NASA

Fatec
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FATECANOS

Marilia, Sao Paulo | Warning: Things are heating up!

Fateclima

EDIT PROJECT

HIGH-LEVEL PROJECT SUMMARY

PROBLEM: Heat waves associated with droughts and forest fires that have billion-dollar impacts on national and global societies. SOLUTION: A weather monitoring and alert application where you can follow the weather forecast in real time. IMPORTANCE: Lay and corporate users can minimize inherent weather risks such as:

fires, windstorms, floods, hurricanes and volcanoes.
CONCLUSION: Although it is a prototype, it has demonstrated its importance in the treatment measures, different from forecasting programs, it generates alerts that are fundamental in the treatment of fires in forest regions and in helping farmers make decisions to prevent droughts and frosts.

LINK TO PROJECT "DEMO"

https://youtu.be/VDntf4GF8Do

LINK TO FINAL PROJECT

https://github.com/fatecanoshackathon/hackathonnasa2021

DETAILED PROJECT DESCRIPTION

WARNING: THINGS ARE GETTING HOT!

PROBLEM: Heat waves are often associated with droughts and forest fires that have billion-dollar impacts on national and global societies.

EFFECTS: These phenomena appear to be increasing in frequency, intensity and duration, and affect the water-energy-food nexus with consequent impacts on social and economic structures

ADVERSE EFFECTS: Environmental co-factors that are related to heat waves and heat stress and affect health include air pollution, exacerbation of pre-existing

health conditions, and the availability or unavailability of infrastructure.

PROPOSAL: SIMPLIFY AND MAKE INFORMATION ACCESSIBLE IN A SIMPLE AND DYNAMIC WAY TO GOVERNMENTAL AND NON-GOVERNMENTAL AGENCIES FOR THE PURPOSE OF MITIGATION AND TREATMENT OF POSSIBLE RISKS.

OBJECTIVES:

1. develop tools to generate heat-related hazard warnings.

2. Use Earth Observations (EO) and models along with local crowdsourced data to provide warnings

2.1. (e.g., heat stress intensity duration levels),

2.2. estimate potential human and environmental/ecological impacts

3. provide guidance on mitigation measures

3.1. that could be adopted at individual and state / national policy levels.

4. Laptop / smartphone app that can generate a heat stress risk alert level (red, yellow, green)

4.1 filters by selected area (e.g. city, county, country)

4.2 filters by potential risk

4.3 risk categories: forest fires , air pollution, crop damage, water and energy supply shortages.

The user interface needs to be simple, with intuitive templates, and the tool should require data or information that is readily available to the user before a risk level can be estimated and displayed.

SPACE AGENCY DATA

The data that inspired our project are:

1. XML Weather Forecast - CPTEC/INPE

Data from the CPTEC/INPE Weather Forecast, UVI and Waves in pure XML format:

http://servicos.cptec.inpe.br/XML/#condicoes-tempo

2. EARTHDATASEARCH NASA

https://search.earthdata.nasa.go

(Source of all search data)

3. worldview NASA:

https://worldview.earthdata.nasa.gov/?
v=-413.86392383822795,-174.43332052864585,265.2435145285458,135.2851
3462607523&z=2&i=2&l=VIIRS_SNPP_Thermal_Anomalies_375m_Night(hidden
),VIIRS_SNPP_Thermal_Anomalies_375m_Day(hidden),VIIRS_NOAA20_Thermal_
Anomalies_375m_Night(hidden),VIIRS_NOAA20_Thermal_Anomalies_375m_Day(
hidden),MODIS_Aqua_Thermal_Anomalies_Night(hidden),MODIS_Aqua_Thermal_
Anomalies_Day(hidden),MODIS_Terra_Thermal_Anomalies_Night(hidden),MODIS_
Terra_Thermal_Anomalies_Day(hidden),OMPS_Aerosol_Index(hidden),OMPS_Aer
osol_Index_PyroCumuloNimbus(hidden),IMERG_Precipitation_Rate,VIIRS_SNPP_
DayNightBand_ENCC(hidden),VIIRS_SNPP_DayNightBand_At_Sensor_Radiance(h
idden),Reference_Labels_15m,Reference_Features_15m,Coastlines_15m(hidden),V
IIRS_SNPP_CorrectedReflectance_BandsM11-I2-
I1(hidden),VIIRS_NOAA20_CorrectedReflectance_BandsM11-I2-
I1(hidden),MODIS_Aqua_CorrectedReflectance_Bands721(hidden),MODIS_Terra_C

orrectedReflectance_Bands721(hidden),VIIRS_NOAA20_CorrectedReflectance_TrueColor(hidden),VIIRS_SNPP_CorrectedReflectance_TrueColor,MODIS_Aqua_CorrectedReflectance_TrueColor(hidden),MODIS_Terra_CorrectedReflectance_TrueColor&lg=true&sh=VIIRS_SNPP_DayNightBand_At_Sensor_Radiance,C1989175258-LANCEMODIS&t=2021-10-01-T00%3A00%3A00Z

(Source of the inspiration for the climate alerts)

HACKATHON JOURNEY

Participating in the Hackathon was a fantastic experience. We met several people, exchanged knowledge, and learned that we should always be in search of knowledge and learning. Our team chose this challenge because it is a reality in our region, climate problems have a strong impact on small farmers and forest fires. During the development our approach was to seek a solution as simple as possible for its commercial viability and distribution, and thus meet the demand of our audience. Our thanks to all the organizers of this event, NASA SPACE APPS CHALLENGE, and their team for the local event that took place in MARÍLIA, interior of São Paulo / Brazil, at UNIVEM College.

