

Cirrolytix Research Services

PROJECT AEDES ENHANCEMENT

EMILY VIZMONTE
MARK PASCUAL
XAVIER PUSPUS



Digital
Public
Goods
Alliance
unicef

ENHANCEMENT TEAM MEMBERS



EMILY JO VIZMONTE

PROJECT AND
RESEARCH LEAD

Manage and lead the project implementation and provide oversight and direction to project activities



MARK PASCUAL

APPLICATION
ENGINEERING LEAD

Develop the product design of the AEDES dashboard and manage the API infrastructure

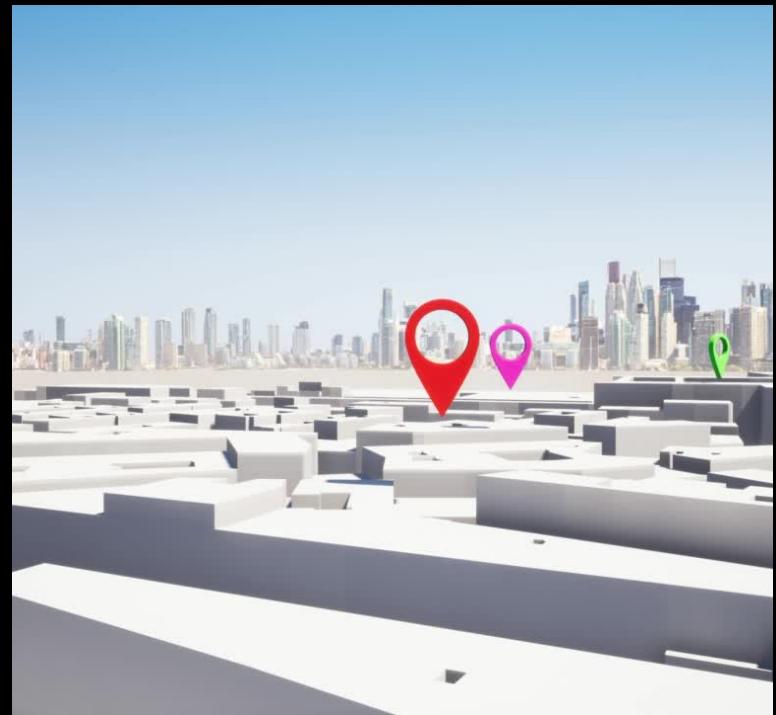


XAVIER PUSPUS

DATA SCIENCE AND
ENGINEERING LEAD

Prepare data for processing and analysis, and leverage machine learning techniques for interpretation and insight generation

Problems



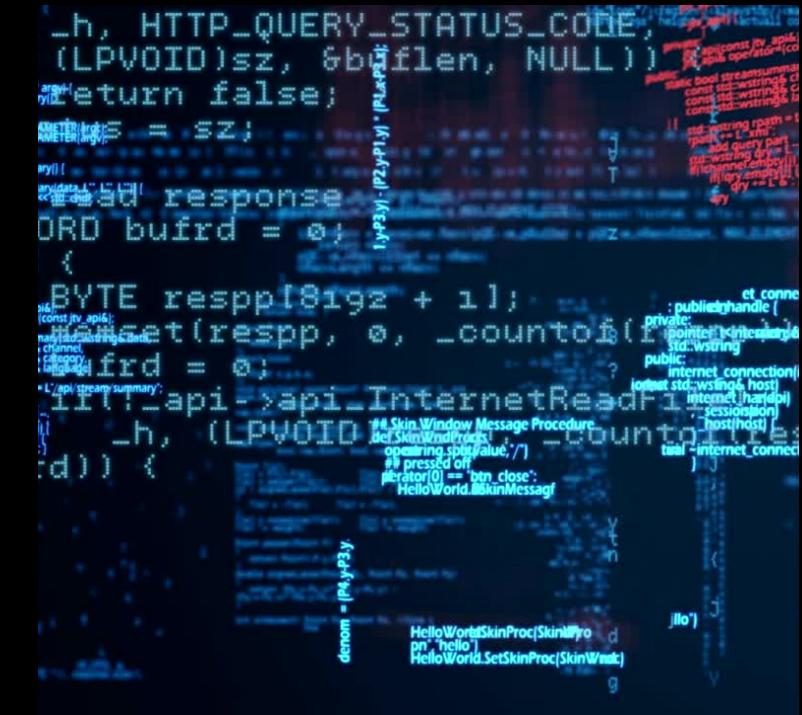
PROACTIVE CASE DETECTION

There is no existing standardized tool for forecasting case counts and identifying possible vector-borne disease outbreak locations.



LACK OF DATA AVAILABILITY

Dengue data (vector-borne disease data, in general) is almost impossible to find in PH, environmental data (weather, remote sensing) are scattered resources.



