# ForeFlame

A fire management tool to predict the probability of wildfire occurrence while providing a comprehensive data source for fire analysts to make informed tactical decisions that mitigate the impact of wildfires

Problem

Wildfires have an important role in nourishing, and enriching life in the forest. However, when uncontrolled, wildfires can cause significant and irreversible loss in terms of land, people, and the economy. Wildfires are increasingly as global issue, from Europe, Australia, South America, to North America, as well as North America, due to climate change and development.

Given the complexity of gathering and analyzing data for accreditation and the growing sophistication of technology systems to fire departments, Foreflame believes a standard analysis and visualization system for fire analysts is an important next step to systematically address the growth and severity of Wildfires.
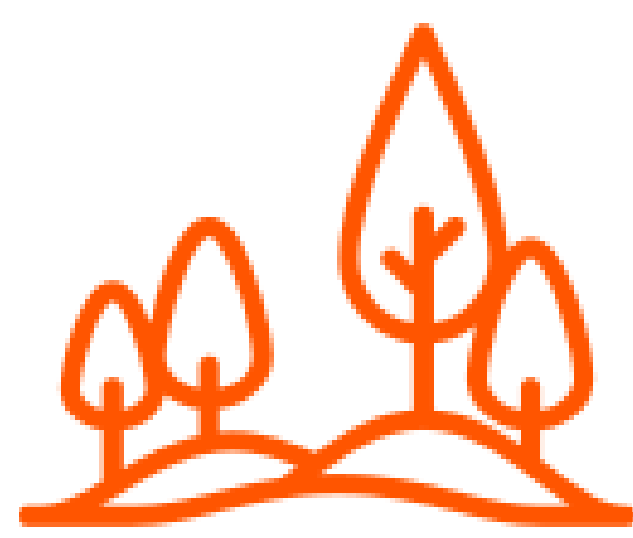
92 M
Acres of land burning in 2019 globally

1.59B
Wildfire suppression costs in 2019

670
U.S. firefighters killed on-duty in the past 10 years

Solution

Develop and Implement a WildFire Occurrence Analysis and Modeling System integrating comprehensive data into the machine learning to develop data driven models that can assist in the prediction of wildfire occurrence in the next 4 days in Washington state.

Dashboard Visualization
Provide an interface which includes a map to identify specific locations and assess conditions and prediction result in linear time. The user can also isolate specific factors like vegetation, canopy data on the map to assist them build a more comprehensive strategy.

Data Fusion and ML
Integrate weather data from NOAA, NDVI from MODIS, fuel data from LANDFIRE, and historical wildfire data in the past 10 years to build the DNN model to provide five days prediction result.

Trends and Timeline
Provide five days prediction result for consistence observation and build completed supression strategy

Collaboration Platform
Develop report functionality for fire analysts to build wildfire reports and send to the fire managers for easy seamless communication

Process

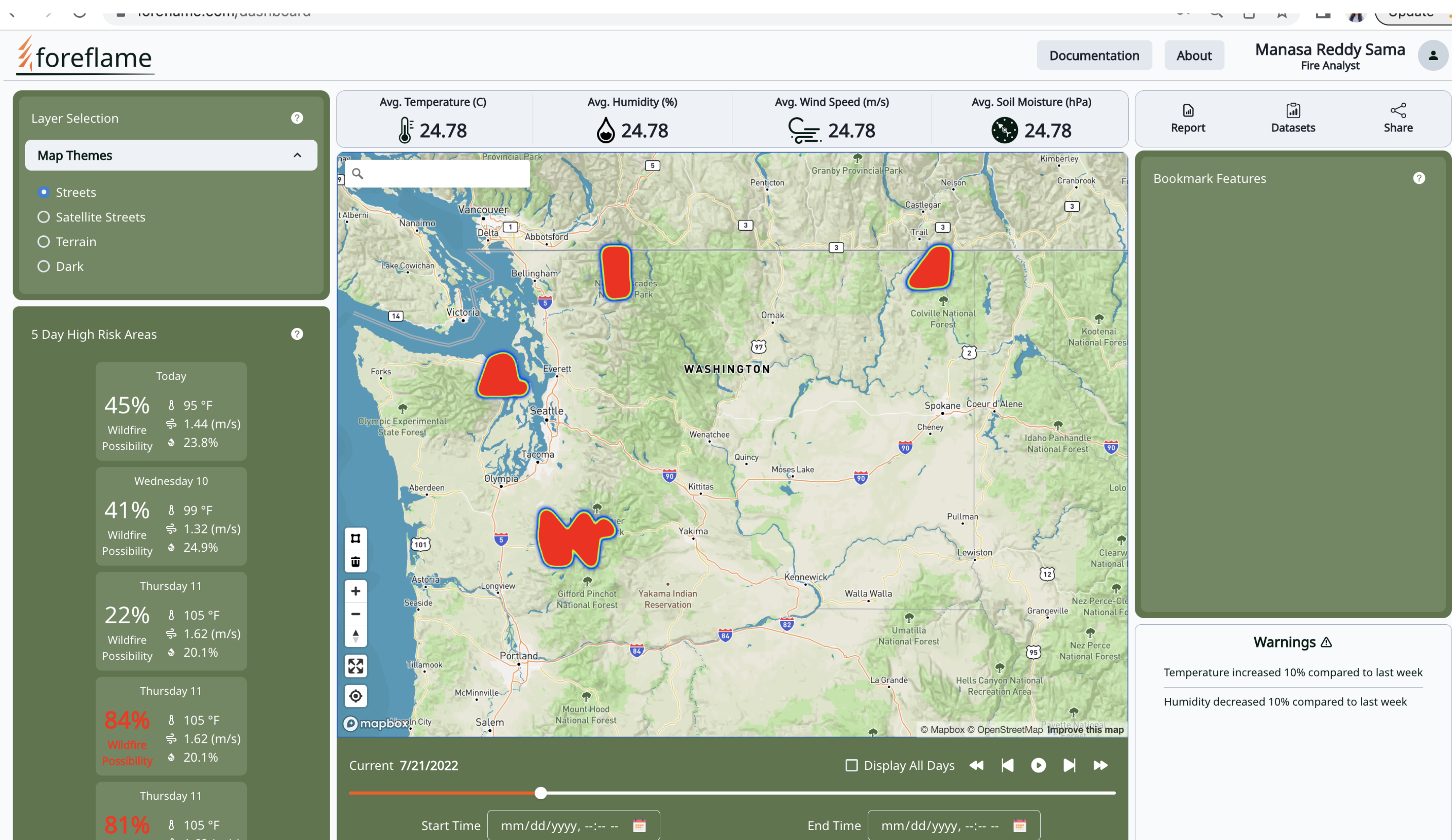|	
Research	**Interview** 6 Expert Interview with fire analysts, meterologist from DNR, research forester from USDA, forester at U.S forest service **Field study** Observe the fire prescription with fire managers and wildfire firefighters
Ideation	Scope down the topic and list the product requirement based on the result of affiity diagram
Development	Build the prototype of the front end interface in figma for usability testing before move forward to software development
Evaluation	7 participants including meteorologist, RAWS Program Manager, Fire Regulation Program Manager.
Testing	3 participants, Functionality testing verified output with 2018 and 2022 wildfires and the correlation was >93%

- Dashboard

- Architecture