



# Use of data mining techniques for the analysis of consumer's electricity consumption over a year in particular region

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## Abstract

Data mining techniques are used to discover electricity consumption pattern at regional level in a city and used to extract knowledge concerning to the electricity consumption with respect to atmospheric temperature and physical distance from geographic features like river, farm, ground and highway. The demand for electricity keeps on increasing almost every year and almost in every region. Installing and developing such a new electricity generation plants is practically impossible due to environmental preservation awareness and pollution control policies of government. To deal with such situation, one needs to find the optional ways for handling and management electricity loads in future with current capacity of electricity generation.

## Introduction

The consumption pattern affected by:

Geographical features  
Environmental conditions like humidity, temperature, rainfall and snowfall.



## Evaluation

### Clustering

This technique on consumer's electricity generation of a month and atmospheric temperature of proposed region of study.

### Consumers clusters

Using monthly consumption data over the year 2015. To check the correctness of the results, MATLAB and WEKA used to compare the results so we can validate it.

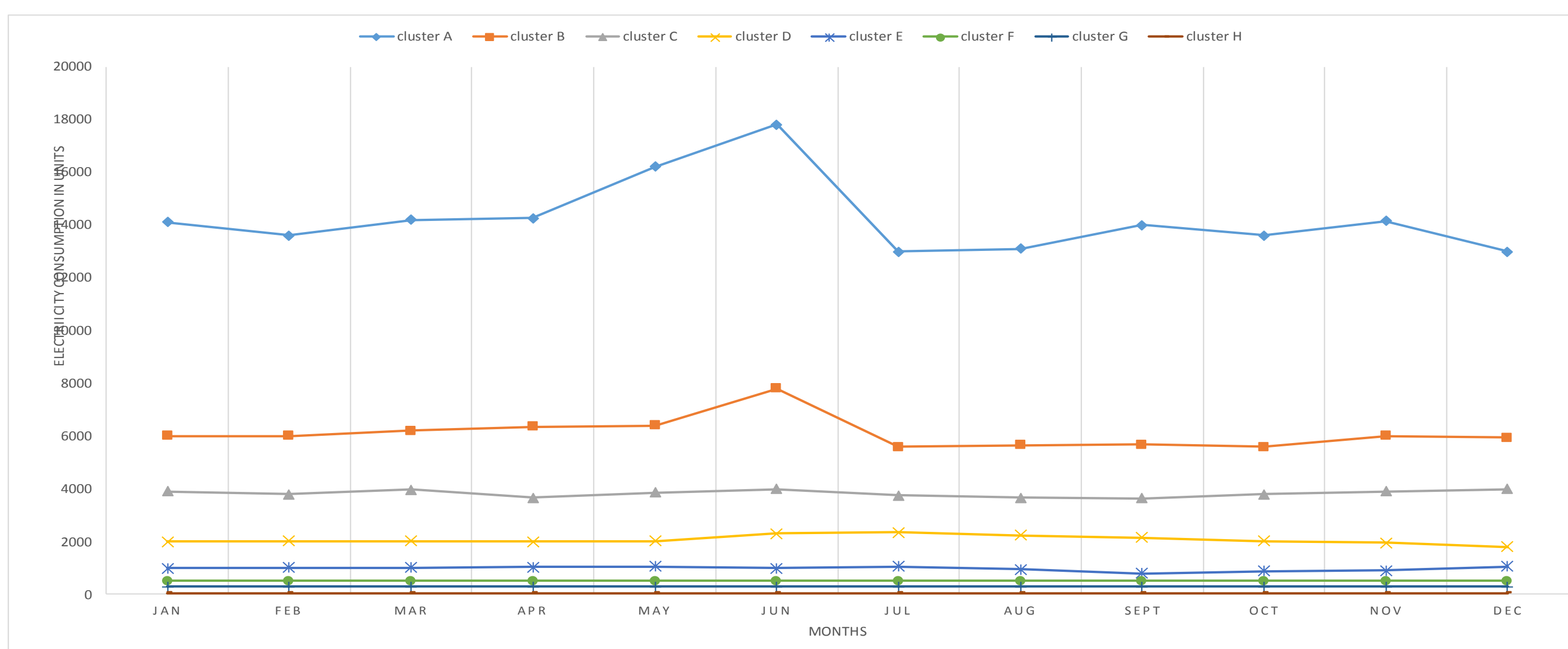
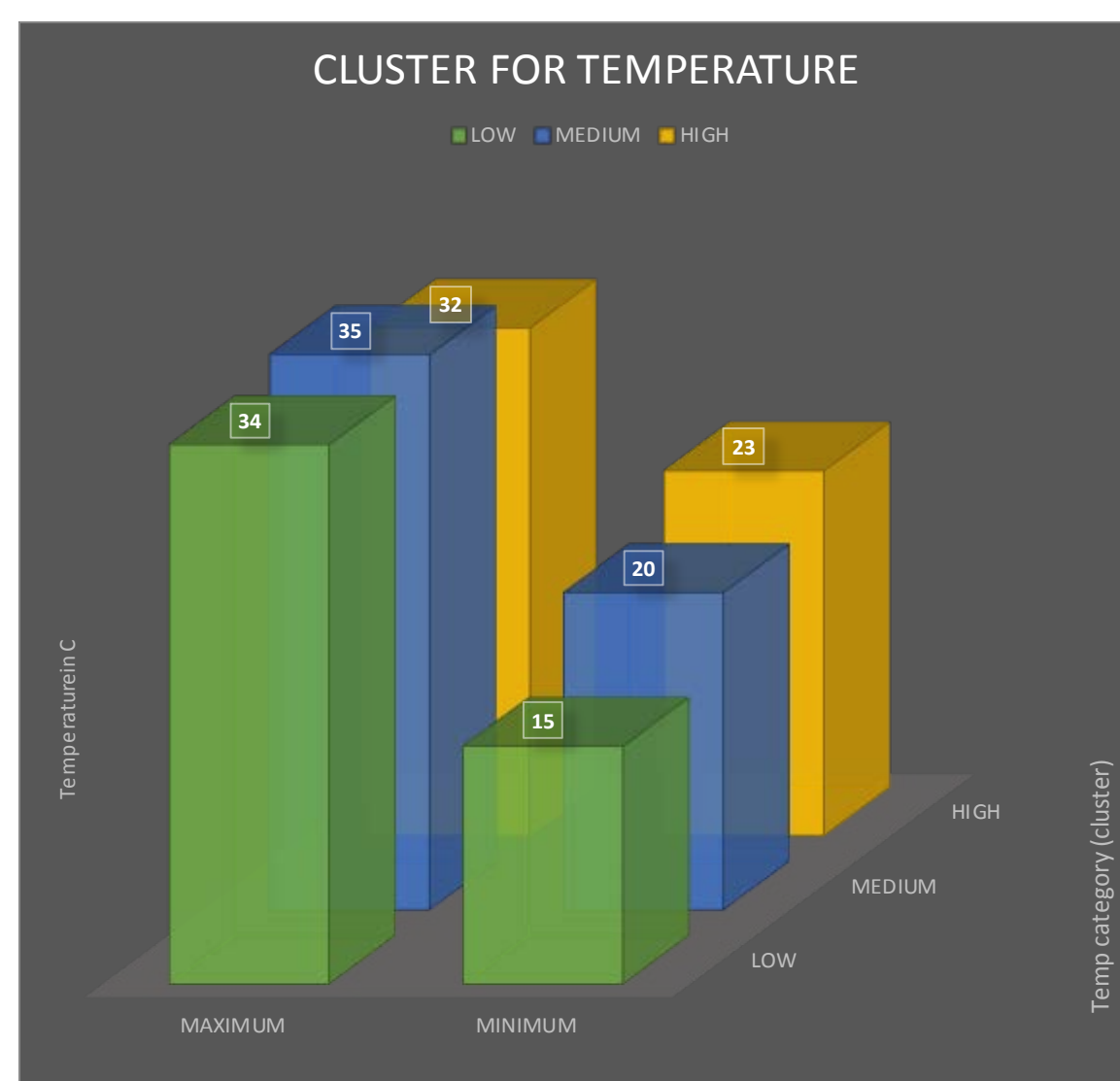
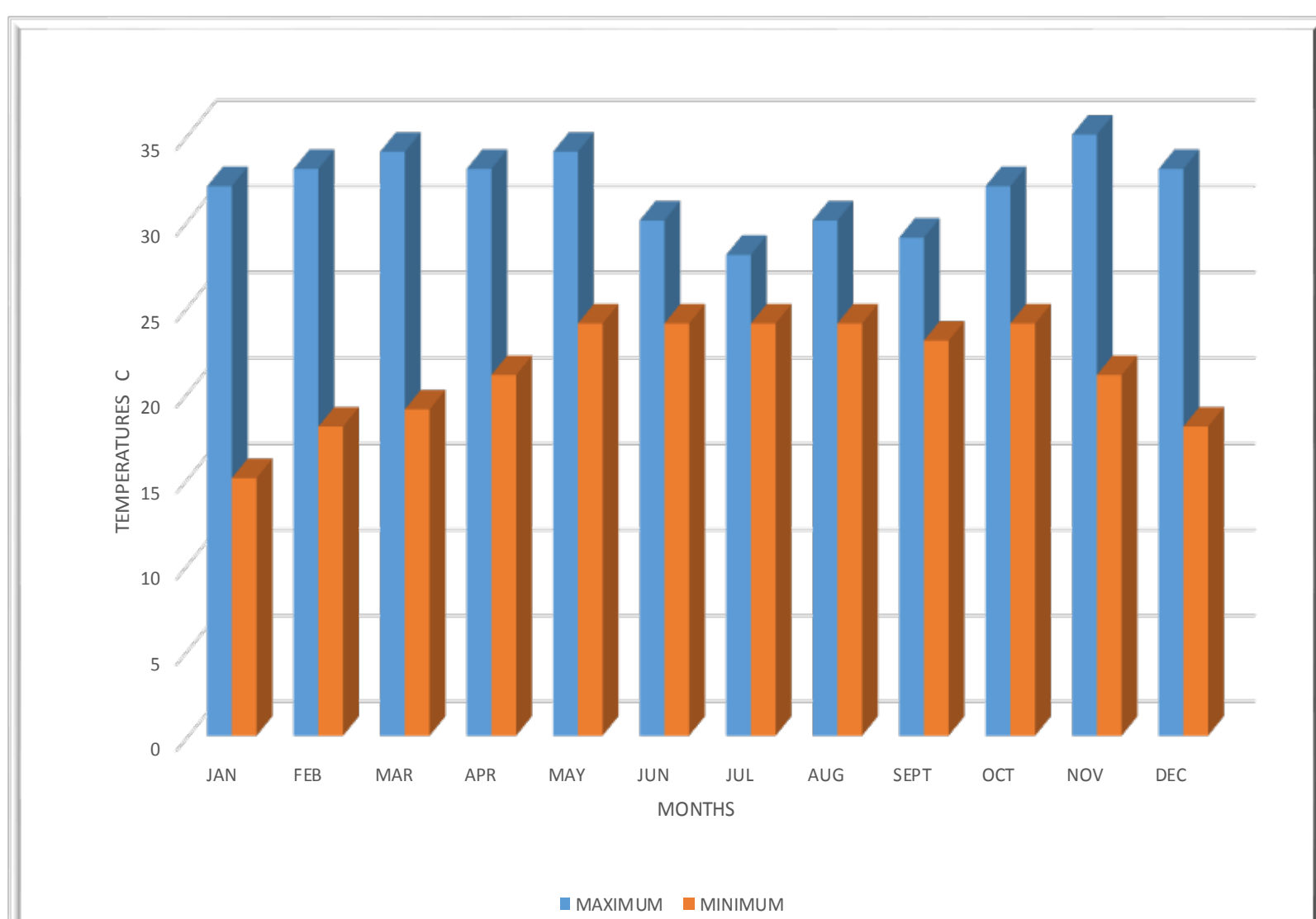
### Atmospheric temperature

