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Plug&Save

Your Energy, Your Control

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OVERVIEW

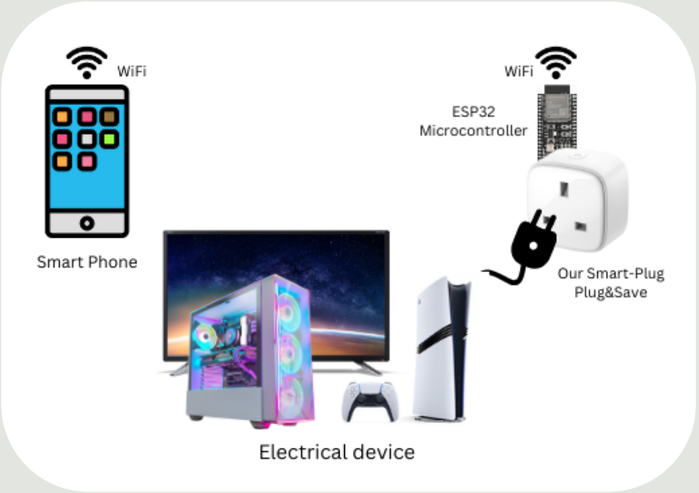
- Problem
- Recommended Solution
- Objectives
- Data Gathering Techniques
- Interface
- Literature Review
- Diagrams

PROBLEM

The problem that our project aims to solve, there is a lot of old electricity devices around the world, and to change these devices with a new one its will cost a lot of money. Also there is no way to monitor the electricity and money consumption for each device individually, and setting a limit of consumption for each device. so here we present out product plug&save.

RECOMMENDED SOLUTION

Implement a smart plug that transforms old devices into smart one to provide users with information about electricity consumption. Additionally, we will develop an app that allow users to control the smart plug and monitor consumption in real time.



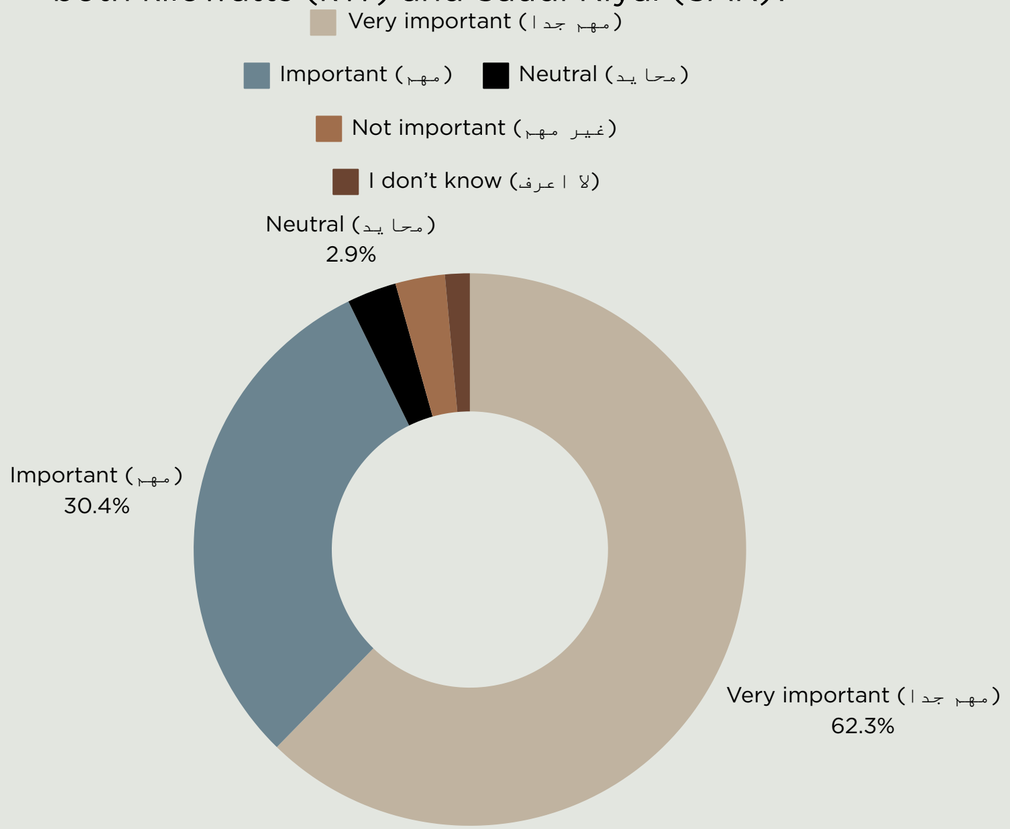
DATA GATHERING TECHNIQUES

To better understand users needs and expectations about our project, we decided to conduct a survey we received about 69 responses from potential users over three days. The survey aimed to collect feedback about how important our project is, usefulness, and potential adoption of the device. These responses provide us with a valuable view of user preferences, behaviors and features they consider to be important. The feedback was very helpful to us in refining our project to better align with user expectations.

RESULT

In the first question, we asked how important it is to monitor electricity in both kilowatts (kW) and Saudi Riyals (SAR). Most users say it is very important or important, and this fits well with our project’s goal to give users a clear view of their electricity consumption.

