Low fidelity UI prototype

Introduction

Following the conclusion of our last document (Design Research), we present the design process leading to the creation of the low fidelity UI prototype for the Soblotix app. The focus of the UI prototype is to best represent the main requirements of the app. This was achieved by conveying information clearly and in a useful way, while also providing intuitive navigation. Work has also been done for the responsiveness of the UI for Desktop, tablets, and mobile devices.

ℹ The prototype can be accessed by clicking the link https://www.figma.com/proto/AkavL2MDykyRgkgO5efHf4/Solbotix-2?page-id=5104%3A67530&node-id=5147%3A74257&viewport=-1573%2C1045%2C0.45&scaling=scale-down&starting-point-node-id=5147%3A74257&show-proto-sidebar=1.

Requirements

In summary, the requirements that the prototype accounts for are as follows:

- Display all the robot's status and battery level
- Allow for the addition of robots
- Display information about the park (e.g., name, panel and robot count, useful graphs)
- Allow inspection of robot
- Display inspected robot's information (e.g., status, battery level, location, sensor data)
- Allow basic robot commands (clean, charge, park, move, stop)
- Allow editing of the robot's RPM and ID
- Display camera feed
- Account for future function addition (e.g., user login, robot editing, robot logs, notifications, job queues)
- The product is a web app for desktop, tablets, and mobile
- AK: how about keeping history of key analytics, ie distance covered, area cleaned, avg speed, avg. cleaning performance (m2 / hour). Longer term we could compare KPIs across robots, customers, geographies, dust types, panel OEMs etc - we could even keep historic data on events like sandstorms, malfunctioning panels etc - perhaps not for MVP , but for future versions…

Our approach

We chose the material design framework for the prototype, as it proved to be effective in similar apps, making it a safe choice. It is also a good fit for our prototype as it conveys information clearly thanks to its minimalism. In addition, stylizing the prototype wasn't our focus, so we appreciated the facilitation of material's library and its more neutral style.

For the layout of the page, we chose to put components in boxes of varying sizes, this can help us organize different kinds of information and graphs, account for components added in the future (by simply adding a box) and can also help with the responsiveness of the page.

For displaying the robot's status and battery the best approach we found is through a table with filters. The filters are useful because the table would be populated by hundreds of robots. We iterated though different versions of the table to visualize information effectively and help the user scan each item.

We displayed 2 graphs on the main page which present general information on the status and battery of robots. Their role is mostly indicative, they show how the layout would accommodate graphs and what direction their style could take (simple and attractive). Nevertheless, they accompany the table well.

General information about the park is accompanied by a picture and is found on the bottom of the page, as it is not as important and doesn't change often.

The header is comprised of the Solbotix logo, the app's name, and a user icon which would trigger the login functionality in the future.

If the user clicks on a table's record s/he will be redirected to the main robot's page. The page includes:

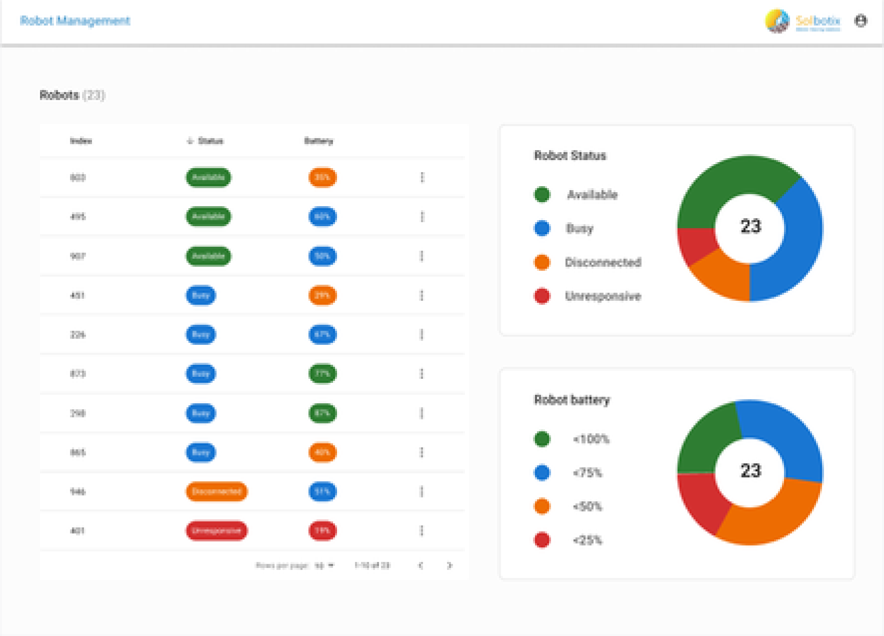
1. The basic robot's functionalities.
2. A camera feed.
3. A panel that represents the position of the robot on the solar panel (the user could move the robot by using the left/right arrows.
4. Multiple diagrams/metrics.

The most important component is the panel that gathers the robot's commands. They are mainly buttons and they stand out thanks to their size and teal color.

A lot of information displayed on the prototype is indicative, what information Solbotix will have access to and which information is important for solar park employees will be defined in the future.