Information using weather reports of the particular region with daily max and daily min temperature. Further make 3 clusters of categories varies from low level, medium level and high level temperatures.

### Analysis of association rules

Find out the rules will give an idea of which geographic location uses lower consumption or higher consumption of electricity.

## Model, Analysis and Results



- The framework of proposed data mining model is simple and easy to carryout clustering and association rule analysis consisting two modules
- Clustering module here used primarily is K-means clustering algorithm
- The number of clusters formed with respect to Sections 'Consumers clustering' and 'Atmospheric temperature clustering' are 3 and 8 respectively
- Association rule example:  
IF (River AND Farm, Near) THEN Electricity consumption (Medium OR Low)

## Conclusion

This data mining model is generalized and applicable to any area or city considering proximity to geographical and other man made features. The presented model is able to differentiate regions by their electricity consumption behavior using set of association rules. The innovative approach of this model is capability to handle large volume of data and performing area profile for planning residential area aiming electricity efficient living.

## Future Work

The semantic knowledge about geographic features closer to consumer's location helps to predict their electricity consumption behavior. Moreover, such patterns are helpful for prediction of electricity usage in such regions and town planning. Detailed consumer and regional profiling using GIS, GPS and remote sensing is helpful for prediction and demand analysis, theft and fraud detection, planning and growth in an electricity distribution network.