ما مدى أهمية مراقبة استهلاكك للكهرباء بالكيلوواط وبالريال السعودي برأيك؟
How important do you think to monitor your electricity usage in both kilowatts (kW) and Saudi Riyal (SAR)?

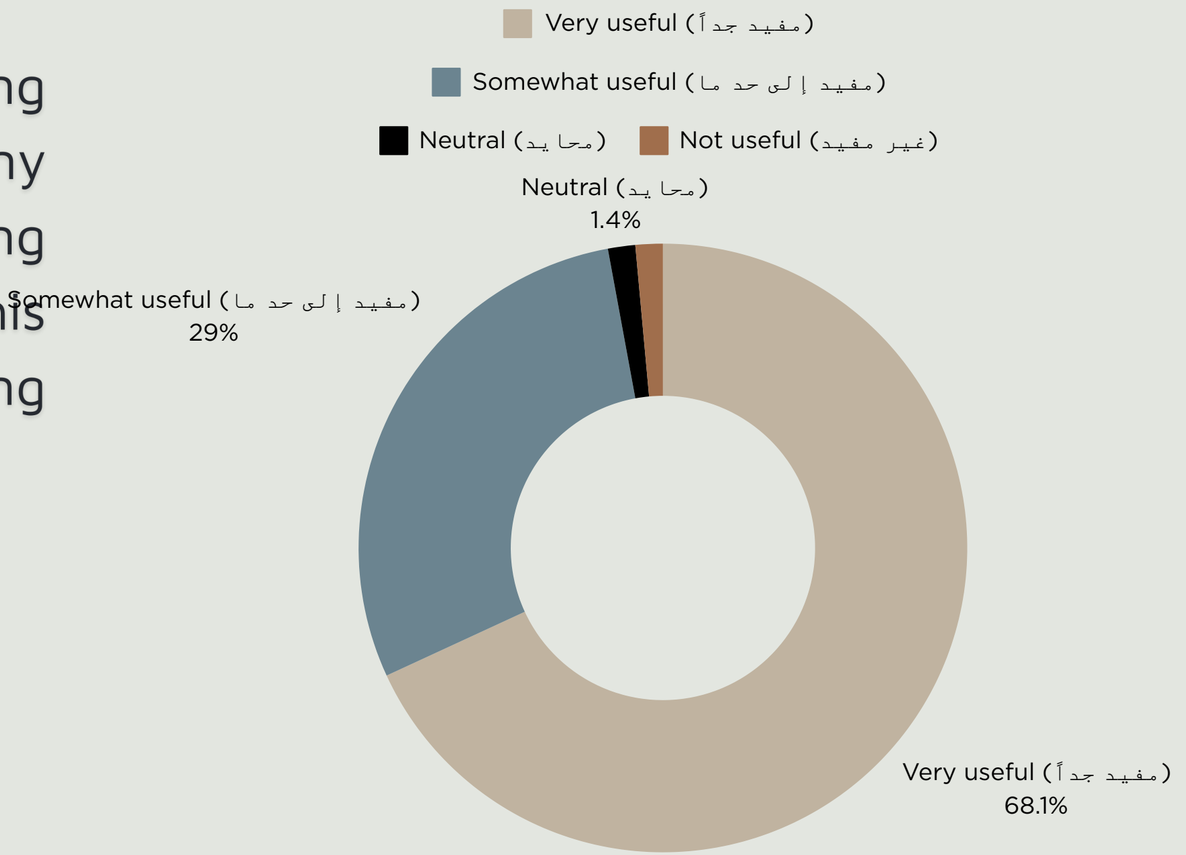


RESULT

And when we asked users about getting periodic reports on device consumption, many said they find this helpful for improving energy usage and saving money. And this shows how important our app’s reporting feature will be.

ما مدى فائدة تلقي تقارير دورية توضح استهلاك الأجهزة في تحسين كفاءة الطاقة وتوفير المال؟

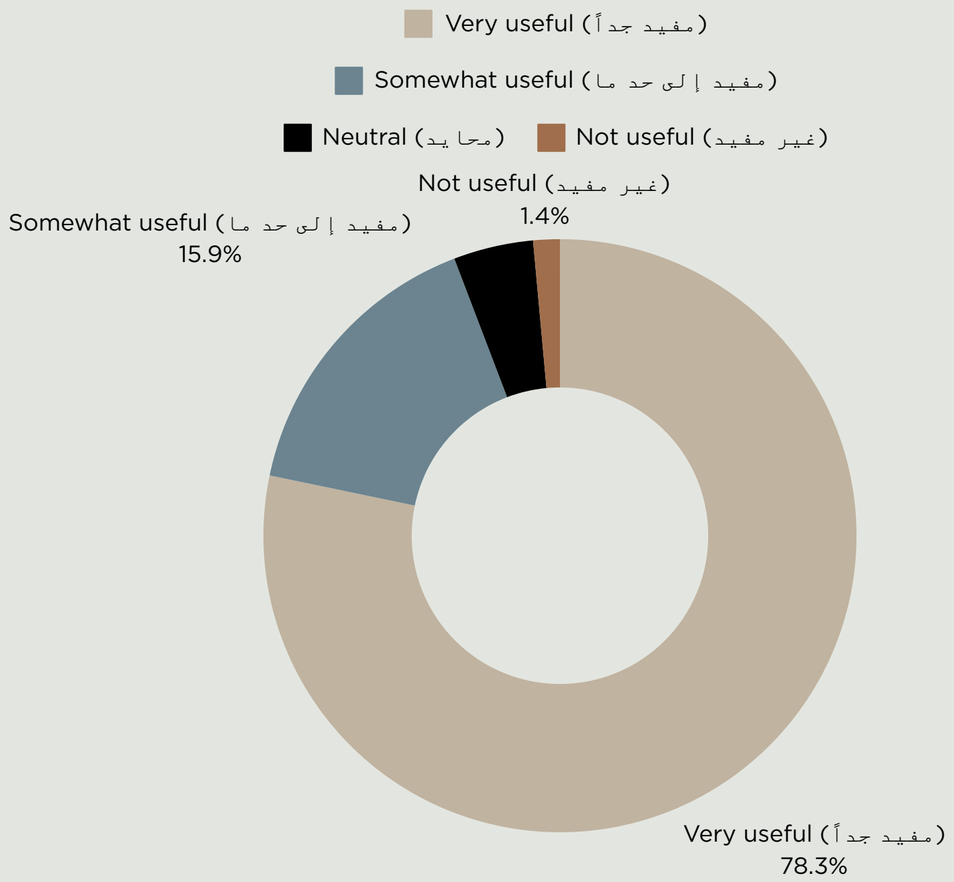
How helpful do you think to receive a periodic reports that show devices consumption appliances in improving energy efficiency and saving money?



