Smart Sage: IoT-Driven Home Automation Framework with Predictive Machine Learning

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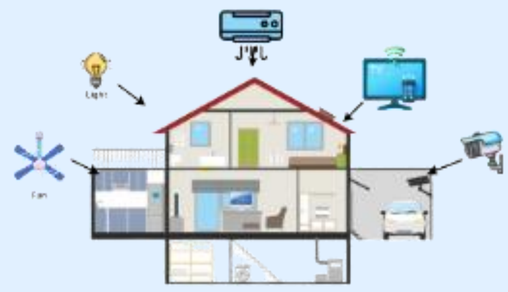
Overview

In the modern generation, the use of automation or AI has become an integral part of our lives. As a result, today it affects various aspects such as transportation and communication, communication, even starting from the rising of the sun every morning and household chores till sunset. Smart home apps are changing the standard of living of people and helping people to do any task very easily, considering this is our endeavor. Nowadays people are more and more attracted towards automation so this paper considers basically how to automate a home or office appliance using machine learning and Arduino Uno. Also, it measures the voltage of the electricity from them to give an idea or framework of what the future electricity demand might be for them.

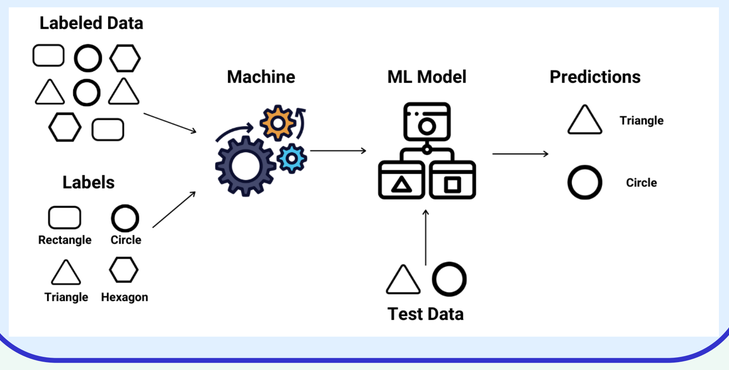
Introduction

The home self-regulation concept is growing in popularity for reducing human effort including errors and thus increasing efficiency. We can manage remote home appliances help of Home self-regulation. Over and above that, the home self-regulation system can also integrate other ardors like alarms, emergency systems, security, etcetera.

