Case Study: NASA Lunar Lettuce Dashboard

Hannah Dick

Introduction

NASA has recently made significant strides in furthering the future of our agriculture, beginning by growing food in a new location, outer space. So far they are mostly just able to produce lettuce and a couple of other vegetables to be consumed by astronauts after they are confirmed to be safe, and the rest is sent to earth for analysis. This gardening is being conducted in a brand new environment compared to conditions on earth so monitoring all conditions is vital in order to continue quality growth, and understand the best practices for a sustainable future system. Our purpose for this project is to create a dashboard with an organized presentation of data to be monitored. The measurements were given to us by developers in the form of structured data which had to be organized and interpreted to be presented in the most effective way. There are a variety of potential stakeholders for this project so I chose to focus on the NASA scientists who I assume would be using the system most to keep track of vital measurements in each plot. However, the language was kept fairly simple, so as the research and science advance, NASA will be able to easily share findings.

Goal

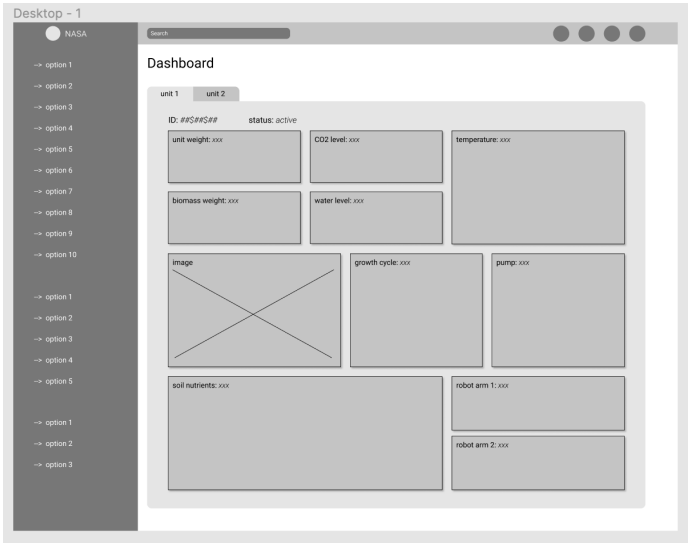
Within the outline of this project's purpose, there were several specific goals to address. These include separating the plots of each module into their own sections of data, creating simple navigation between each module and section, highlighting the data that was recognized to be the most important, establishing modes of activation and deactivation where appropriate, and then centralizing the most essential information for a useful mobile view. I determined these goals by considering possible use cases for the dashboard, such as a scientist who would need to be able to efficiently preview the current measurements, ensure levels have not reached points of concern, and toggle the activation of important functions or the entire plot altogether. For the mobile version, I considered its primary use would be for quick referencing while inside the area of the current module, meaning the live streaming of the room would be unnecessary. Even when away, such imagery would be more cumbersome than useful on a mobile device. In order to convert the structured data provided for this project, I placed it in the JSON list software in order to easily organize and interpret everything into an efficient display.

Structured data: https://github.com/Digi-D/Class-Sample-JSON/blob/main/module.json

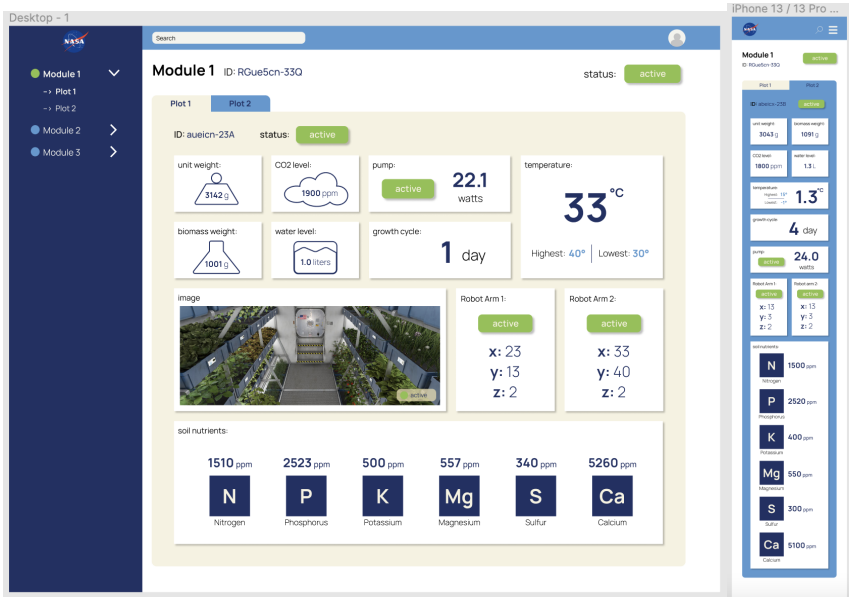
Solutions

The elements I recognized as more important are displayed larger compared to measurements that are likely to rarely or only gradually change. That is why temperature, pump, nutrients, and the robot arm information all stand out the most at first glance. A specific use case I considered was a NASA scientist needing the dashboard to track the temperature of each plot to ensure stability. Navigating to the intended module is fairly self-explanatory in the side navigation bar, and then moving between plots can be achieved by the simple tab function above the data or

again in the dropdown menu in the side navigation. Then the temperature is one of the most visible elements and the highest and lowest points of the day are included in its section to easily determine any anomalies that might need to be addressed.



As seen in the wireframe above, I gave each portion of data its own square in order to organize each item in a legible fashion. The side navigation bar on the side has more options than necessary but displays an example of the simple function of switching between modules and garden plots.



In the final UI version, the sections were somewhat rearranged to accommodate the hierarchy of information and the actual size of each element's data. There were also activation buttons added in order to provide ease of functionality in deactivating things like the robot arms and pump, as well as the overall plot in case of emergency or lack of use. The colors were chosen to complement the NASA theme along with reflecting technology and nature, and the tabs were distinguished with different colors to prevent confusion when going between each plot.

Mobile Prototype: https://www.figma.com/proto/YSlP7YOyLUU3xIEQ86GhrF/NASA-Dashboard?node-id=51%3A236&scaling=scale-down&page-id=51%3A235&starting-point-node-id=51%3A236

Desktop Prototype: https://www.figma.com/proto/YSlP7YOyLUU3xIEQ86GhrF/NASA-Dashboard?node-id=84%3A691&scaling=scale-down-width&page-id=23%3A188&starting-point-node-id=23%3A248

Future expansions

The main expansions that I would plan to make to this in the future would be to create breakout boxes to elaborate on each element in the desktop prototype. For example, clicking on the temperature section would display a graph of the temperature measurements throughout the day or weeks to get a more specific understanding of trends and extremities. Alternatively, selecting a section could navigate to a window filling the screen with information specific to that element, which could be a function applicable to desktop and mobile versions. It also could be useful to have warning notifications or highlighting actions to direct the users' attention to any areas of concern for the day and allow simple deactivation as a reaction to these alerts. In this project, the lack of contactable stakeholders made it more difficult to determine the level of importance for each area, so possible expansions of the work would include adjusting based on the real needs and preferences of the main scientists that would be utilizing it.