RESULT

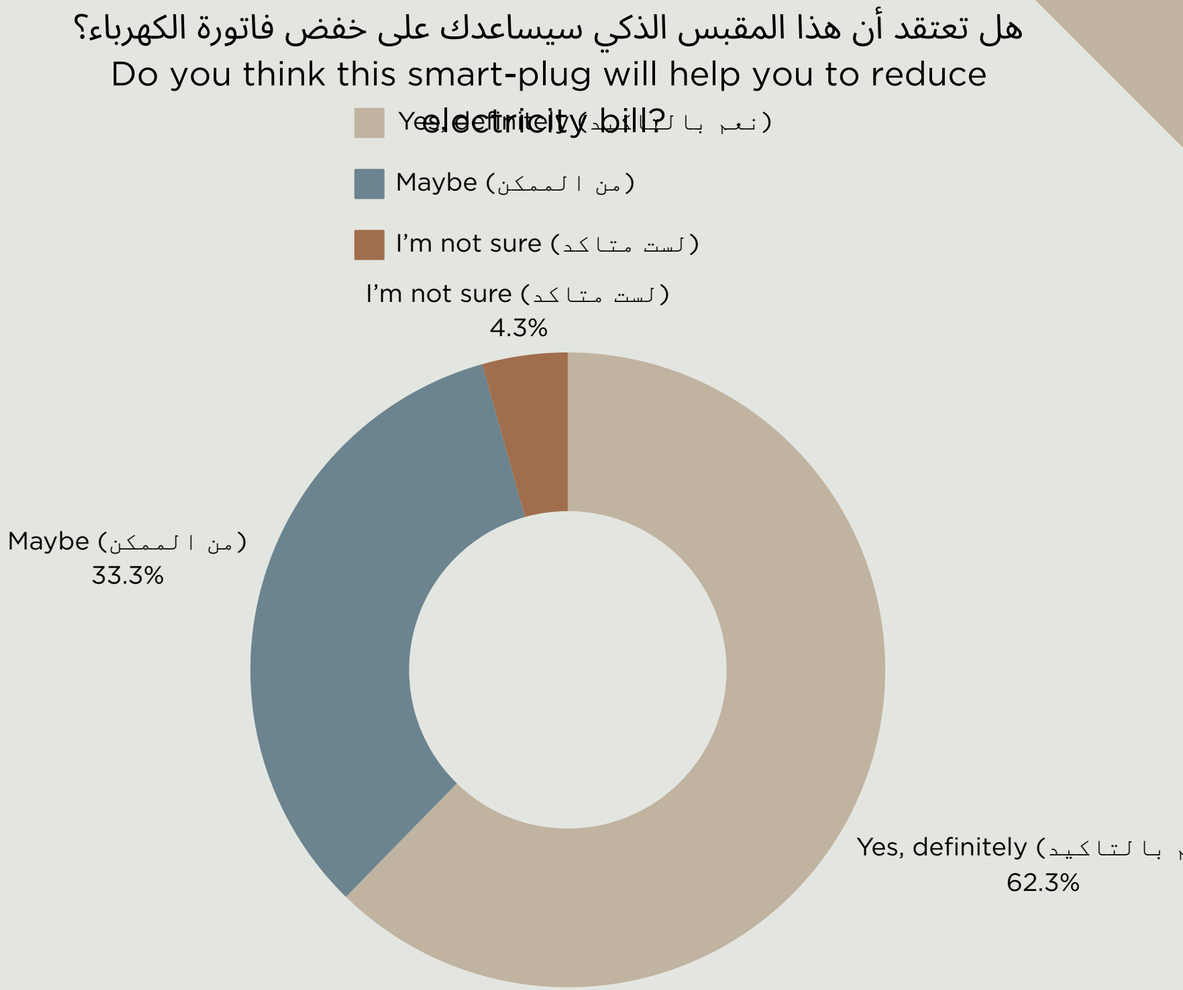
We then looked into how useful users found the idea of monitoring their electricity consumption through a mobile app. and most of the responses said it’s very useful.