First iterations

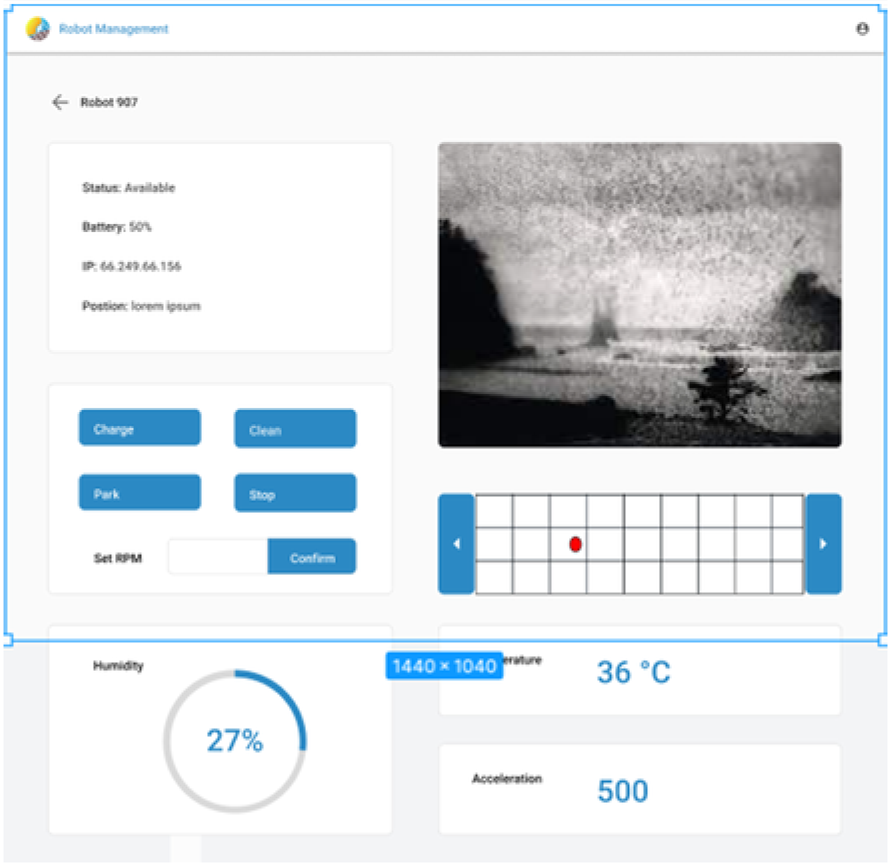
After sketching simple user flows and wireframes we proceeded to create the prototype in Figma. Our first iterations are shown below. As the platform of choice was the desktop, we started creating the UI in a 1440 pixels wide and 1040 pixels long frame. For the main page, we made heavy use of color for both the status and the battery, and we found it to be overwhelming for the user. For the robot screen things were more straightforward, buttons stand out and are consistent, components appear in an order that makes sense and there is plenty of empty space.



Robots (23)

Index	↓ Status	Battery	
603	Available	35%	⋮
495	Available	60%	⋮
907	Available	50%	⋮
451	Busy	29%	⋮
226	Busy	67%	⋮
873	Busy	77%	⋮
298	Busy	87%	⋮
865	Busy	40%	⋮
946	Disconnected	51%	⋮
401	Unresponsive	19%	⋮

Rows per page: 10 ▾ 1-10 of 23 ‹ ›



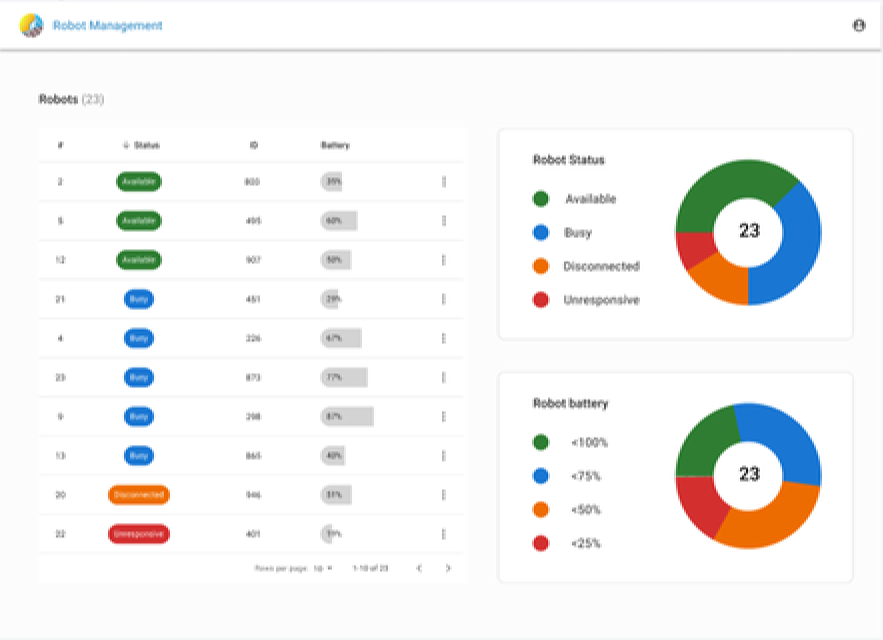
Status: Available

Battery: 50%

IP: 66.249.66.156

Postion: lorem ipsum

We corrected the main page by putting progress bars for battery levels, this way the information for each row can be perceived instantaneously. We also tried a different order for the columns, added the general park information on the bottom, and the add robot button above the table. We displayed a different graph for battery levels to better distinguish between the two, also we settled on the logo being on the left side of the header. For the robot page we found it redundant for the user to scroll down for metrics, so we made better use of space for every component to fit in the page.