REFERENCES

1 - SOURCE OF RESEARCH DATABASE

1.1 - XML Weather Forecast - CPTEC/INPE

Data from the CPTEC/INPE Weather Forecast, UVI and Waves in pure XML format:

http://servicos.cptec.inpe.br/XML/#condicoes-tempo

1.2 EARTHDATASEARCH NASA

https://search.earthdata.nasa.go

1.3 -worldview NASA:

https://worldview.earthdata.nasa.gov/?
v=-413.86392383822795,-174.43332052864585,265.2435145285458,135.2851
3462607523&z=2&i=2&l=VIIRS_SNPP_Thermal_Anomalies_375m_Night(hidden
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Anomalies_375m_Night(hidden),VIIRS_NOAA20_Thermal_Anomalies_375m_Day(
hidden),MODIS_Aqua_Thermal_Anomalies_Night(hidden),MODIS_Aqua_Thermal_
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Terra_Thermal_Anomalies_Day(hidden),OMPS_Aerosol_Index(hidden),OMPS_Aer
osol_Index_PyroCumuloNimbus(hidden),IMERG_Precipitation_Rate,VIIRS_SNPP_
DayNightBand_ENCC(hidden),VIIRS_SNPP_DayNightBand_At_Sensor_Radiance(h
idden),Reference_Labels_15m,Reference_Features_15m,Coastlines_15m(hidden),V
IIRS_SNPP_CorrectedReflectance_BandsM11-I2-
I1(hidden),VIIRS_NOAA20_CorrectedReflectance_BandsM11-I2-
I1(hidden),MODIS_Aqua_CorrectedReflectance_Bands721(hidden),MODIS_Terra_C
orrectedReflectance_Bands721(hidden),VIIRS_NOAA20_CorrectedReflectance_Tr
ueColor(hidden),VIIRS_SNPP_CorrectedReflectance_TrueColor,MODIS_Aqua_Corr
ectedReflectance_TrueColor(hidden),MODIS_Terra_CorrectedReflectance_TrueCo
lor&lg=true&sh=VIIRS_SNPP_DayNightBand_At_Sensor_Radiance,C1989175258-
LANCEMODIS&t=2021-10-01-T00%3A00%3A00Z

1.4 -NPP/VIIRS Atmospherically Corrected Surface Reflectance 6-Min L2 Swath
375m, 750m NRT:

https://cmr.earthdata.nasa.gov/search/concepts/C1344298008-
LANCEMODIS.html?
_gl=1*ail4lx*_ga*MTE3OTI5MzYzNy4xNjMzMTgwOTU3*_ga_PVF13VX9Z5*MTYz
MzI3NzIwNDUxMi55cjJsMGNyYS4xLjEuMTYzMzI3NzIwNC4w

1.5 -OMPS-NPP L2 NM Aerosol Index swath orbital:

https://cmr.earthdata.nasa.gov/search/concepts/C1564538427-GES_DISC.html?
_gl=1*ail4lx*_ga*MTE3OTI5MzYzNy4xNjMzMTgwOTU3*_ga_PVF13VX9Z5*MTYz

MzI3NzIwNDUxMi55cjJsMGNyYS4xLjEuMTYzMzI3NzIwNC4w

1.6 -MODIS/Aqua Near Real Time (NRT) Thermal Anomalies/Fire 5-Min L2 Swath 1km:

https://cmr.earthdata.nasa.gov/search/concepts/C1219248602-LANCEMODIS.html?_gl=1*h1s1t6*_ga*MTE3OTI5MzYzNy4xNjMzMTgwOTU3*_ga_PVF13VX9Z5*MTYzMzI3NzIwNDUxMi55cjJsMGNyYS4xLjEuMTYzMzI3NzIwNC4w

1.6 -VIIRS/NPP Active Fires 6-Min L2 Swath 375m - NRT

https://cmr.earthdata.nasa.gov/search/concepts/C1886251885-LANCEMODIS.html?_gl=1*12qgqcn*_ga*MTE3OTI5MzYzNy4xNjMzMTgwOTU3*_ga_PVF13VX9Z5*MTYzMzI3NzIwNDUxMi55cjJsMGNyYS4xLjEuMTYzMzI3NzIwNC4w

2. Resources and tools used:

2.1 - Power Bi

2.2 - Power Query

2.3 - Excel

2.4 - MIT App Inventor 2

2.5 - https://www.wix.com

TAGS

#climate, #rain, #fire, #agribusiness, #firefighters, #heat, #cold