هل تعتقد أنه من المفيد مراقبة وتتبع استهلاك الكهرباء باستخدام تطبيق الهاتف المحمول؟
Do you think it is useful to monitor and track electricity consumption using a mobile app?



RESULT

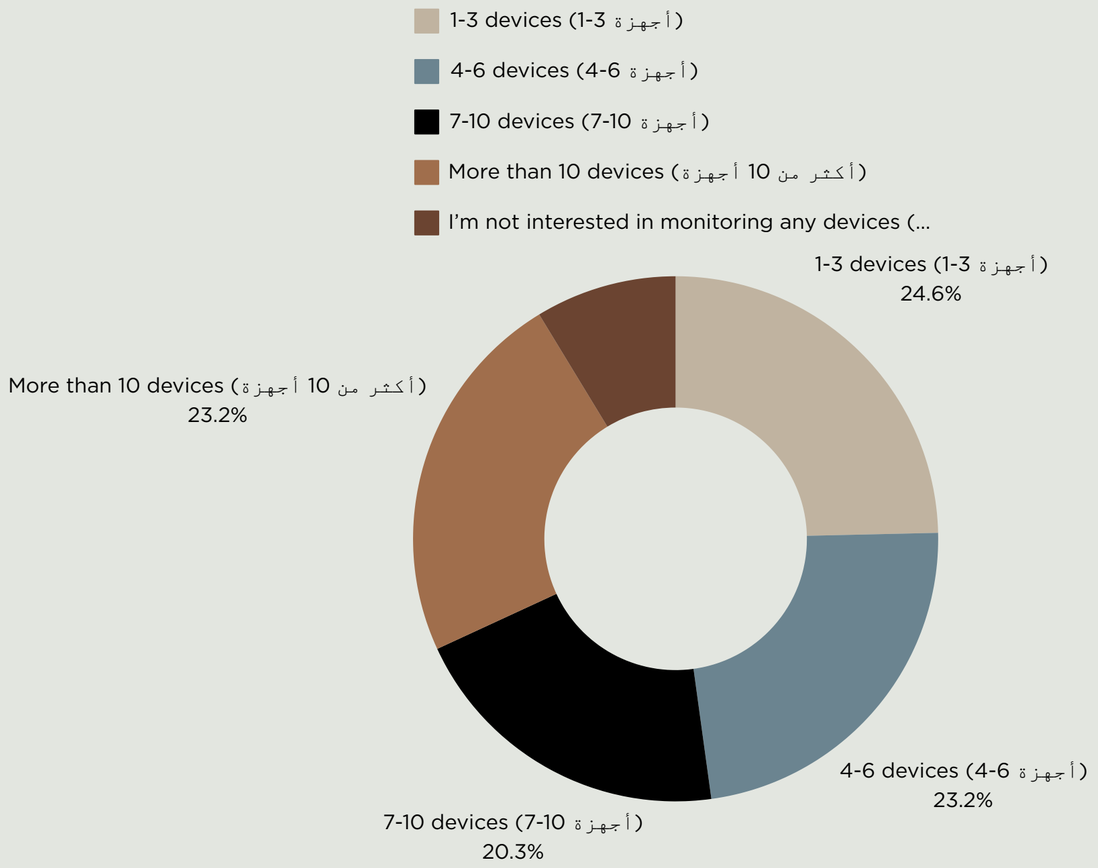
Next, we wanted to know if the user they thought the smart plug would help reduce their bills, and most agreed 33.3% said maybe and 4.3% said they are not sure with no one said No.