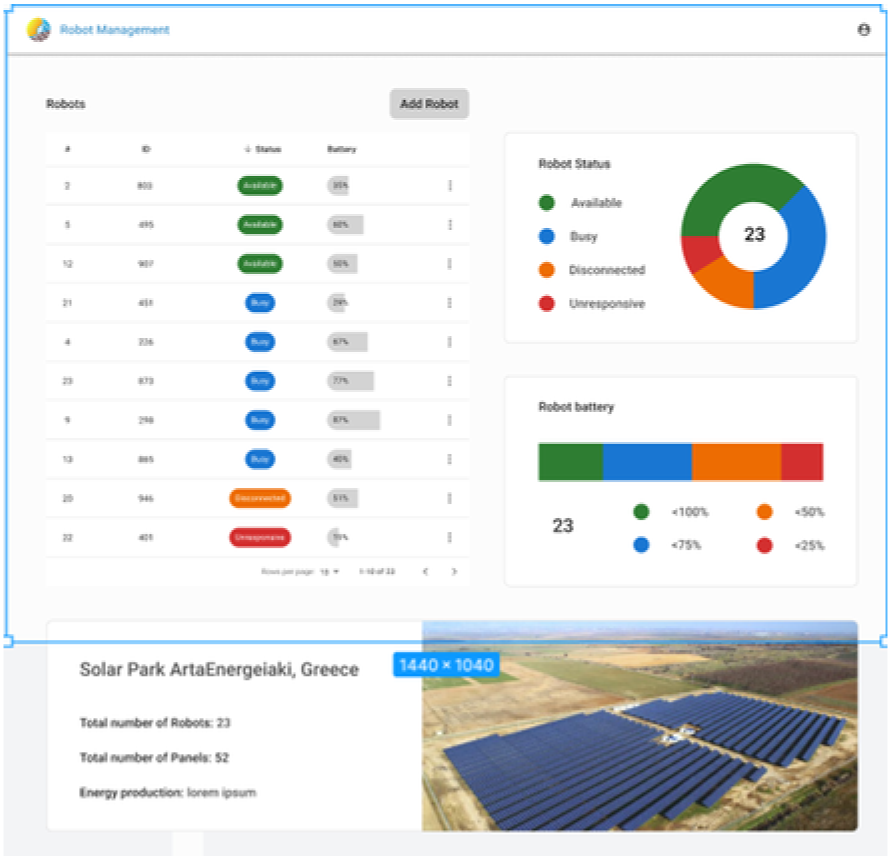


Robot Management

Robots (23)

#	↓ Status	ID	Battery	
2	Available	803	35%	⋮
5	Available	495	60%	⋮
12	Available	907	50%	⋮
21	Busy	451	29%	⋮
4	Busy	226	67%	⋮
23	Busy	873	77%	⋮
9	Busy	298	87%	⋮
13	Busy	865	40%	⋮
20	Disconnected	946	51%	⋮
22	Unresponsive	401	19%	⋮

Rows per page: 10 ▾ 1-10 of 23 ‹ ›



Robot Management

Robots

Add Robot

#	ID	↓ Status	Battery	
2	803	Available	35%	⋮
5	495	Available	60%	⋮
12	907	Available	50%	⋮
21	451	Busy	29%	⋮
4	226	Busy	67%	⋮
23	873	Busy	77%	⋮
9	298	Busy	87%	⋮
13	865	Busy	40%	⋮
20	946	Disconnected	51%	⋮
22	401	Unresponsive	19%	⋮