LACK OF AVAILABILITY OF OPEN-SOURCE TOOLS

Most tools/scripts are behind paywall, scattered resources or have steep learning curves.

Solutions and Enhancements

PROJECT AEDES OPEN PLATFORM

FORECASTING

Predict future number of cases/deaths of vector-borne diseases using Machine Learning

HOTSPOT DETECTION

Identify locations of possible hotspots for outbreaks

INFORM RISK MAPPING

- Map out risk framework using data representing human settlement situation

OPEN API

Publicly open pre-processed satellite, weather, socioeconomic and health datasets

PYTHON PACKAGE

Open-source tools used for data collection, feature engineering and automated machine learning

RISK-BASED ASSESSMENT FRAMEWORK

HAZARDS

Monitor progress
of epidemic,
Generate alerts

VULNERABILITIES

Prioritize areas
with vulnerable
groups, suggest
demographic and
geographic
determinants of
risk

LACK OF COPING CAPACITY

Prioritize areas for
emergency aid,
recommend
infrastructure
investment

RISK-BASED ASSESSMENT FRAMEWORK

HAZARDS

Dengue Case incidence
Flood Occurrence
Temperature
Precipitation
COVID-19 Incidence
Access to water
Access to sanitation

VULNERABILITIES

Population ages 0-20
Poverty Index
Population affected by natural disasters
Population previously infected by dengue
Mortality
Land-use types
Social listening
Primary and secondary schools
PhilHealth coverage
Human mobility

LACK OF COPING CAPACITY

Presence of health centers
Presence of hospitals
Number of health workers
Health expenditure
Vaccination coverage