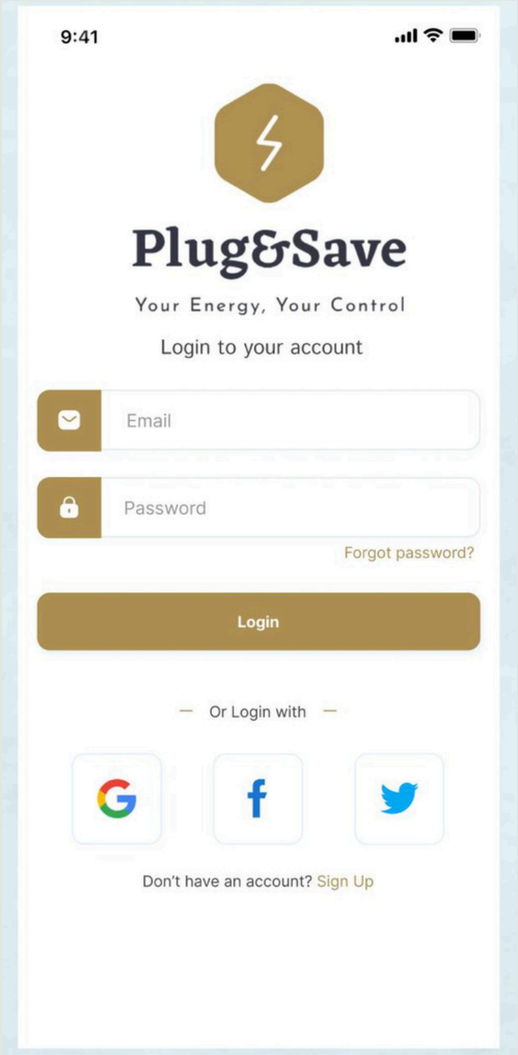
RESULT

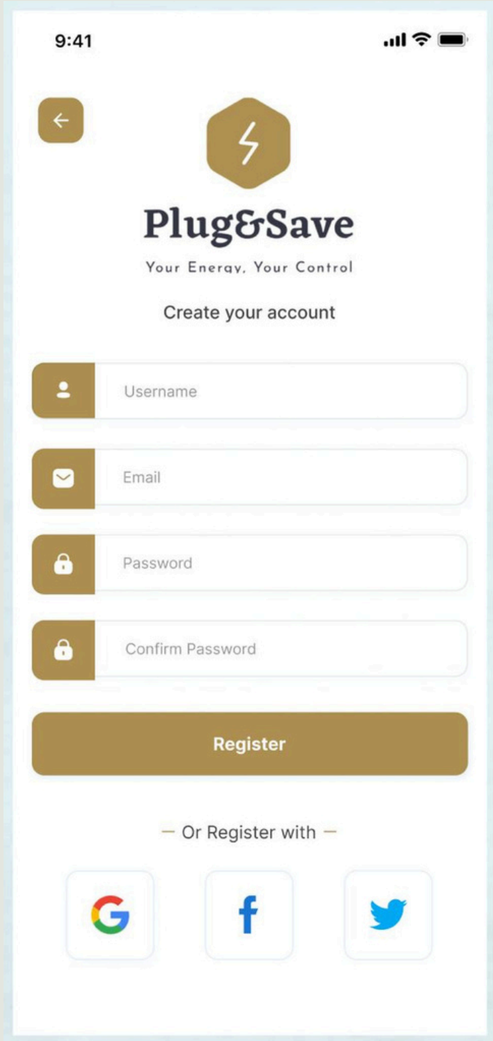
Finally, we asked users how many devices they would want to monitor. The results showed that 8.7% were not interested in monitoring any devices. Among those who were interested, the preferences were as follows: 25.6% would like to monitor 1-3 devices, 23.2% preferred 4-6 devices, 20.3% wanted to track 7-10 devices, and 23.2% indicated that they would like to monitor more than 10 devices.

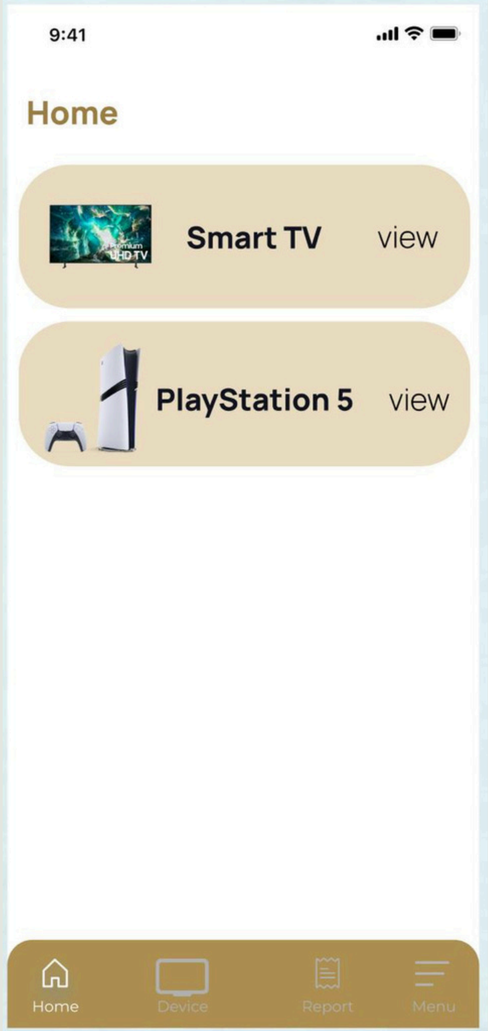
كم عدد الأجهزة في منزلك التي يجب عليك مراقبة استهلاكها للكهرباء؟
How many devices in your home you have to monitor their electricity usage?