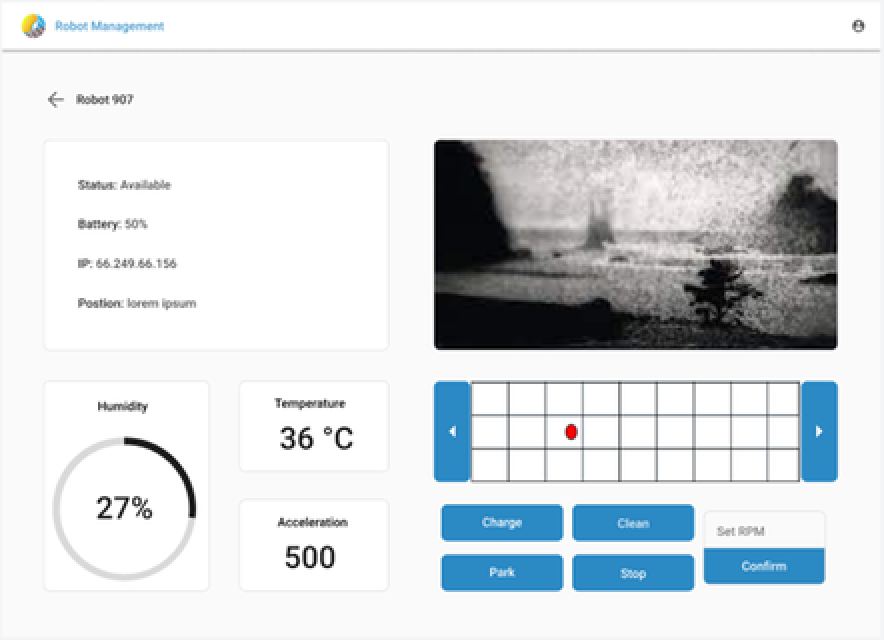
Rows per page: 10 ▾ 1-10 of 23 ‹ ›

Solar Park ArtaEnergeiaki, Greece

Total number of Robots: 23

Total number of Panels: 52

Energy production: lorem ipsum



Status: Available

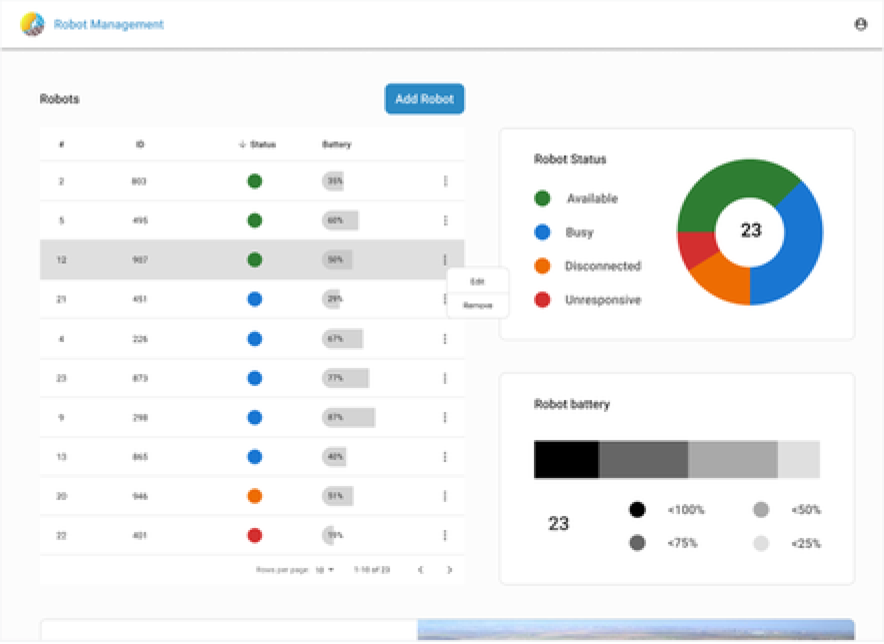
Battery: 50%

IP: 66.249.66.156

Postion: lorem ipsum

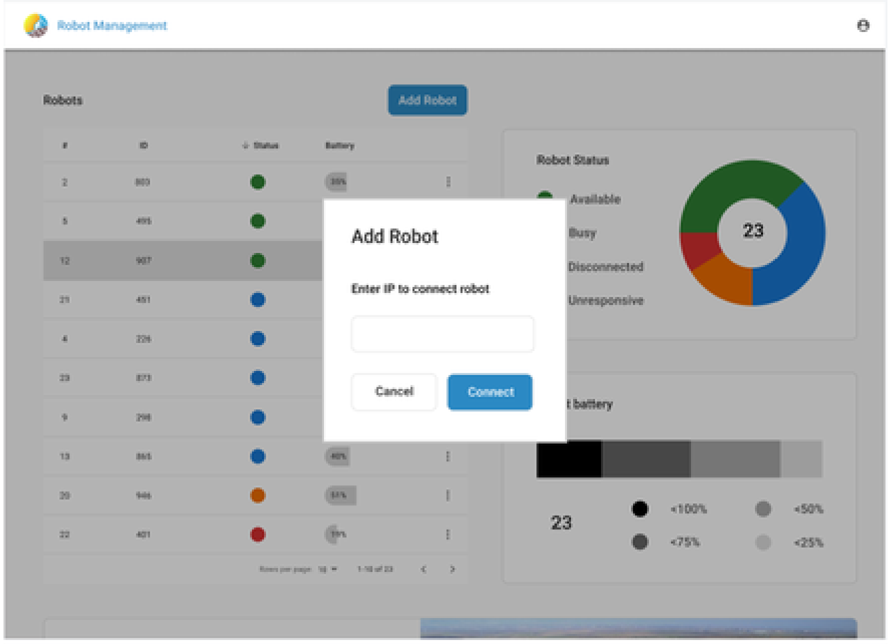
Interactions

We added a few basic interactions, the popup from the three-dots menu in the table, the connect robot popup. We deemed it important to add a confirmation popup that also informs on the average time of the operation for commands. When the user confirms a command, the rest are greyed out, this way there is a strong visual cue showing that the operation is running. In addition, emphasis is put on the running operation's button, which, when clicked, lets the user stop the operation. Finally, the table needs to hint the user that each item is clickable, each item will be greyed on hover.



#	ID	↓ Status	Battery
2	803	🟢	35%
5	495	🟢	60%
12	907	🟢	50%
21	451	🔵	29%
4	226	🔵	67%
23	879	🔵	77%
9	298	🔵	87%
13	865	🔵	40%
20	946	🟠	51%
22	401	🔴	19%

Rows per page: 10 ▾ 1-10 of 23



Robot Management

Robots

Add Robot

#	ID	↓ Status	Battery
2	803	●	35%
5	495	●	
12	907	●	
21	451	●	
4	226	●	
23	873	●	
9	298	●	
13	865	●	40%
20	946	●	51%
22	401	●	11%