CURRENT PROJECT AEDES



CURRENT TECH STACK

Dengue Panic Alerts

Dengue Case Nowcasting

Dengue Hotspot Detection

Chart JS

Mapbox API

Web Front-end

AJAX / PHP

Google
Search
Trends

PAGASA
Precipitation

PAGASA
Temperature

DOH Epi
Bureau
Cases and
Deaths

Sentinel
FAPAR

Sentinel
NDVI

Sentinel
NDWI

FRONT-END | BASICS



FRONT-END | FRAMEWORKS



FRONT-END | TOOLS



 Data-Driven Documents

BACK-END



DATABASE | RDBMS



DEV-OPS | INFRASTRUCTURES



ENHANCED TECH STACK

DEV-OPS | DEVELOP

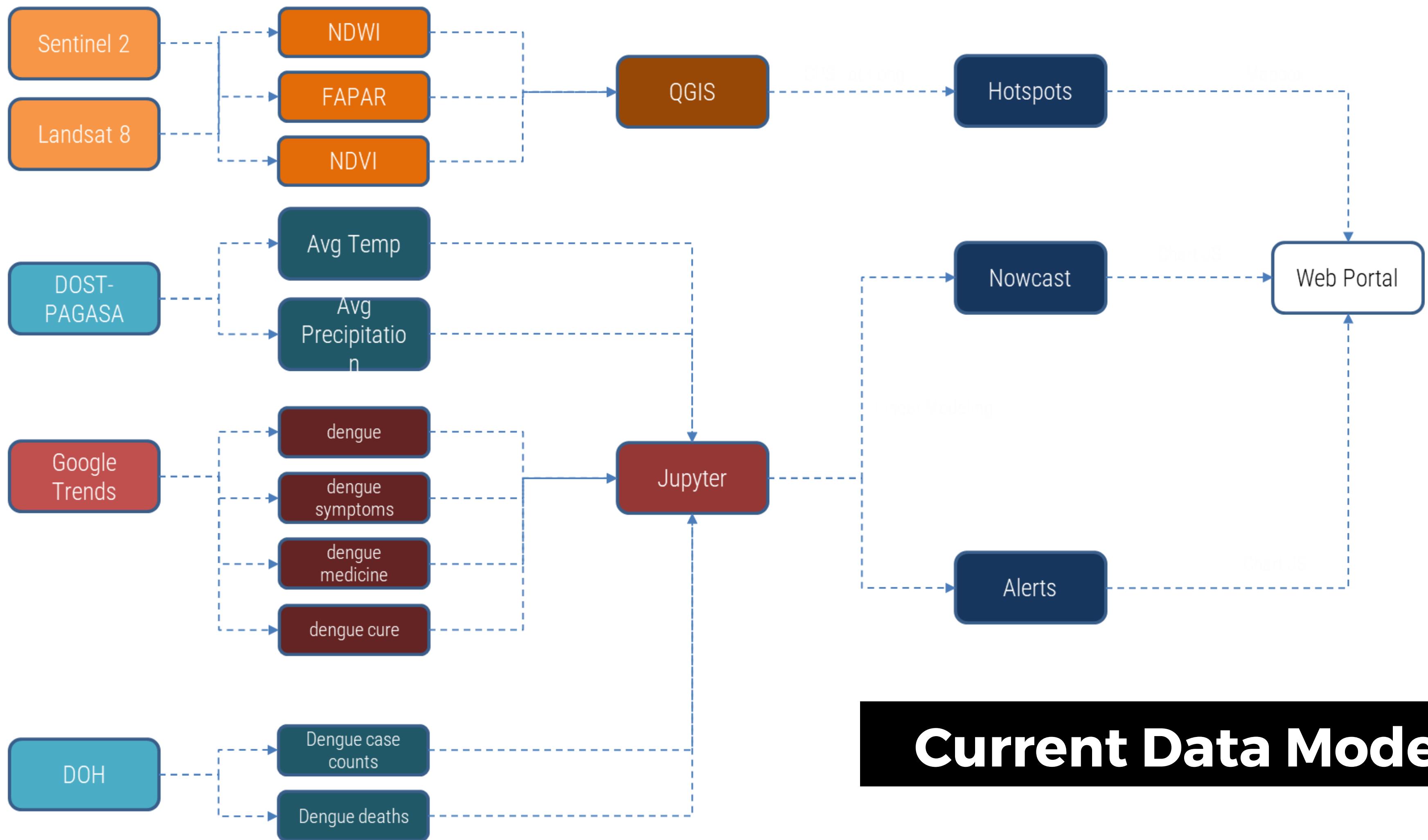