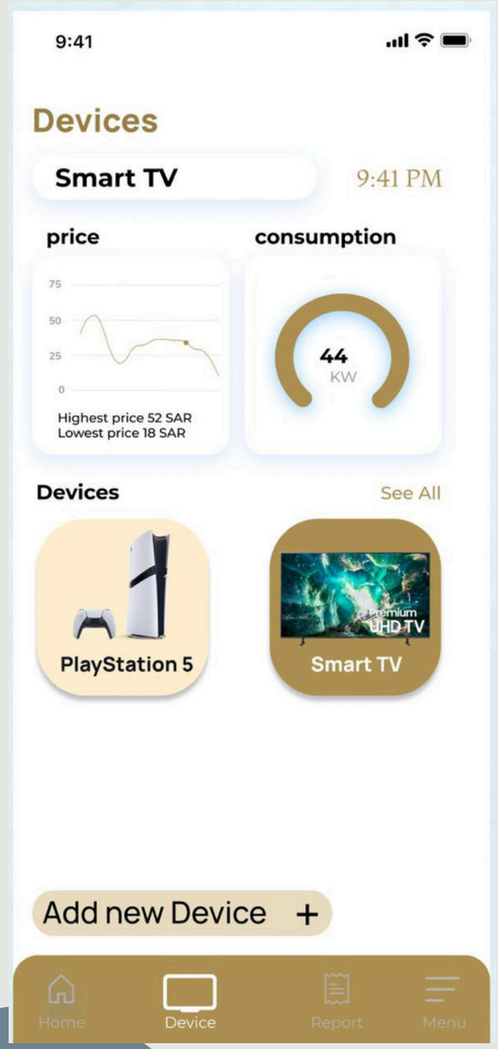
INTERFACE

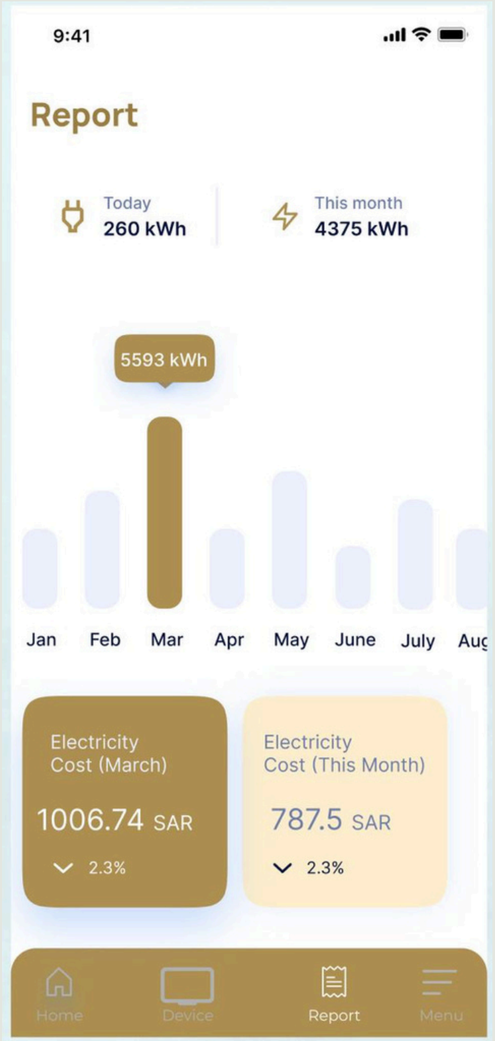

9:41
Plug&Save
Your Energy, Your Control
Login to your account
Email
Password
Forgot password?
Login
— Or Login with —
Don't have an account? Sign Up


9:41
Plug&Save
Your Energy, Your Control
Create your account
Username
Email
Password
Confirm Password
Register
— Or Register with —


9:41
Home
Smart TV
view
PlayStation 5
view
Home
Device
Report
Menu

INTERFACE


9:41
Devices
Smart TV
9:41 PM
price
consumption
75
50
25
0
Highest price 52 SAR
Lowest price 18 SAR
44
KW
Devices
See All
PlayStation 5
Premium
UHD TV
Smart TV
Add new Device +
Home
Device
Report
Menu