Rows per page: 10 1-10 of 23

Robot Status

- Available
- Busy
- Disconnected
- Unresponsive

Add Robot

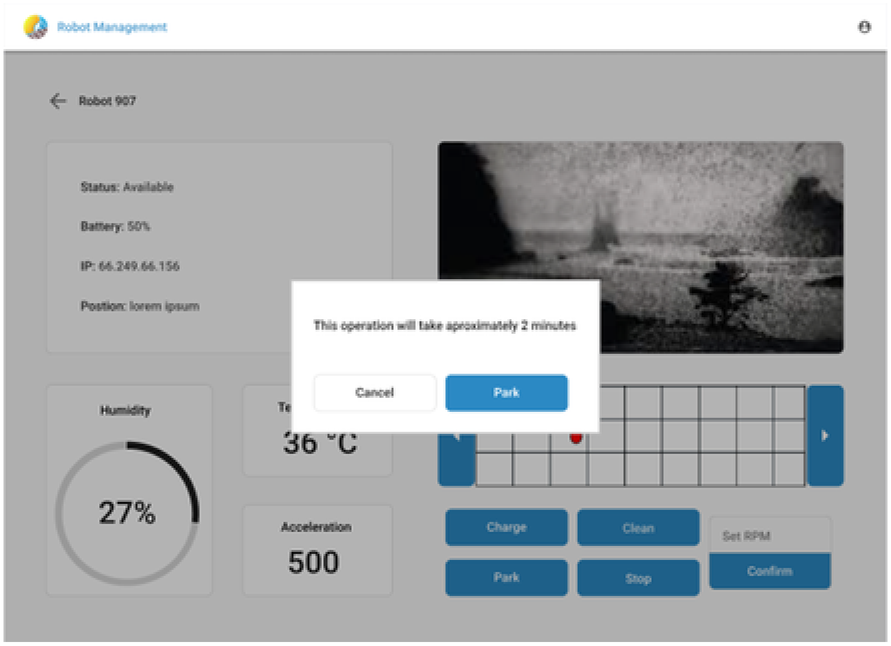
Enter IP to connect robot

Cancel Connect

t battery

23

●	<100%	●	<50%
●	<75%	●	<25%



Robot Management

Robot 907

Status: Available

Battery: 50%

IP: 66.249.66.156

Postion: lorem ipsum

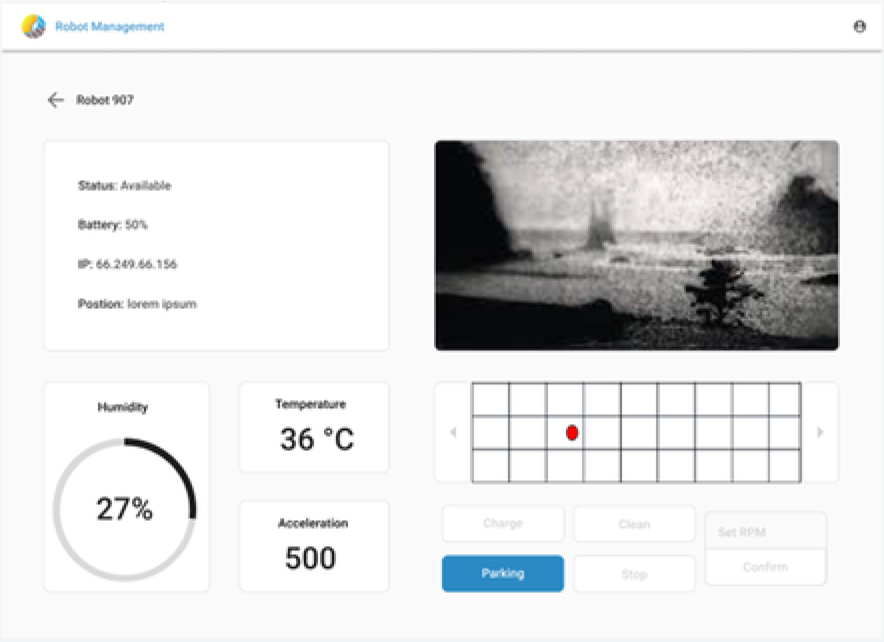
This operation will take aproximately 2 minutes

Cancel Park

Humidity 27%

Te 36 °C

Acceleration 500



Robot Management

Robot 907

Status: Available

Battery: 50%

IP: 66.249.66.156

Postion: lorem ipsum

Humidity 27%

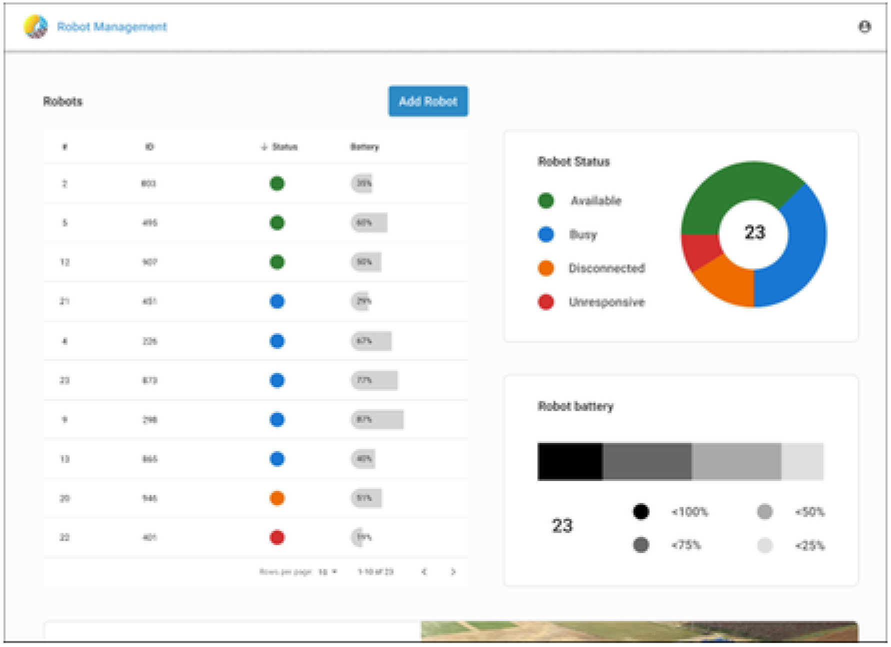
Temperature 36 °C

Acceleration 500

Final iteration

For the final iteration we also removed the colors from the battery levels graph, so the colors are exclusive to the robot’s status, this way the main page becomes more readable. We removed the three-dots menu from the table, because the remove robot option is rarely used and only really used by system administrators. Furthermore, we added simple edit options to the robot’s page for changing the ID and the RPM, this is bound to change if more editing options are introduced.

We also added some graphic elements to the robot’s information to help visualize information. We applied visual hierarchy to the robot’s command, making the clean button larger as it is the most used and removing the stop button as it is redundant. We displayed a 10-column grid for the move command’s map, this way the user can easily perceive and count the portion of the panel that the robot is located.



Robot Management

Robots

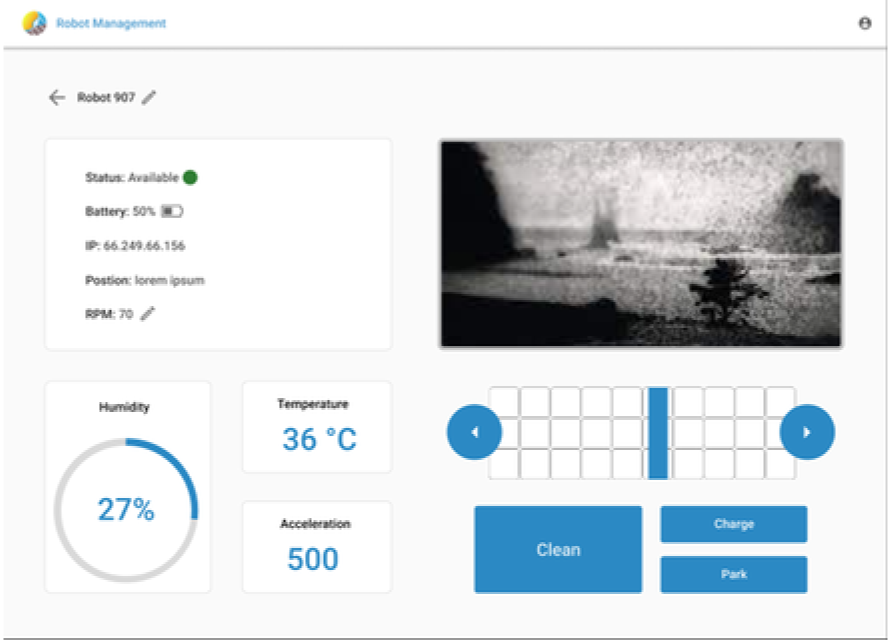
#	ID	Status	Battery
2	803	●	35%
5	495	●	60%
12	907	●	50%
21	451	●	29%
4	226	●	67%
23	873	●	77%
9	298	●	87%
13	865	●	40%
20	946	●	51%
22	401	●	11%

Rows per page: 10 1-10 of 23

Robot Status

● Available
● Busy
● Disconnected
● Unresponsive

Robot battery



Status: Available ●

Battery: 50%

IP: 66.249.66.156

Postion: lorem ipsum

RPM: 70

Humidity 27%

Temperature 36 °C

Acceleration 500

Responsiveness

Mobile devices

For mobile devices we worked on a frame 480 pixels wide and 950 pixels long. We suggested using a bottom menu to display the robots table and the park's information for the main screen, when the user selects a robot the menu switches to the robot's commands and the robot's information. The header also switches to clearly show the change of screens, also enhanced by the move-in animations. The information tab is not the default selected, as it is less important. In case there are not many components to display, the main page and the robot's page could just be scrollable without a bottom menu.

