PYDISP PACKAGES

1. MATPLOTLIB

This package is used to plot graphs in the *PyDisp* software. Matplotlip creates a plot in which the desired title, axes names, legend, scale bar, colors and the data to be plotted are added.

In the PyDisp software, matplotlib plots the initial data, exposed data and the infected data all in the same plot. Also the package is used to export the plot into a tiff file saved in the selected working folder.

2. NUMPY

The package creates data arrays that are easy to manipulate. The manipulations include the update of grid cells status (exposed and infected) during the runtime. Most of the imported/working data are converted to numpy arrays for manipulaion. The working data include:

(i) Grid data
(ii) Neighborhood data
(iii) Initial colonized area data
(iv) Constraint data

3. PANDAS

In the *PyDisp* software, this package has been used mainly to handle the processing of csv and excel data files. The package imports initial colonized areas data in the form of csv or excel files.

Also the package has been used to store the working data in the form of csv for faster access during the runtime after they have been imported.

4. SHAPELY

The package contains method to convert array data into geopandas geometry data which is easy to plot using matplotlib package.

5. MATPLOTLIB_SCALEBAR

The package has been used to create and label the scale bar in the matplotlib plot. Also the package provides a method to automatically scale the scalebar depending on the physical size of the shapefile under study.

6. GEOPANDAS

The package has been used to perform several processes concerning the shapefiles

- Used to read in the shapefile data including the geometry of the shapefile which is used as data input to the matplotlip for plotting the maps.
- Used to produce the grid by use of the clip method incorporated inside the geopandas package.

7. PYSHAPE

The main use of this package in the *PyDisp* software is to create new shapefile with specified cells size that is used by the geopandas package for the clipping to produce the grid.

8. TKINTER

Has been used to create the graphical user interface of the *PyDisp* software. This includes the software layout itself with all the buttons, data entry fields, plotting field and the progress status.

9. THREADING

Has been used to ensure smooth running of the *PyDisp* software by ensuring that both the backend and frontend of the software are running concurrently.

10. RASTERIO

This package has been used to import the tiff data in the *PyDisp* software. After the import the package is also used to extract the data from the tiff file at the points corresponding to the grid points.

11. MATH

The package has been used to provide mathematical functions such as rounding up of data sets.

12. OS

The package provides a way of handling files and folder in the host computer. This includes creation of folders, specifying the path to files, checking existence of files and folders, splitting path names to check type of files and deletion of files.

13. SHUTIL

This package provides method to copy imported shape files into the working folder to be used in creating the grid.

14. PIL

Used as a way to plot graphs in the *PyDisp* software as images. The images saved as ".tiff" using the matplotlib package during the runtime are imported using the PIL package into the software.