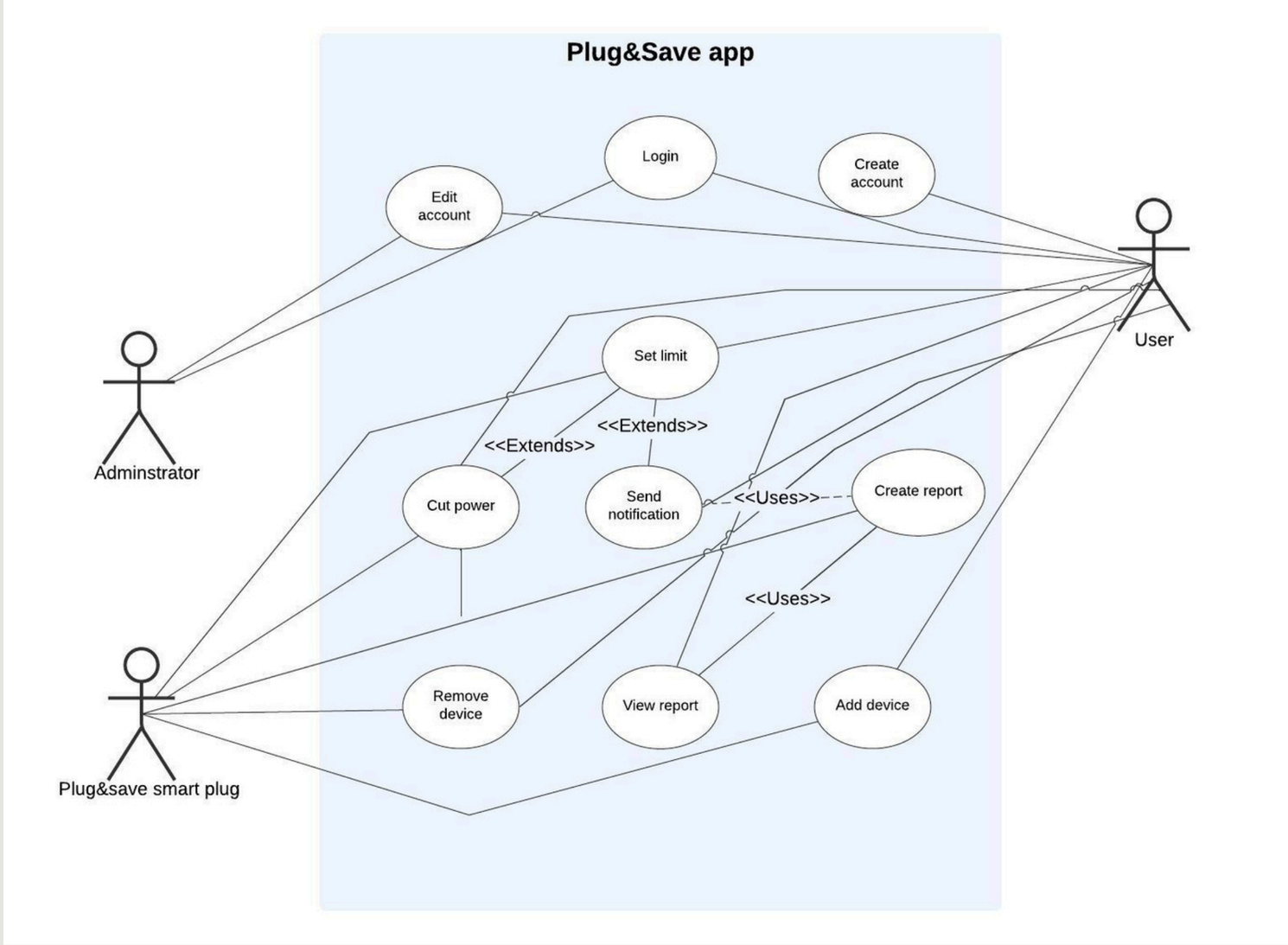

9:41
Report
Today
260 kWh
This month
4375 kWh
5593 kWh
Jan
Feb
Mar
Apr
May
June
July
Aug
Electricity
Cost (March)
1006.74 SAR
2.3%
Electricity
Cost (This Month)
787.5 SAR
2.3%
Home
Device
Report
Menu

LITERATURE REVIEW

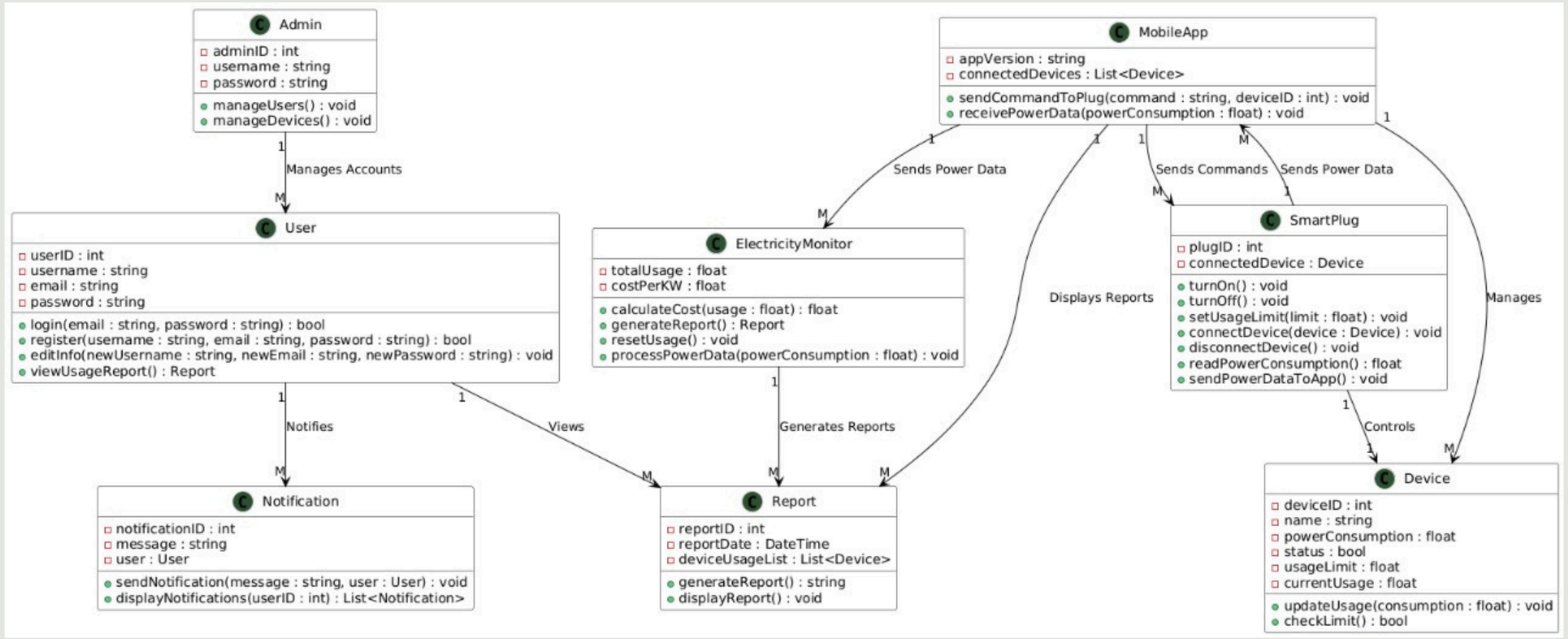
Topic title	Relevance	Advantages	Disadvantages
An IoT-Based Smart Plug Energy Monitoring System	provides insight on how to use IoT to establish real time electricity monitoring	• real time electricity monitoring • efficient and low cost	• poor UI experience • lacks setting a consumption limit
IoT-Enabled Energy Management System for Smart Homes	it aligns with the detailed power consumption reports our product offers	it discusses how power consumption trackers can be integrated with smart homes	the system in this paper requires expensive hardware to be deployed effectively
Design and Implementation of a Low-Cost Smart Plug for Energy Saving	it gives more inspirations on how to make our product more cost effective	• low cost design • includes users feedback function	it focuses more on being cost effective while neglecting the consumption tracking feature

