



SMART POWER PANEL - AMPERAC



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Prototype Design

Outer Interface



The Problem

Households and commercials face a problem with the inability to monitor and manage their electricity consumption. So, for homeowners and businesses seeking to lower their electricity expenses, AMPERAC offers an electricity monitoring system that helps users control electricity expenditures at an affordable price. Unlike competitors, AMPERAC is cost effective and easy to install.

How We Met the Specifications?

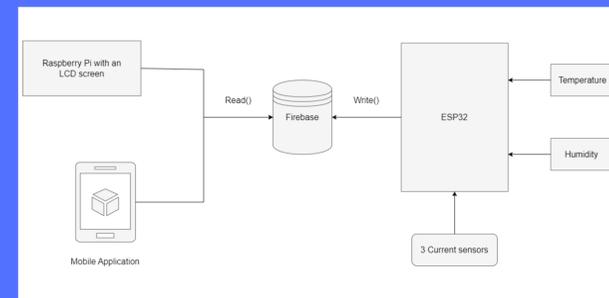
We reached a product cost of 913.4 SAR, which is below our planned range of 2-3K.

We reached a metering accuracy of 97% by using an ammeter as a reference, Our goal is to reach 90%.

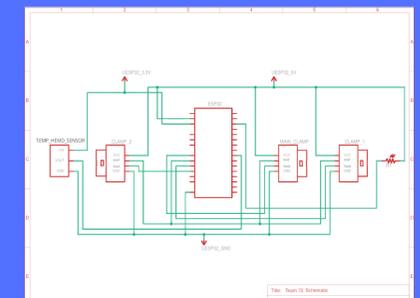
Obtained a forecasting accuracy of 89.6% using the advanced neural network model, the target is 70%.

If parts are available, the maintenance duration is lower than 30 mins due to our non-intrusive design.

System Architecture



Circuit Schematic



Impact of Our Product

- Economical: Controlling electrical bills.
- Societal: Raises awareness on conservation.
- Environmental: Reduction of carbon-footprint.

Facing the Constraints

- Simplified design for the core functionalities.
- Lower power levels.
- Budget focuses on essential features.
- Compact and portable design.
- Adhering to laws, standards, and regulations.
- 15-week development timeframe.

Our Specifications

- Overall cost with a range of 2K-3K SAR.
- Metering accuracy higher than 90%.
- Forecasting accuracy higher than 70%.
- Maintenance duration lower than 30 mins.

Conclusions and Future Work

A device that:

- Shows detailed electrical bills.
- Simplify monitoring and controlling consumption.
- Has a low cost and low maintenance.
- Forecasts future consumption and bills.
- Measures temperature and humidity for safety.
- Has an informative application and outer UI.

Future work:

- Add a demand scheduling feature using AI.
- Arc-flash warning sensor.
- Online controlling.

Hardware Part



Application



Forecasting Model