DATA SERVICES



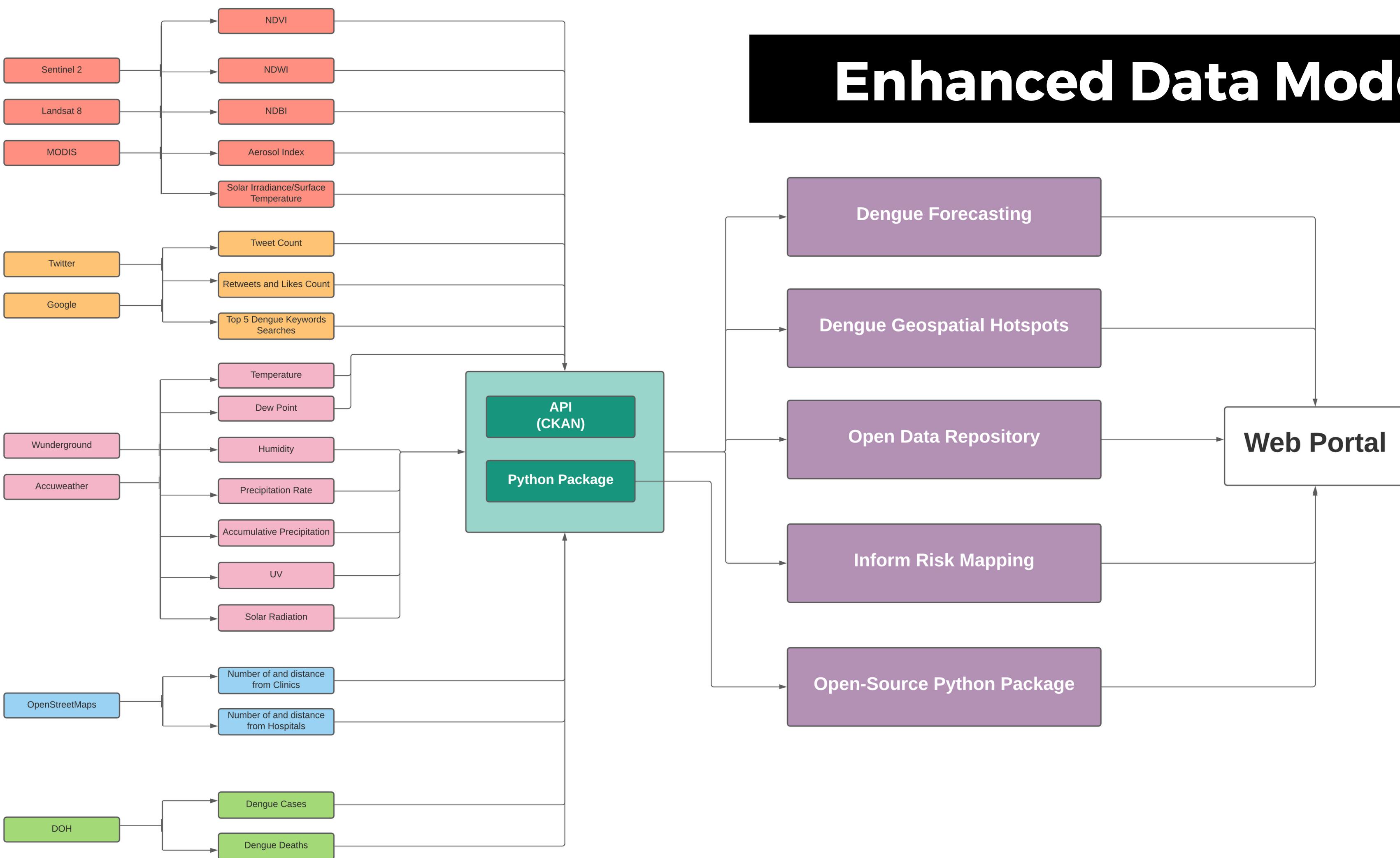
DATA MANAGEMENT SYSTEM



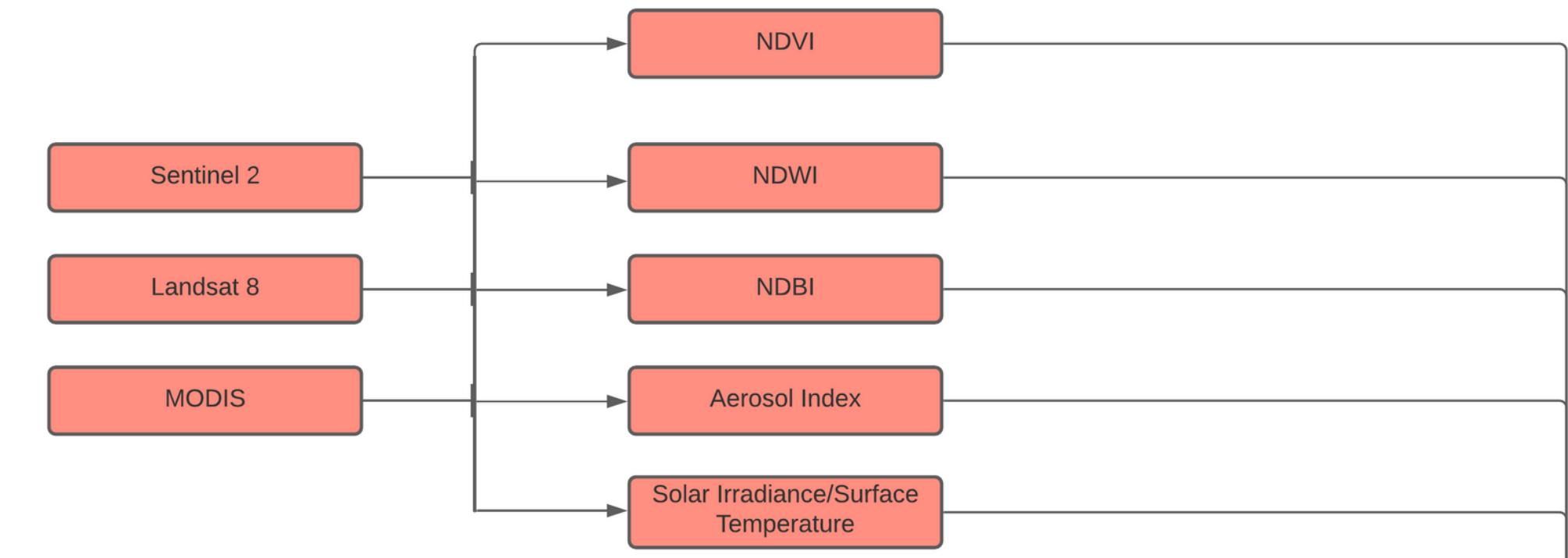


Current Data Model

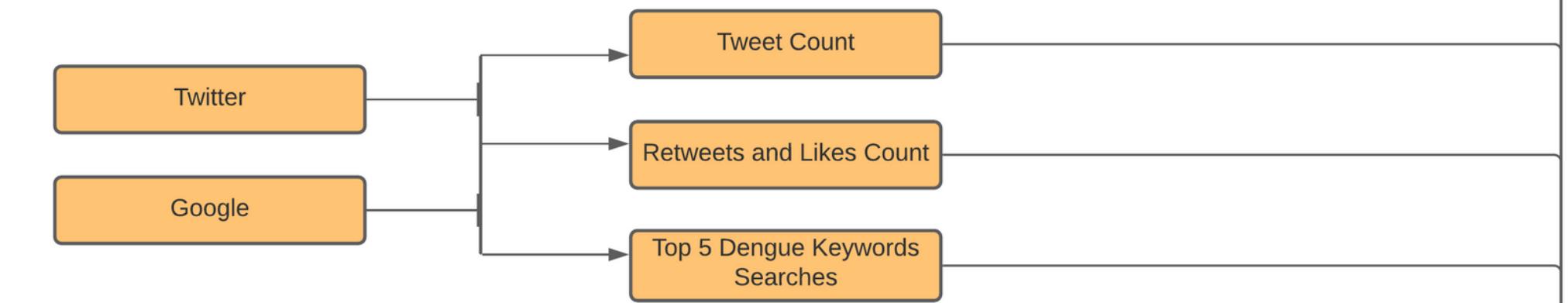
Enhanced Data Model



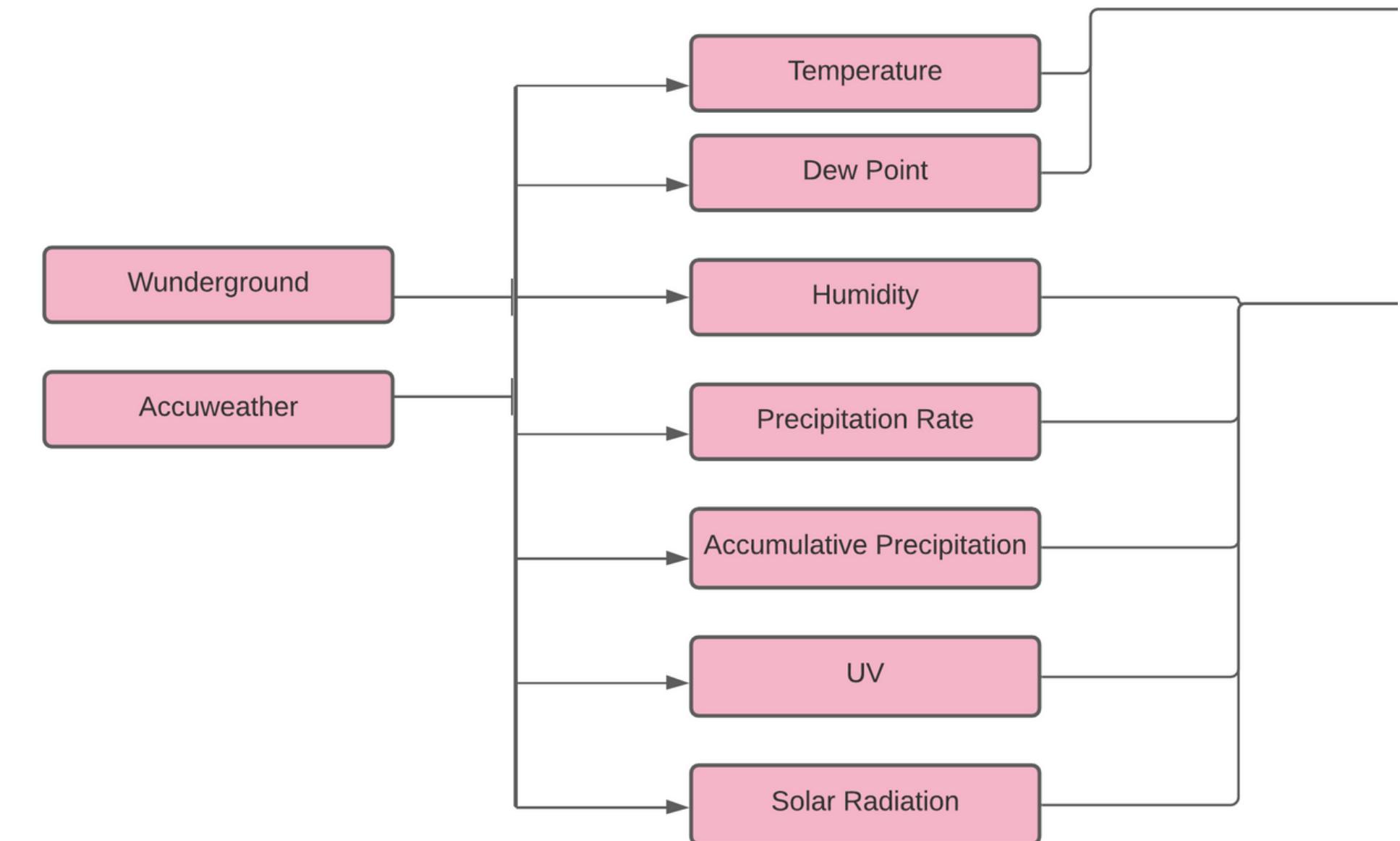
Satellite (Remote Sensing)