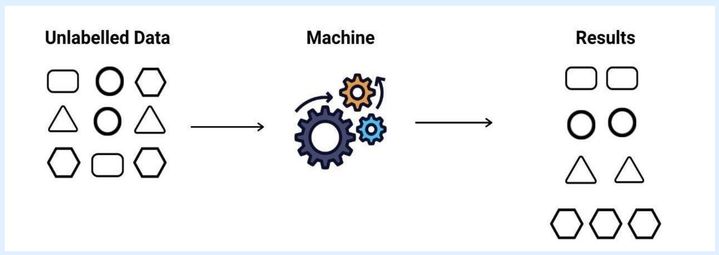


Prediction With Machine Learning

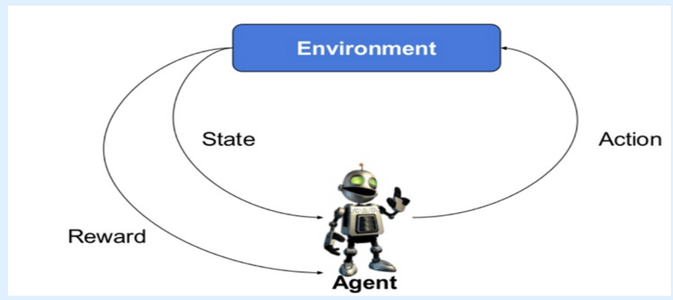
Supervised Learning



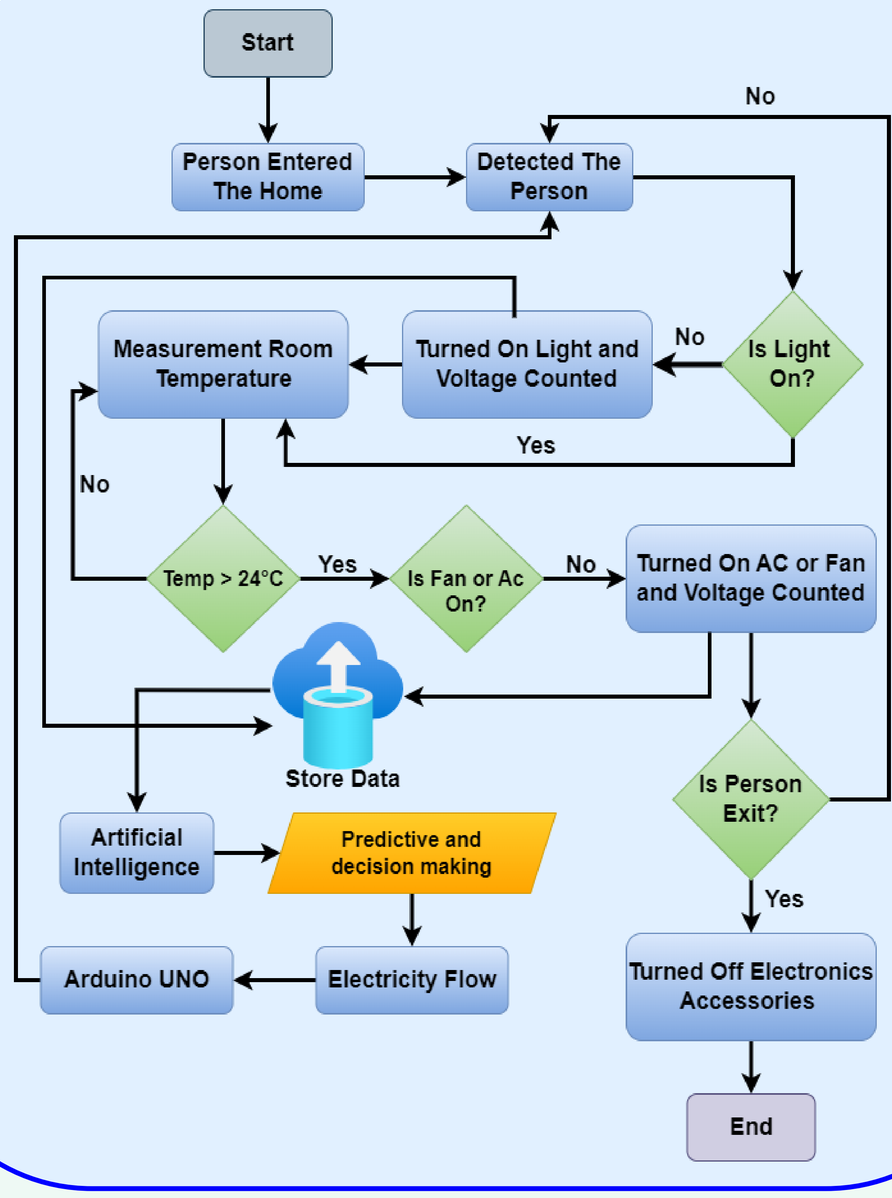
Unsupervised Learning



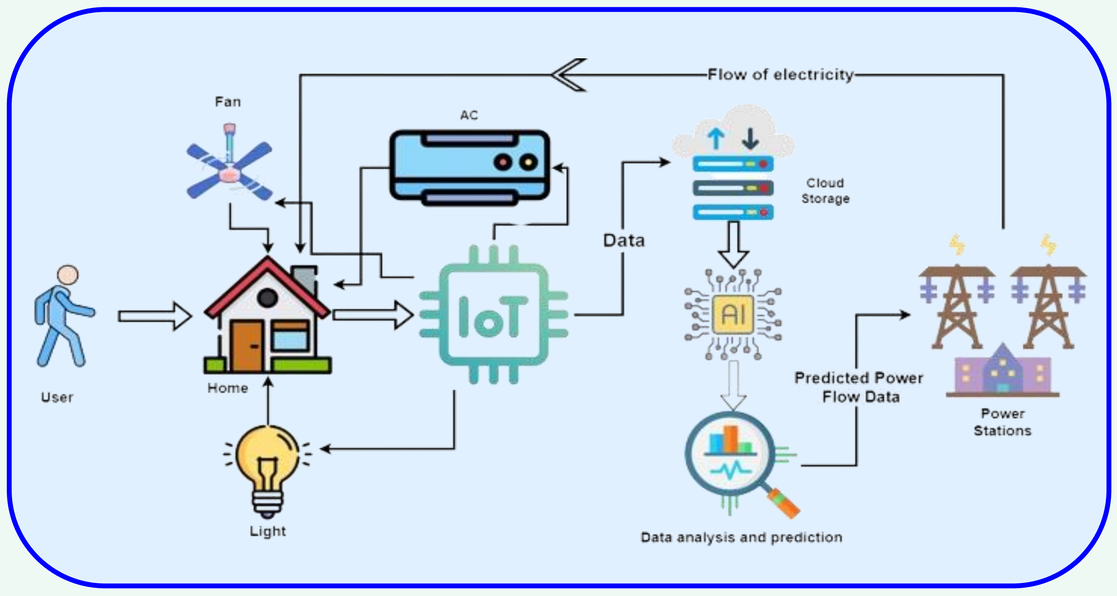
Reinforcement Learning



Data Flow Diagram of the Proposed System



Methodology of This System



Result and Analysis

Our proposed framework offers invaluable assistance in automating the tracking and control of the smart home environment. Leveraging a reinforcement learning algorithm, our system efficiently processes information to manage home equipment, enabling informed decisions for optimal functionality. Implementing this method yields successful identification of home appliance usage and monitoring data with precision.