Tablets

For tablets we used a 990 pixels long and 680 pixels wide frame. Not many changed have been made, we mostly resized the contents and the margins. It's important to note that in landscape mode, the main page table needs to display many rows and shouldn't be cut off. We suggested extending the table on the right for this reason. We made sure that the interactions are in line with the tablet's peculiarities, that the buttons are big enough and are located on the edges of the screen.

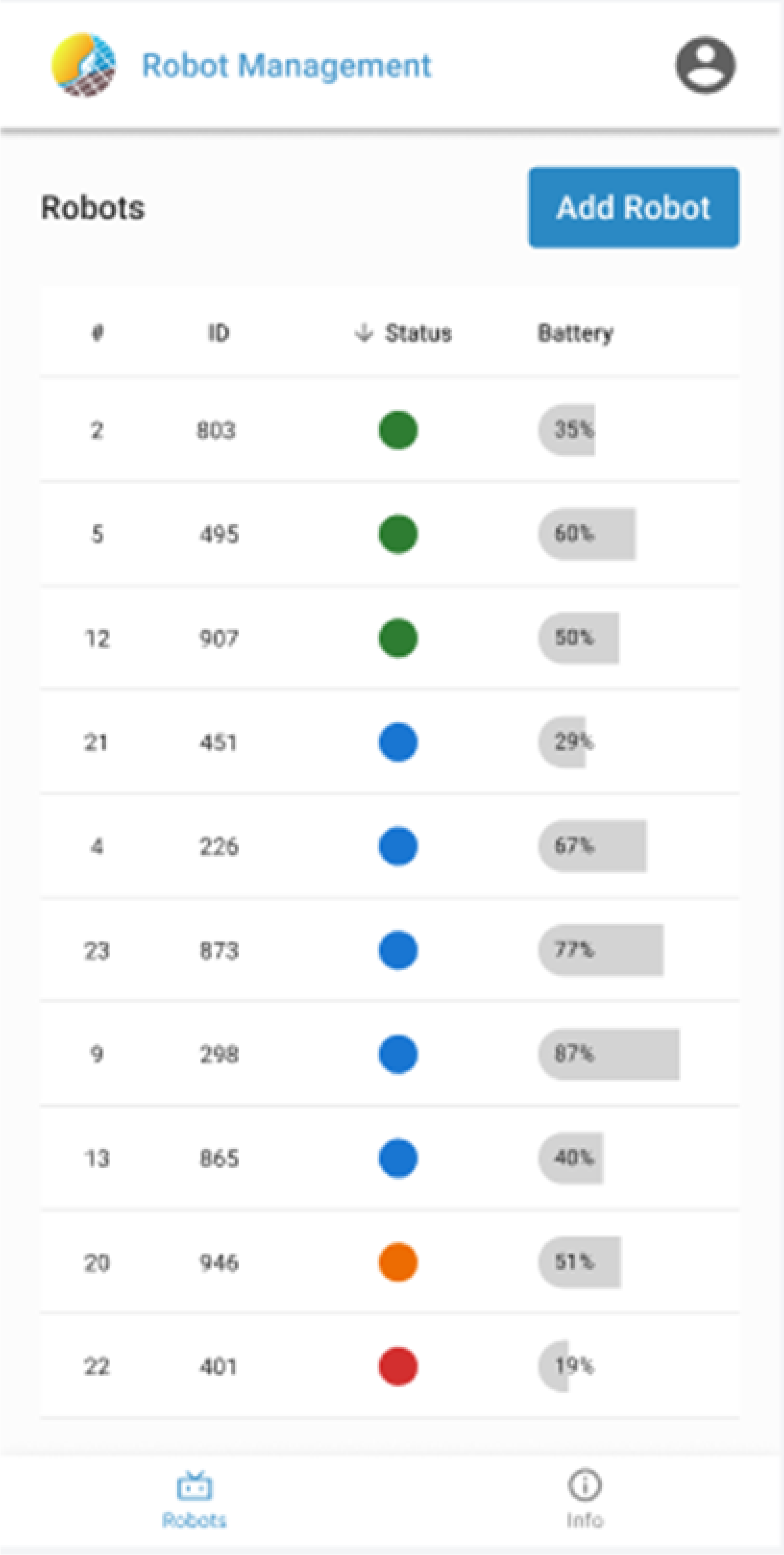
Conclusion

This document explains the design process leading to the creation of the low fidelity prototype for the solbotix app user interface, focusing on a few basic requirements and building up on our insights from our last document. Moving on we need to conduct user testing to evaluate the prototype's usability, usefulness, accessibility and move on to high fidelity prototypes.

We suggest some further improvements:

- Implementing a way to display robots in the order that they are found in the park.
- Allow for full screen camera feed.
- Avoid scrolling on the tablet's robot page by making better use of space.
- Display last time cleaned in the robot's information.
- Estimate how much distance there is between the robot and the start of the solar panel.
- Display the position of the charger in the move command's map.
- Change the color of the robot in the move command's map, according to its status.
- Use lighter shades on the battery levels graph.

Areas that need work are certainly the graphs, defining which information needs to be displayed for the park and the robots. Also, the commands need user testing to prove their effectiveness.