DIAGRAMS

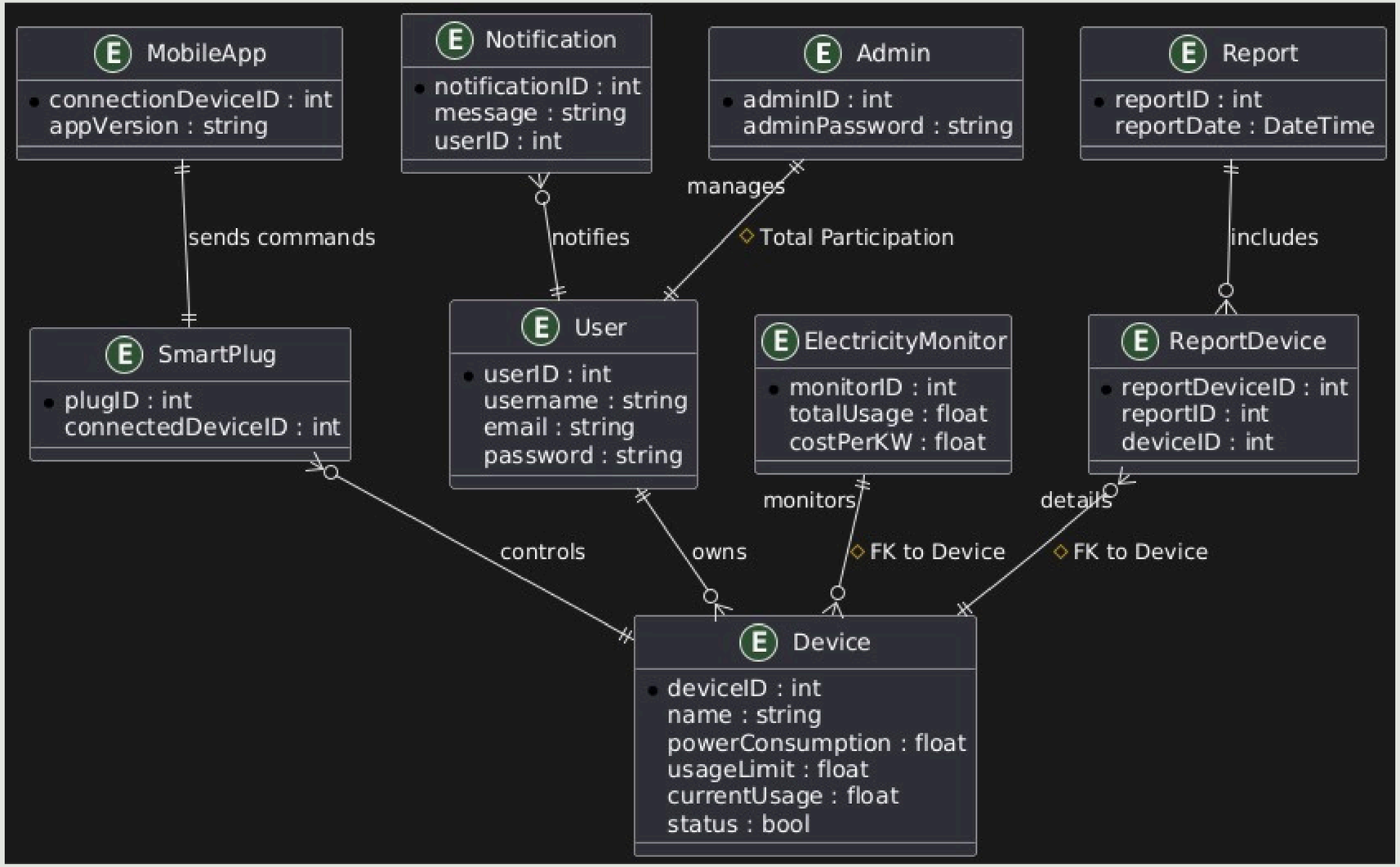
USE CASE DIAGRAM



CLASS DIAGRAM



ER DIAGRAM


MobileApp
connectionDeviceID : int
appVersion : string
Notification
notificationID : int
message : string
userID : int
Admin
adminID : int
adminPassword : string
Report
reportID : int
reportDate : DateTime
sends commands
notifies
manages
Total Participation
includes
SmartPlug
plugID : int
connectedDeviceID : int
User
userID : int
username : string
email : string
password : string
ElectricityMonitor
monitorID : int
totalUsage : float
costPerKW : float
ReportDevice
reportDeviceID : int
reportID : int
deviceID : int
controls
owns
monitors
details
FK to Device
FK to Device
Device
deviceID : int
name : string
powerConsumption : float
usageLimit : float
currentUsage : float
status : bool

Thank You

For your attention