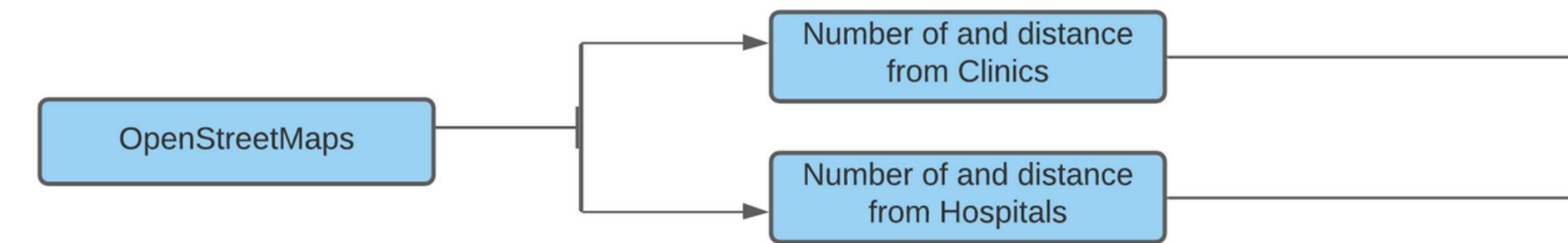
Social Listening



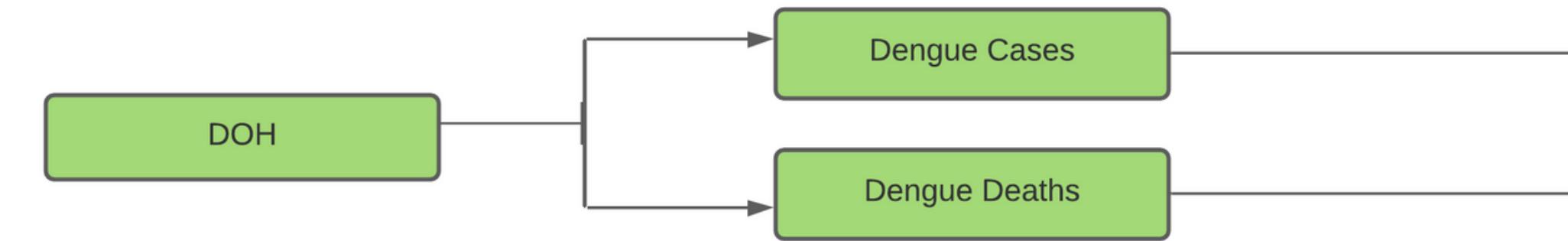
Weather



Health Capacity (OpenStreetMap)



Case Count (Health Data)



Hotspot Detection Features

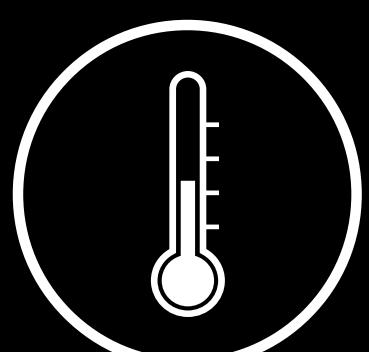
COLLECTING SATELLITE DATA
AT POINTS OF INTEREST