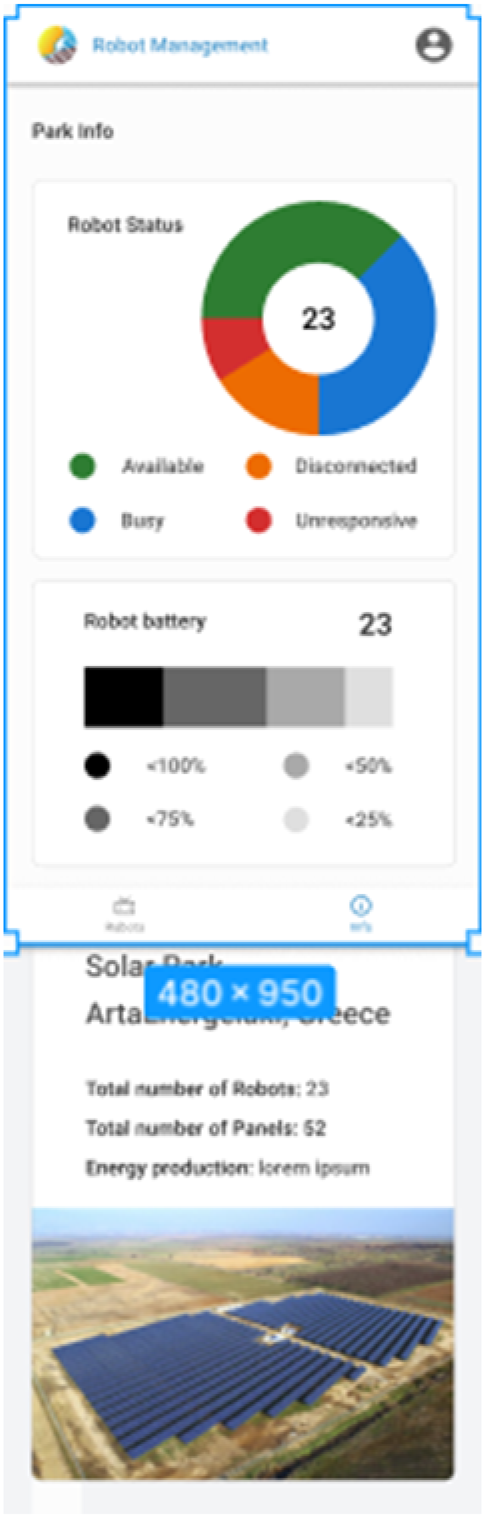


Robot Management

Robots

Add Robot

#	ID	↓ Status	Battery
2	803	🟢	35%
5	495	🟢	60%
12	907	🟢	50%
21	451	🔵	29%
4	226	🔵	67%
23	873	🔵	77%
9	298	🔵	87%
13	865	🔵	40%
20	946	🟠	51%
22	401	🔴	19%



