PREDICT THE BEST SUITED LOCATION FOR NEW ATM

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ABSTRACT

The problem choosing a location for placing a new ATM such as within an urban city or large regions in geographical sense has attracted much research efforts recently. This problem can be generalized as a spatial resource allocation, where they commonly share the characteristics of meeting certain demands by a limited amount of resources. The demands are usually distributed, unevenly in a confined spatial area. educing capital and operational costs became a main course of action to improve business performance and to be competitive for every company in today's challenging economy. However, companies also aim to improve their service delivery and customer satisfaction accordingly. Location management is widely regarded as one of the critical issues for its cost reduction potential in every line of business. Therefore, companies need to develop location strategies for their business units such as factories, distribution centers and stores in accordance with the overall business strategy.

KEYWORDS

Banking Industry, Decision Support Systems, Location Selection, Clustering, Spatial Resource Allocation

1. INTRODUCTION

The main way of finding out an optimal solution is arrived through the use of certain algorithms and other resources. There are several algorithms which are running in place of clustering or for dividing the map into certain regions. There are many factors that go into the decision process of placing new ATMs and those include factors like foot traffic, drive time traffic, physical security, type of neighbourhood, no. of homes, security, remote monitoring and maintenance, most travelled road routes, gas stations, malls and shops, workplaces, other ATMs, banks etc. These factors and mainly other buildings which are located in the vicinity of an ATM play a crucial role in deciding the placement of new ATMs. The banks put huge emphasis on finding out these factors and calculating whether an ATM can be profitable or not before setting up new ATM. Since a lot of work, effort and time goes into it, such a process can be automated to save all those resources. That is the main of this project, to automatically predict the best suited location to place an ATM in a region that is selected by the user.
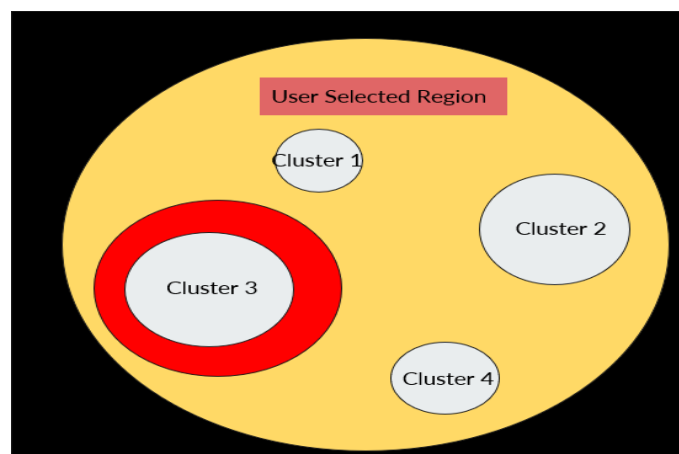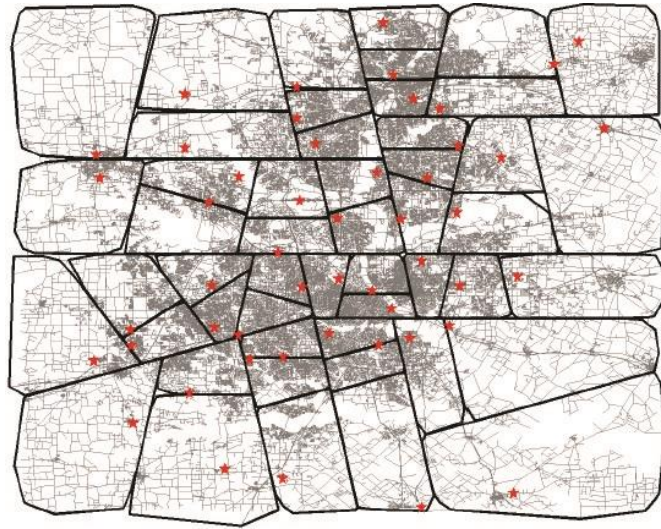

Figure 1. Example of how clusters are formed

Figure 2. A map is partitioned into a set of clusters, with each cluster starting out from an important location. This could be a typical way of breaking a huge region into smaller clusters.

2. THE PROCEDURES

Initially the user selects a certain region on the basis of placing a pin and pin pointing it or just select a certain radius. All the buildings inside this region is arbitrarily assigned a certain score based on what category the building belongs to. The score is based on past studies conducted and other research papers where the data has been collected through extensive surveys or exploring general trends. It has been observed that some factors like malls, shopping centres, gas stations, police stations, hospitals, banks, casinos etc. have a positive impact on the ATM income whereas some other factors like the existing chain of ATMs, security issues, crime neighbourhood, low traffic neighbourhood etc. are having a negative effect and would reduce the income of an ATM. The factors which have a positive impact are given a positive impact score based on how good of an influence it has, similarly the negative scores are given to factors which are inducing a bad effect on the ATM. After this, we developed a system to index new clusters to the most important (good scored) places or buildings. Now, many new clusters would get initially formed. From here, the cluster have to expanded again.

2.1 Cluster Neighbourhood Search

The clusters are expanded on the basis of the buildings in the surrounding regions. The data of the categories of buildings in any location is found out with the help of here API. For clustering a certain range has been found to be ideal, from the cluster in a circular radius all the neighbouring regions to a certain radius which is dependent on the cluster size itself is searched for. The search space increases or decrease as the cluster size decreases and increases respectively. The search range from the cluster varies from a range of 7% - 33% of the cluster size.

2.2 Cluster Expansion

The clusters are expanded upon the next best scored building inside the search area, if buildings with the same score are present then the one closest to the present cluster is chosen. After including the new region the cluster is expanded and the centroid of the cluster is updated. revoked.

2.3 Stopping Condition for Expansion

The stopping condition is based on the directly based on the coverage area of an ATM. All the ATMs have a certain coverage area where people are more likely to use the ATM than ignore it. The cluster are set to stop exactly when that area of coverage is reached.

2.4 Cluster Ranking

The clusters are ranked based on the total score that is achieved by a cluster. The net score of a cluster is the sum of all the different categories of buildings that are present inside that cluster. Then the different cluster can be ranked based on the score. The higher the score, the better the rank, which means more ideal for placing an ATM there and vice versa.

3. INNOVATIVE FROM OTHER SOLUTIONS

Ranking system which shows all the best suited options for placing the ATM instead of just one. The clusters are formed with a certain algorithm which produces the optimal solution. More than one location inside that user selection region is shown. Many more factors affecting the ATM location are considered. Both negative as well as positive scoring has been considered.

4. CONCLUSION

In this paper, we proposed a solution which can be used to predict the best suited location for an ATM in a very feasible and efficient method. This method can be used by anyone especially banks to reduce the time and computation effort that goes into setting up new ATM locations. This would be helpful in many places and have an overall positive impact on several places.

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