Normalized
Difference
Vegetation Index



Normalized
Difference
Built-up Index



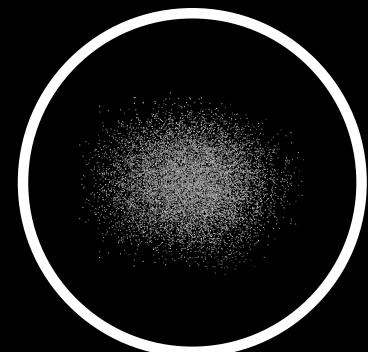
Surface
Temperature



Relative
Humidity



Normalized
Difference
Water Index



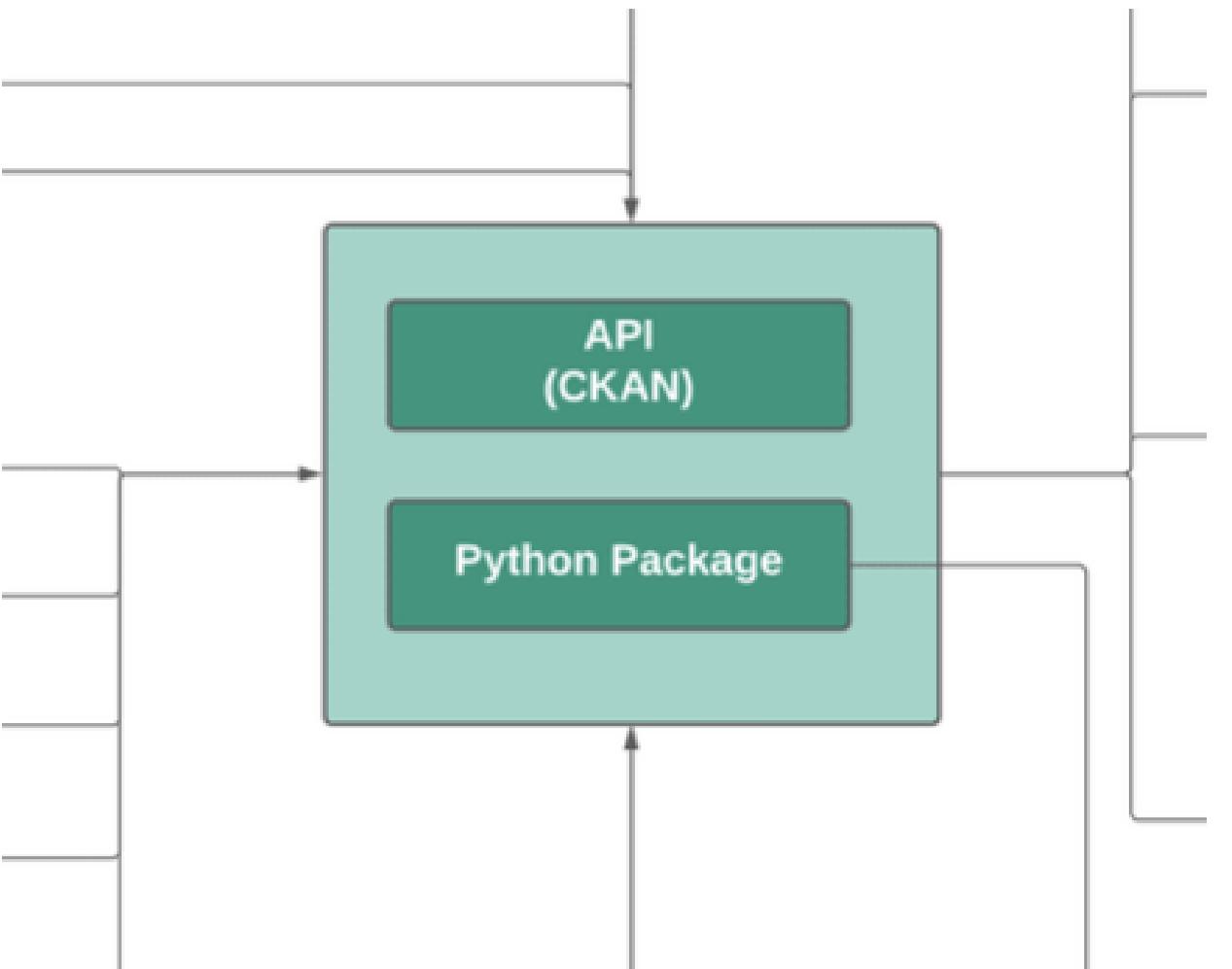
Aerosol Index for
Air Quality

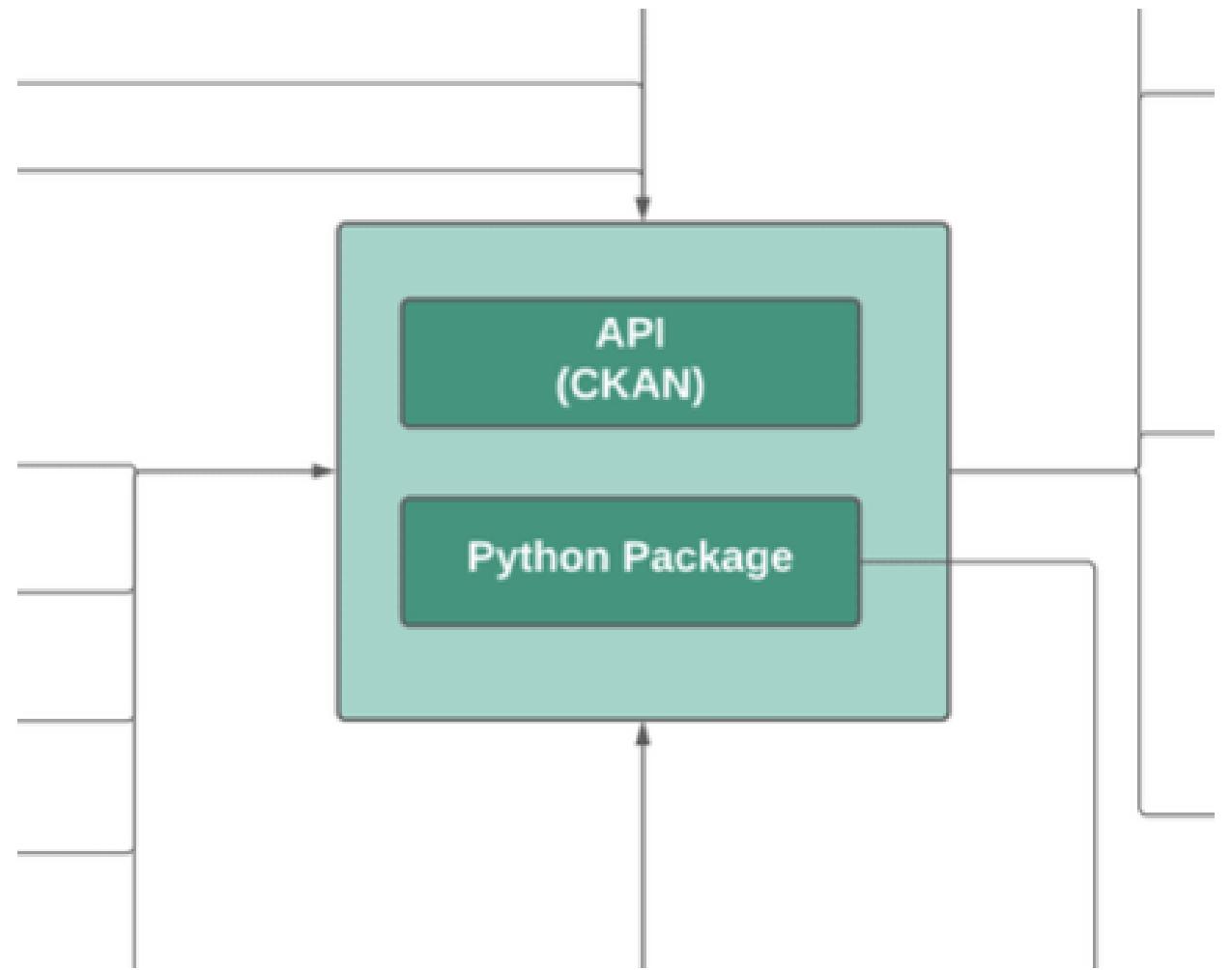


