

# Graphed-based K-Means and Shortest Distance Tree for the Construction of Elderly Safe Corridor Accident and Prevention Platform

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**Abstract**—As medicine, science, and technology improve, the average age of the population on earth is also increasing. The World Health Organization (WHO) reported that the average age of the countries that had joined and surveyed was 68 years old, and the highest country had over 80 years. The care of the elderly population requires more attention and careful planning. There are a variety of social support systems available for the elderly today. Apart from encouraging them to participate in various social affairs and activities, it is also necessary to consider the safety and accident prevention needs of the elderly when they move. This is one of the critical factors for the elderly to obtain various opportunities and resources. Those areas or locations where older adults are densely concentrated require a more effective police presence to maintain the safety of moving routes. This research primarily deals with arranging police forces based on a simulation of elderly individuals' action trajectories. The level of care that the elderly require is weighted. Furthermore, the weighted K-means Clustering method is used to find the clusters of the elderly and make the cluster center close to the elderly who need high care to deploy the police force to provide higher priority services. Then the shortest paths between the elderly settlements (cluster center) and the activity venue are found based on the consideration that the movement patterns of the elderly are mainly walking, and they are most likely to arrive at the activity venue within the shortest distance. The activity venues of the shortest paths are taken as the root to construct the shortest path tree. During tree construction, the number of elderly in each settlement is summed in each intersection node as the number of elderly passing through. Then the breadth-first search method is applied to find the multi-path convergence points that the most elderly pass through as the reference for recommending police force arrangement. According to the proposed method, the police can plan safety corridors for the elderly so that they may receive the best safety care while away from home.

**Keyword**—elderly care, weighted K-means, shortest path tree, police force arrangement



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