IGNIZARD

 "A single spark can start a fire, but a single idea can spark change."

HIGH LEVEL SUMMARY

Most of us know about the California wildfires, but here in Argentina, recently, there have been wildfires all across the country. This motivated us to create **Ignizard**, an app that will help people and the government to spot fires across the whole country as well as to analyze areas in danger of being affected by fires. The app uses satellite information and information provided by users to detect and predict where fires might develop. Also it suggests possible escape routes, hospital locations, connections to firefighters brigades and other useful tips that can be vital in an emergency or to avoid situations which can become critical.

HOW YOUR PROJECT ADDRESSES THIS CHALLENGE

Uncontrolled wildfires are a growing threat for many areas in the world. This natural hazard endangers not only many ecosystems and habitats, but also human lives and several economic activities which later on may also lead to serious social issues. Therefore, we believe that in order to reduce the impacts and to try controlling the damages, a rapid detection and emergency procedures are needed. Ignizard is an app that will allow people to have easy access to all the information they may need before, during and after a fire. Its straightforward display enables users to understand and process information from satellites that, otherwise, they might find hard to comprehend. By taking into account several factors that contribute to the formation of wildfires, we will be able to predict which areas are more prone to developing fires. One such factor is draughts, which create the right conditions for the development of fires because of the accumulation of fuels such as dry vegetation. Additionally, lack of rain also means no natural way of putting out a fire; and we will analyze thunderstorms, as lightning could trigger a fire in forest areas. Once an igneous source is detected, our app will provide, in a friendly-user way, crucial information such as wind direction to predict spreading patterns; as well as precipitation forecasts in order to know if the fire can be extinguished naturally. What is more, this app will also help firefighters by providing helpful data about extra sources of water available to use, such as swimming pools. Notifications will pop-up in order to alert people and will also warn people if the conditions are favorable for the formation of fires.

Furthermore, the platform has an *'advice' tab* where information about evacuation procedures and recommendations (in order to be prepared and rapidly detect fires) is displayed; and a *'news' tab* where different users can upload pictures and data of fires that other users can see by using hashtags (#) to filter that information and

show what is relevant depending on your location. Besides, the app has a *'map' feature* that exhibits if there is a fire developing in the surrounding areas, evacuation routes that will be helpful to prevent agglomerations and emergency roads that emergency services; such as ambulances, firefighters brigades and police might use. This map is based on waze's system where users can upload information about traffic and data is also automatically updated by using GPS signals.

HOW YOU DEVELOPED YOUR PROJECT

First we did research about the different wildfires crisis which are currently affecting Argentina and the USA from different news sources, social media and members of the affected communities.
We met and concluded this was a topic of relevance for all of us and began planning the app.
To use the app users have to create an account and allow the app to use your location so the system knows where you are, if you have to evacuate or if you need help.
We used a program called Figma where the app was presented by different layers with command bottoms to create a model of how the app would work. In each layer we distributed different pieces of information.
At first we started a mock up and discus how to address the problem in a easy interface but collecting and showing enough information to be the most price on addressing the problem.We saw how other existing apps work such as Waze and Google Maps to try and innovate with different methods such us taking pictures to try to help other people more efficiently.
As we moved on in the design we implemented the idea of connecting the app to different social media sources , and having hashtags to give precise information to the users.This helps us to design a layer where users can read what others have published about fires near their zones of residence
Finally we thought about what may happen if someone forgets their wallet at home during an emergency evacuation (and therefore they may not have their identity card or important personal information on them) and about users' relatives and friends. They will like to know if they have escaped or where they are. So we implemented in the user profile a section where they can know their location and give them a call if necessary.
After that we put all these elements together on Figma where we tried to develop an easy to use and helpful app where everything is divided in layers connecting everything related to maps and pictures together with social media layers .

HOW DID YOU USE SPACE AGENCY DATA IN YOUR PROJECT

Our fire prediction map is based on satellite data. By taking into account different variables such as humidity, vegetation, temperature, wind, active fires and water bodies, our programme is able to assess which are the high risk areas where fires are prone to develop.

Precipitation patterns will also be considered when building this map but in this mockup it wasn't taken into account since there weren't any precipitations happening in the short term in the zone studied.

We used the program QGIS with the Semi-Automatic Classification Plugin (SCP) to visualize some of the satellite images.
The satellites we used are the Sentinel-2 from ESA from which we downloaded images for the Normalized Difference Vegetation Index (NDVI) and the water Bodies from the B8 and B4 channels. This is shown in the app in the vegetation filter and the water body map filters that can be applied to the map. We also used images for the moisture levels form the channel B8A and B11. We used this to show in the app to add a map filter of moisture index.

The other satellites we used are from the FIRMS System, which include the satellites NOAA-20, VIIRS, MODIS Aqua and MODIS Terra to spot the active fires. All of this satellites were used to create map filter that show a timeline to show the spread of the wildfires

We used the internet web page Windfinder to measure the wind direction, based on an intra-web of forecasting stations to follow and anticipate the spread of the fires. This data was used to create a map filter to show the speed and directions of the wind

DEMONSTRATE YOUR SOLUTION

https://www.figma.com/proto/R1Bti0kzlPDrT8C0vFAGGB/Ignizard-app-development?node-id=1%3A2&viewport=-444%2C963%2C0.5609584450721741&scaling=scale-down

Our web page: https://matedenti.wixsite.com/dosdejunio-ingnizard

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