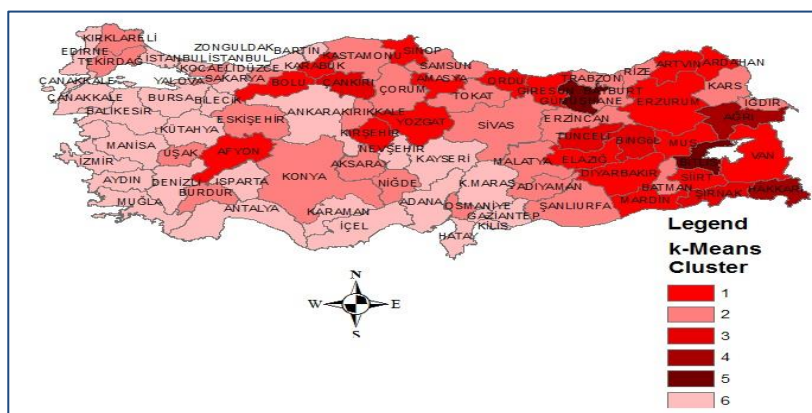


Fig. 1: Mapping of the provinces according to k-means clustering method

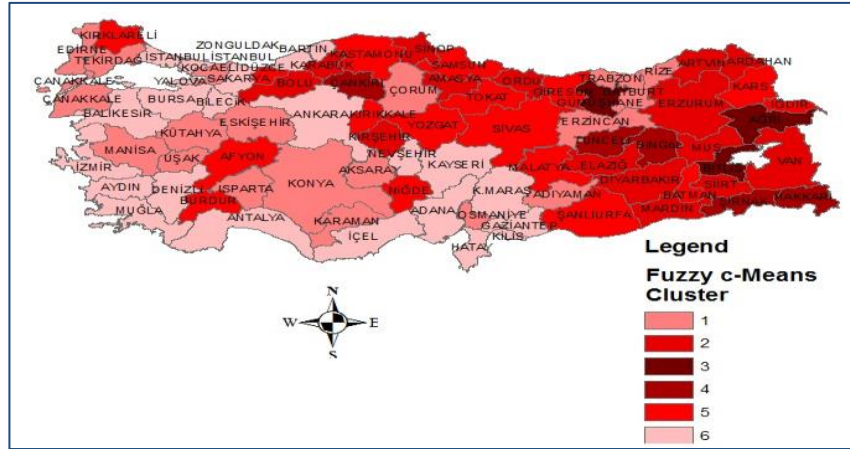


Fig. 2: Mapping of the provinces according to fuzzy c-means clustering method

In the study, differences are seen in the provinces in clusters obtained according to the two methods (Fig. 1 and Fig. 2). This difference is due to the fact that fuzzy c-means technique was affected less by the initial values as compared to k-means technique. It was observed that fuzzy c-means technique usually produced more stable results. In addition, fuzzy c-means technique was observed to have been affected very much by exceptional data whereas k-means technique was influenced very little (2).

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