Statement of Purpose

Project Title: To develop a Machine Learning framework for electricity demand projection including peak demand in urban areas

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Project Summary:

This project focuses on developing a real-time electrical demand forecasting system for urban and semi-urban areas to accommodate significant load variations during different seasons as well as day and night cycles within a 24-hour window. The main objective is to build a time-series machine learning pipeline that accounts for weather effects such as temperature, humidity, wind speed, and precipitation, along with other influencing factors like public holidays, weekly holidays, natural load growth, renewable energy integration, and real estate development. The Supervisory Control and Data Acquisition (SCADA) and Automatic Meter Reading (AMR) data have been obtained from the Area Load Dispatch Center (ALDC), Ambazari, under the Maharashtra State Electricity Transmission Co. Ltd. (MSETCL). The developed model aims to accurately forecast electricity demand for multiple future horizons, ensuring grid stability and efficient energy management.

Motivation:

Rising demand, renewable integration, and shifting consumption patterns create new challenges for India's power sector. Reliable load forecasting is crucial for maintaining grid stability and minimizing imbalances between electricity demand and power purchase. Seasonal variations and the Duck-curve effect further emphasize the importance of accurate demand prediction. With the growing adoption of solar energy and evolving consumption behaviors, developing a robust forecasting system has become essential for effective power distribution planning.