Robot Management

Park Info

Robot Status

🟢 Available 🟠 Disconnected

🔵 Busy 🔴 Unresponsive

Robot battery 23

● <100% ● <50%

● <75% ● <25%

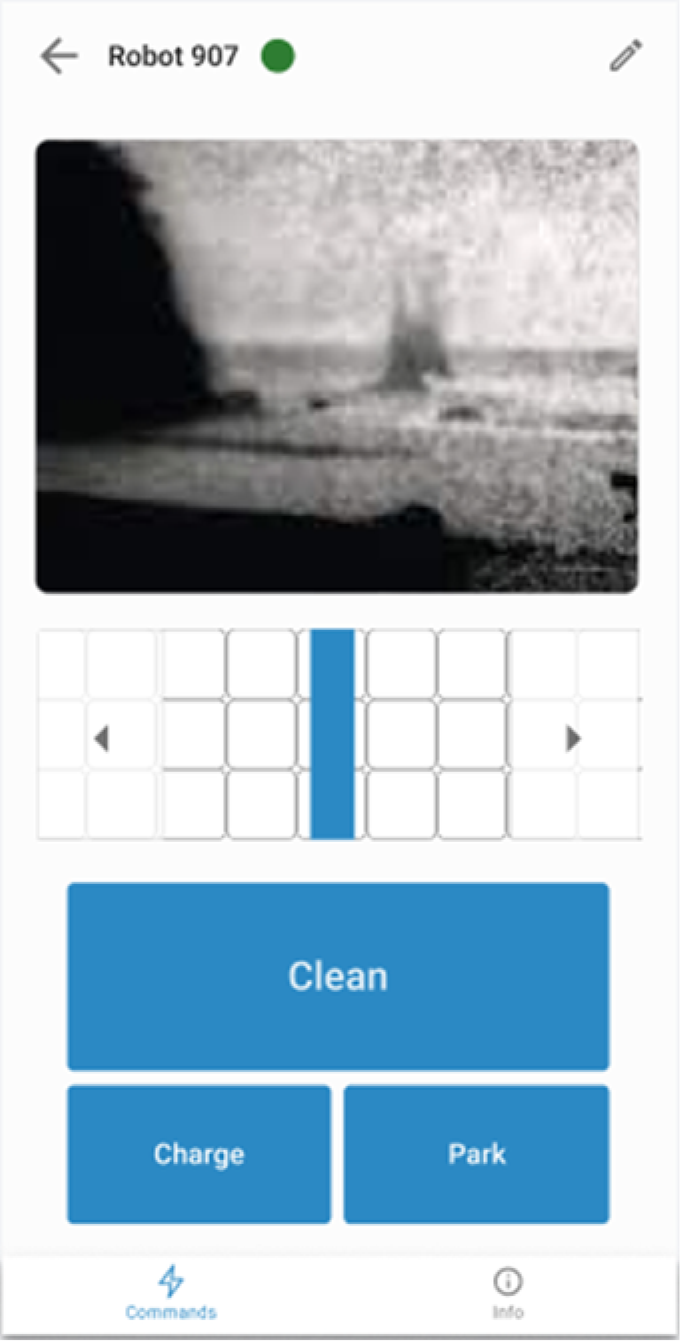
Solar Park

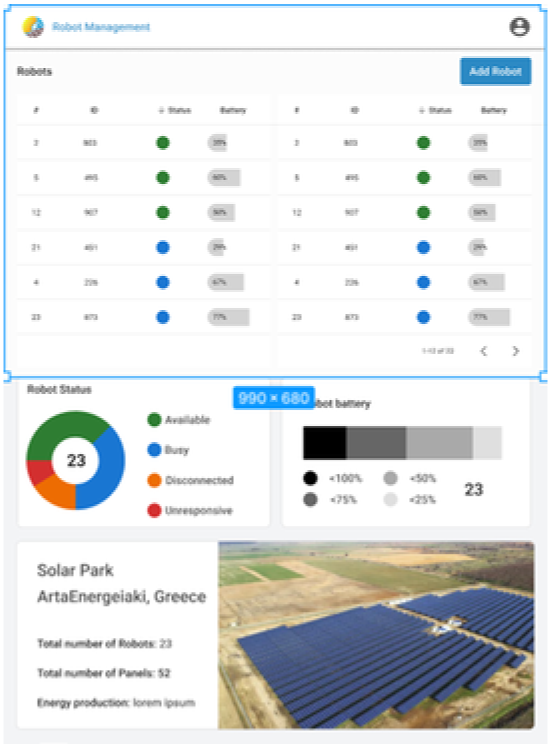
ArtaEnergeiaki, Greece

Total number of Robots: 23

Total number of Panels: 52

Energy production: lorem ipsum


Robot 907
Clean
Charge
Park
Commands
Info



Robots

#	ID	↓ Status	Battery	#	ID	↓ Status	Battery
2	803	●	35%	2	803	●	35%
5	495	●	60%	5	495	●	60%
12	907	●	50%	12	907	●	50%
21	401	●	29%	21	401	●	29%
4	226	●	67%	4	226	●	67%
23	873	●	77%	23	873	●	77%

Robot Status

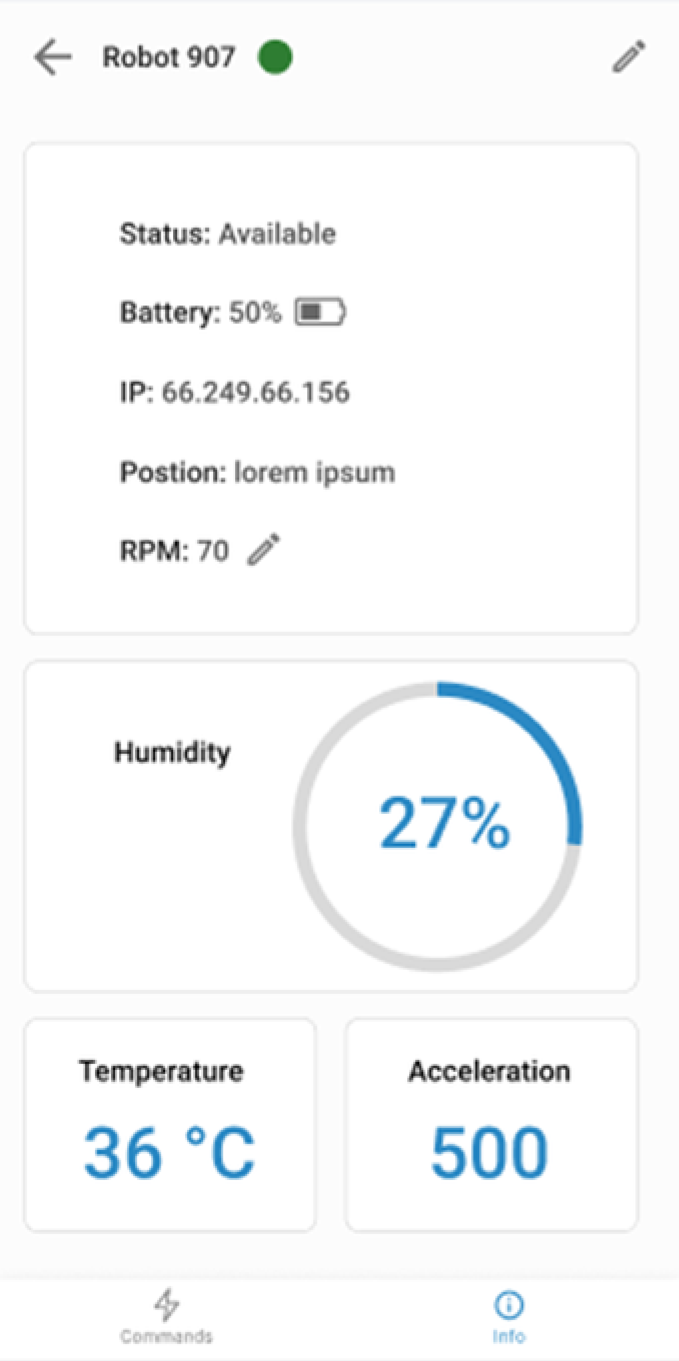
Robot battery

Solar Park
ArtaEnergeiaki, Greece

Total number of Robots: 23

Total number of Panels: 52

Energy production: lorem ipsum



Robot 907 ●

Status: Available

Battery: 50%

IP: 66.249.66.156

Postion: lorem ipsum

RPM: 70

Humidity

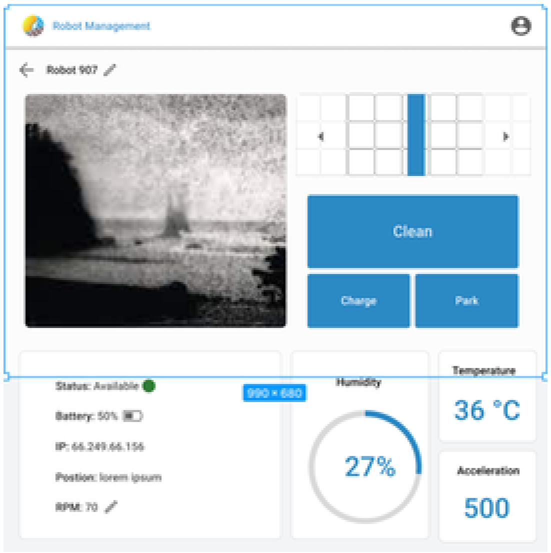
27%

Temperature

36 °C

Acceleration

500



Status: Available ●

Battery: 50%

IP: 66.249.66.156

Postion: lorem ipsum

RPM: 70