

# SOLVING NARROW-INTERVAL LINEAR EQUATION SYSTEMS IS NP-HARD

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*to my*

*MOTHER and FATHER*

*with love*

# Chapter 1

## Related Works

In this chapter I will describe what other works has so far been done to predict customer's future energy demand.

Predicting customer's energy demand is important because failure to predict the demand accurately can cause monetary and environmental loss.

For a single customer's energy demand prediction, some work have been done. Several machine learning algorithms have been applied to predict the future demand and to figure out which attributes have the most predictive power. In this methodology if we are to make prediction about  $n$  customers, we will have to have  $n$  different type of models which may be infeasible for a large value of  $n$ . But they don't tell what happens if there are different types of customers instead of a single type customer. Some works on demand prediction based on the aggregated population of an area has been done. In a wide area many types of customers may reside and their power demand may vary widely. This method fails to fine grain the customer according to their behavior. Some researchers have used prediction as a mean to cluster customer based on their energy usage behavior. They use a long history of the customer's energy usage and try to cluster customers based on the huge amount of dimensions. As we know using a lot of dimensions or attributes in machine learning may lead to the curse of dimensionality problem. Which is undesirable.

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