Rate of
Precipitation

Data Management System

Python
Package





API

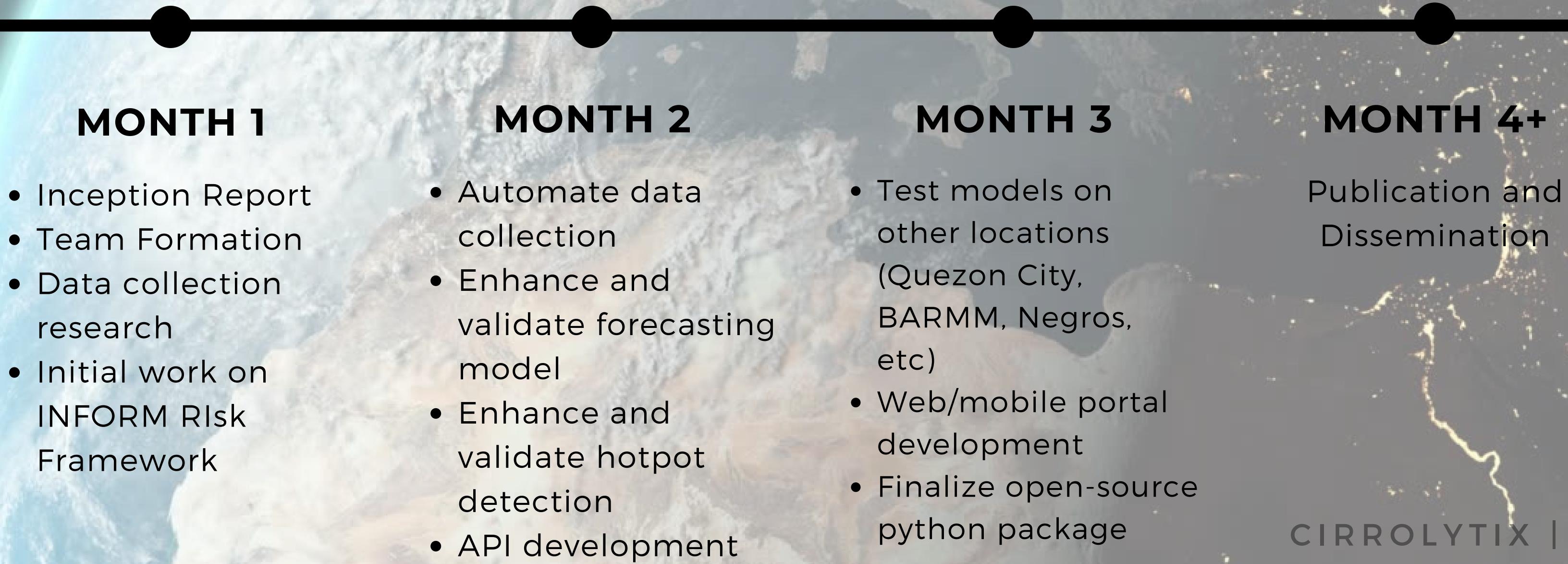
Allows communication between user and software/system

Python Package

Opens up the code of platform to other collaborators

DPG Timeline

ENHANCEMENT ACTIVITIES



PROJECT VISION