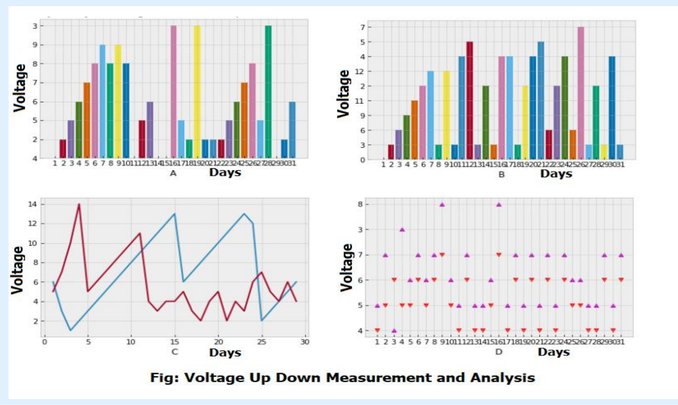
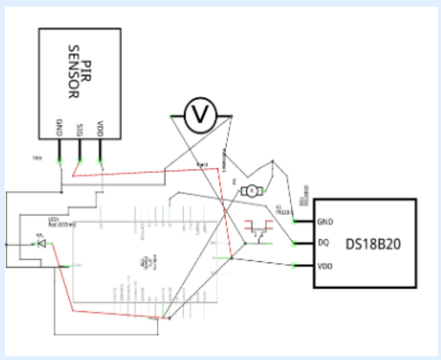
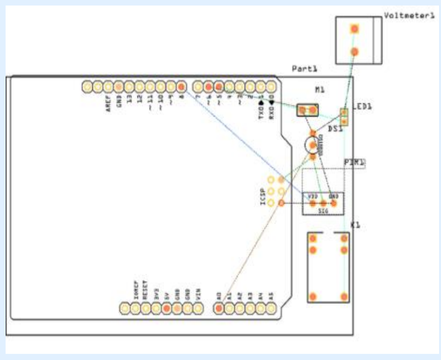


Fig: Voltage Up Down Measurement and Analysis

Schematic and PCB of Proposed system





Conclusion

Our project emphasizes low-power utilization via various sensors to augment smart home accuracy and efficiency. By effectively managing home devices, we optimize time and energy consumption, particularly in comparison to standalone or city-based stationary devices. Looking ahead, our system aims to integrate seamlessly with human activities, such as recognizing individuals entering the house, providing personalized interactions, and synchronizing household devices autonomously. This holistic approach promises to streamline home management effortlessly.