**Malaria Outbreak Prediction Model**

This app is primed to assist public health workers to detect possibility of an early outbreak of malaria and suggest measures to mitigate the risks associated with an outbreak of the disease.  
  
**App Architecture Framework**  
The malaria outbreak prediction app is web based and acts as an early warning system for occurrence of malaria. Malaria outbreak is determined by calculating threshold for likely outbreak of malaria based on three frameworks namely; climatic variables, mosquito vector population and reported malaria cases.  
  
**i. Vector Based Framework**  
Malaria outbreak is attributed to plasmodium falciparum and plasmodium vivax parasites. This framework is based on meeting threshold for mosquito vector population as hosts for these disease-causing parasites. In a herd of mosquito, the number of the two species of mosquito will determines the likelihood of malaria outbreak.  
  
**ii. Climate Based Framework**  
This framework emphasises how climate variability influence the growth of mosquitoes hence, their population. Climate change is known to have an influence on growth of mosquito vector and parasites by offering perfect conditions for both to grow in number. Climate variables used in this app are: rainfall, max and min temperature, relative humidity (at 0800 and 14000hrs).  
  
**iii. Case Based Framework**  
The focus in this framework is reported malaria cases in an area. Reported malaria cases is a direct indicator of malaria outbreak threat in a target area as a pointer to the presence of the disease within community.  
  
**App Usage**  
The model is trained using decision tree algorithm and built using machine learning pipeline. Prediction is done by analysing aspects of the dataset which include malaria population, malaria cases and climate variables. Prediction can be made even with some parameter values being zero. Weather API is used to gather live climatic conditions of counties in Kenya, and users asked to provide herd mosquito vector population and number of reported malaria cases.  
  
The algorithm then uses the framework to predict likelihood of a malaria outbreak. Prediction is classified into three outcomes: **HIGH ALERT, MILD ALERT**and**NO THREAT**, and suggests control measures to address a possible malaria outbreak. The app is a two-stage application with the main page for the prediction and shows various tables, while the second stage is for visualization of graphs showing relationship between different variables.