**Malaria prediction web app**

**Architecture framework**

The malaria prediction app is a web based up designed to act as an early warning system for malaria outbreak occurrence. Malaria outbreak is determined through calculating the threshold limit for which past that an outbreak is likely to occur. Climate change is known to have an influence on growth of parasites by either offering perfect conditions for parasites to increase in number or reduce in number. The malaria web app works based on three frameworks from which its architecture is built from:

1. **vector based framework**

Malaria is caused by plasmodium falciparum and plasmodium vivax which are the common threats attributed to malaria. This framework works based on mosquito population. In a herd of mosquitos, the number of the two species of mosquito will determine if there is a likelihood of a malaria outbreak.

1. **climate based framework**

In this framework, the main emphasis is on how climate variability influence the growth of mosquitoes hence increasing or decreasing their population. Climate variables used for this web app are, rainfall, max and min temperature, relative humidity (at 0800 and 14000hrs).

1. **case based framework**

For this framework, our focus is in the cases reported. The cases reported is a direct indicator of the threat species in the area.

**App usage**

The app is built using machine learning where the dataset is collected, cleaned and undergo feature engineering and is trained using different machine learning algorithms. One important thing to be noted is, the algorithm uses the above discussed framework to predict the likelihood of an outbreak. The algorithm used for this is decision tree, the prediction is done from analyzing the vector aspect of the dataset, the climate variables and cases. This means that the prediction can be made even with some parameter values as zero. A weather api is used to gather live climatic conditions of counties of Kenya and the user is asked to give herd population and number of cases reported then the algorithm can do the prediction. The prediction is classified into two, ‘outbreak’ and ‘minimum threat’ for which both of them control measures are provide.

The app is a two page application with the main page for the prediction purpose while the second page is the visualization page where graphs that show the different relationship of variables is used. The graphs are built using plotly which makes the interactive with zoom in and zoom out features available as well as the employing different themes.