

Ideation Phase Brainstorm & Idea Prioritization Template

Date	19 September 2023
Team ID	9C05B58063F2C7CAA384F87D2AA8CF21
Project Name	Solar panel forecasting
Maximum Marks	4 Marks

Brainstorm & Idea Prioritization :

In pursuit of an impactful solar panel forecasting project, we propose a range of ideas. The first concept involves the creation of a user-friendly mobile application that offers real-time solar panel performance forecasts for homeowners, facilitating optimized energy consumption and storage. Additionally, we suggest developing a community-based solar energy sharing platform, allowing neighbors to share excess energy, with forecasts ensuring grid stability and fair sharing. For the agricultural sector, we can build a tool that predicts solar energy availability, enabling farmers to optimize irrigation, livestock management, and crop planting. Furthermore, a disaster preparedness forecasting model can predict extreme weather event impacts on solar energy production, aiding in emergency planning and relief efforts. Implementing a solar energy trading marketplace where owners can buy and sell excess energy, guided by forecasts, is another valuable option

Step-1 Select the Problem Statement

1

Define your problem statement

Accurate forecasting of solar panel energy production is critical for optimizing energy utilization, reducing maintenance costs, and enhancing sustainability. The intermittent nature of solar energy generation due to varying weather conditions necessitates a solution that can predict energy output reliably. We aim to develop a solar panel forecasting system that provides real-time and future energy production estimates. This system will facilitate efficient energy consumption, proactive maintenance planning, and informed grid integration. The challenge is to create a highly accurate forecasting model that factors in weather conditions, historical performance data, and system-specific attributes, thereby ensuring the optimal use of solar energy systems and minimizing their environmental impact

Step-2: Brainstorm, Idea Listing and Grouping

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

Yuvasri

Data Collection:

Collect historical weather data, including irradiance (solar radiation), temperature, and cloud cover.
Gather historical solar panel performance data, considering factors like degradation over time.

Machine Learning Models:

Develop machine learning models (e.g., linear regression, random forest, neural networks) to predict solar panel output based on historical data.
Explore models that can consider not only historical data but also real-time weather and atmospheric conditions.

Weather Forecast Integration:

Integrate weather forecast data from reliable sources to improve short-term predictions. This can help anticipate sudden changes in solar panel output due to weather conditions.
Anomaly Detection:

Liyashini

Anomaly Detection:

Implement anomaly detection algorithms to identify and account for sudden and unexpected drops in energy production, like cloud cover or heavy rain.

Time-Series Analysis:

Use time-series analysis to detect and predict daily and seasonal patterns in solar panel output.

Hybrid Models:

Combine different models, including physical models based on the PV system specifications and machine learning models, to improve forecasting accuracy.

Sarmila

Cloud Cover Prediction:

Develop cloud cover prediction models that can provide more accurate short-term forecasts by using cloud imaging or satellite data.

User Interface:

Create a user-friendly dashboard or web application to display forecasts, actual production, and system health in real-time.

Optimization:

Integrate the forecasting model with optimization algorithms to manage energy storage, consumption, and grid interaction to maximize self-consumption and reduce costs.

Anusiya

Data Visualization:

Use data visualization techniques to present the forecasts and historical performance data to end-users or operators.

Maintenance Predictions:

Develop predictive models for solar panel maintenance based on historical data to reduce system downtime.

API Integration:

Make the forecasting model accessible through APIs for easy integration with other systems and automation.

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

20 minutes

Solar Panel Maintenance

Forecasting:

Create a predictive model that forecasts when solar panels may require maintenance or cleaning based on historical performance data and local environmental conditions. This can help reduce downtime and ensure optimal

Solar Energy Pricing

Forecast: Create a tool that forecasts electricity prices and aligns solar energy production with peak pricing periods, allowing users to sell excess energy at higher rates or optimize consumption during low-cost periods.

Energy Storage

Optimization: Develop a forecasting model that predicts energy production and consumption, allowing for optimized control of energy storage systems (e.g., batteries) to maximize self-consumption and grid interactions.

Demand Response

Forecasting: Predict energy demand fluctuations and provide forecasts to grid operators and consumers, enabling them to adjust their energy consumption patterns in response to varying solar energy production.

Environmental Impact

Assessment: Create a tool that forecasts the environmental impact of solar panel systems, considering factors such as reduced carbon emissions and energy savings over time. This information can be valuable for sustainability reporting and decision-making.

Solar Energy Investment

ROI: Develop a forecasting tool that estimates the return on investment (ROI) for potential solar panel installations, considering location-specific data, electricity prices, and government incentives.

Step-3: Idea Prioritization

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

