Plotting the Grow Dataset Sensors Over the UK Map

Objectives

The objective of this assignment was to develop a Python program to:

1. Import the GrowLocations.csv dataset into a DataFrame.
2. Cleanse and preprocess the data to rectify inaccuracies in the latitude and longitude figures.
3. Accurately plot the sensor locations on a supplied UK map image while maintaining data integrity.
4. Incorporate a feature to highlight and interactively display additional information about the sensors.

Steps Undertaken

1. *Data Loading:*
   - The dataset named GrowLocations.csv was imported into a pandas DataFrame.
   - Essential libraries like pandas and matplotlib were utilized for data manipulation and visualization.
2. *Data Cleaning and Preprocessing:*
   - *Serial Column Correction:*
     - The values in the Serial column were processed with regex to pull out essential identifiers, guaranteeing consistency.
   - *Latitude and Longitude Labels:*
     - The dataset contained erroneous labels for Latitude and Longitude, which were amended.
   - *Filtering for Valid Locations:*
     The sensors located outside the specified boundaries for the UK map were excluded according to these criteria:
     - Longitude: -10.592 to 1.6848
     - Latitude: 50.681 to 57.985
3. *Map Integration and Plotting:*
   - The map image of the UK (map7.png) was placed on a plot with an extent that accurately corresponds to the bounding box.
   - The positions of the sensors were depicted using a scatter plot, with each sensor represented by blue markers.
4. *Interactive Features:*
   - A tooltip was implemented to display detailed information about each sensor (e.g., Serial, Latitude, Longitude, Sensor Type, and timestamps) when hovering over points.

- A highlighted marker dynamically tracked the selected sensor location during mouse hover events.

Outcome

The project effectively processed the GrowLocations.csv dataset by fixing data integrity issues, such as adjusting column labels and cleaning invalid coordinates and Serial values. Sensor locations were accurately plotted on a UK map within the specified bounding box. Interactive features like tooltips and highlighting were added to enhance user engagement.