PRODUCING RESULTS FOR ACASU AND MNIST CASE STUDIES

STEP 1: Install nnv from the link: *https://github.com/verivital/nnv (follow the readme.md for the installation guide).*

STEP 2: Add nnv to matlab path using Home → Set Path →Add with Subfolders

STEP 3: Go to folder: nnv0.1/examples/Submission/FM2019/ACASXU or MNIST

STEP 4: Produce results for ACASXU

Compute reach set:
Go to each Property, for example, property P1 on N1_1
Run *reach_P1.m* scripts to compute the reachable set of the N1_1

Notice: to run in a normal computer, you need to change the number of cores you use for computation, **numCores** = 1, 2, 3, 4 for examples.

The results of this script is the *outputsSet.mat*

Our results are from Amazon cloud with 90 cores. You can see numCores = 90 in the script. Change this to the number that is suitable for your computer.

Verify Safety:
Run the script : *verify_P1.m*
This script load the reachable set from the outputSet.mat and verify the safety of the network.

STEP 5: Produce results for MNIST

Go to each subfolder to run the scripts for each network.

For example, in mnist_1_140 run:

search_robustness_bound_exact_star.m (searching using exact star method)
or
search_robustness_bound_approx_zono.m (searching using zonotope method)
or
...

These scripts are runnable on a labtop without changing anything.

STEP 9: For any question please contact: trhoangdung@gmail.com