This algorithm perfoms Automatic Landslide Suspectibility Mapping using Novel Sampling. User can download the whole files and run the code automatically.

Run The Algorithm With Given Sample Data:

To run the algorithm with the example .shp and .tif files : User can directly download all of these files and run the algorithm after changing folder paths in the code.

In this repisotory there are:

1- **shp_files** folder
(this folder has 99 .shp file and these shape files are the input of the code.)
2- **shp_files_buf** folder
(this folder has 99 .shp file and these shape files are the input of the code.)
3- **working_area_borders.shp** file
(this file has the working area border location(lat,lon) informations)
4- **0765_aster_sub.tif** image
(this image is a 15 bands multispectral image and it has orginal values of pixels not normalized vlaues, DEM values are generated from this image file, these values are also the input of the code.)
5- **stretch_bands_A_band1-14_.tif** image
(this image consis of first 14 bands and used for train and test data sets)
6- **stretch_bands_B_band15-28_.tif** image
(this image consis of last 14 bands and used for train and test data sets)
7- **Generating_Seed_Ceel.m** Matlab file.
(The whole main algorithm, preprocessing, 2LRS method and generating data sets are written in this file)

Run The Algorithm With Your .shp and .tif Files:

There are two shape files folders. One of this folder contains landsilde shape files and the other one contains landslide buffer shape files. User should put her/his shape files. After adding own files, the folder path in the code should be changed to read these files. Please note that all shape files sampling ratio should be higher to run the code withouth any problem. That is to say: if the working area pixel size is 15mx15m, in shape file between two neighbour points the distance must be less than 15m.

There are three image files in repisotory. stretch_bands_A_band1-14_ and stretch_bands_B_band15-28_ consist of 14 bands seperately. This is because github doesnt let to users to load a file larger than 100MB. Normally the image used in the code is 28 bands. Exiting code in the system can automatically merge these two data sets. If the user want to use her/his image file, user can modify the imread and concatenating image lines of the code.

The algorithm is implemented in Generating_Seed_Ceel.m file with matlab codes. This code has 3 main parts as mentioned in the article in figure 1. The first part of the code is preprocessing. In this part user should set the parameters for his/her files. Please note that:

- lat_begin and lon_begin are the parameters which are the starting points of your working area in UTM Coordinates Systems. (Code Line 50 and 51)
- size_of_y and size_of_x are the pixel size of your working area (Code Line 52 and 53).
It is recomended to user to run the codes part by part. After runing part 1 codes, user can check the results by uncommenting the figure/imshow lines in code.

The second part of the code is Generating Seed Cell Polygons. In this section user just need to define the radius. It is recommend to the user to check the landslide figures and then decide a radius which is the coverage of the bigest landslide. After entering radius value user can run the second part of the algorithm. In this part the result will be the seed cell of the all landslides. interested_buf_struct(j).final will be output of the second part(In the code). Using these seed cells(interested_buf_struct(j).final) user can generate 2 times random samples from these seed cells in third part of the code.

Final part of the code is 2 Level Random Sampling Method. In this part of the code the final aim is to generate the array_learner, arrayImage_test_ls and arrayImage_test_non_ls data sets. array_learner is the data set for training process. By opening MATLAB classification learner toolbox user can use this train data set during training operations.

Please note that, in third part of the code 2 times sampling is done randomly. This means that if the user run the algorithm again and again, everytime user will have a new array_learner, arrayImage_test_ls and arrayImage_test_non_ls data sets.

After runing all three parts of the code, user can change the training percentages in the code and then run the code again.