

Preface

Buildings have a major impact on greenhouse gas emissions and energy consumption worldwide. According to a US Energy Information Administration survey, buildings are responsible for 30% of greenhouse gas emissions and 40% of energy use globally [1]. Therefore, lowering building energy use is crucial in promoting sustainability and mitigating climate change. Optimizing energy usage with cutting-edge technologies and data analytics, smart building, and energy management helps accomplish this goal. Buildings frequently incur high operating costs, with energy costs accounting for a large portion. Therefore, building owners and operators can lower energy expenditures by optimizing energy usage using short-term energy management approaches.

Besides helping the environment, short-term smart building energy management techniques also improve occupant comfort and productivity. It creates a more comfortable and productive indoor environment for occupants by optimizing building systems such as lighting, heating, and cooling. The primary goal of the thesis is to create models that can precisely forecast how much energy smart buildings will need. The analysis included a thorough examination of existing energy prediction techniques. This investigation has uncovered a few small holes or restrictions in the existing techniques, which could impact the forecasts' accuracy. For example, the current models might not consider all the pertinent variables that influence energy use, like weather variations, occupancy patterns, or shifts in the use of appliances.

A new model has been developed that considers the relevant factors and uses inno-

vative algorithms to get more accurate energy predictions in smart buildings. Various statistical, machine learning, and deep learning model approaches have been developed, and a new model was proposed using deep learning methods. These models are based on the latest algorithms and techniques in the field and have been validated through extensive testing and analysis. The performance of each model is then compared with one another to get the significance of proposing a new model that is accurate for smart building energy prediction, which can help optimize energy usage and reduce costs.