FBSSNN Code

September 2018

Steps:

- Convert the address events (time, channel, x, y, pol) to spike trains to be compatible with SpiNNaker using **cnvrt_evt2spk.py**, inside the file, Specify the data set file and folder.
- Run the file **spin_generate_conn.py**:
  This file will generate all th econnection lists required to build the FB-SSNN. You can change the different parameters corresponding to retina width/hight, kernel size of Gabor, .. etc (for all parameters description see section 3.2 - Table 3.1 in the report). This file will generate a folder in the same directory named "connlsts", inside the folder you can find 6 files:
  - **Lrf2cnet_connlsts_wxh_dlywGain.pickle**: the connection list between the Left RFs_layer and the DD_layer.
  - **Rrf2cnet_connlsts_wxh_dlywGain.pickle**: the connection list between the Right RFs_layer and the DD_layer.
  - **inlyr_dsp_mext_connlst_wxh_dlywGain.pickle**: internal pre-excitation connection list between each neuron and the neurons that has same disparity value in the same layer in the DD_layer.
  - **outlyr_dsp_mext_connlst_wxh_dlywGain.pickle**: internal pre-excitation connection list between each neuron and the neurons that has same disparity value in the neighbour layers in the DD_layer.
  - **inlyr_rwcl_minh_connlst_wxh_dlywGain.pickle**: internal pre-inhibitation connection list between each neuron and all the neurons along the same line of sight in the same layer in the DD_layer.
  - **outlyr_rwcl_minh_connlst_wxh_dlywGain.pickle**: internal pre-inhibitation connection list between each neuron and all the neurons along the same line of sight in the neighbour layers in the DD_layer.

- Run the file **spin_RTNA_RF_DD.py**:
  This file will generate the RFs_layer and the DDs_layer, it uses differnet set of classes:
  - **c_rtna_cls.py**: This class uses the spike trains generated from the first step and generate two population of neurons (spiking source) by default are called left_retina and right_retina.
  - **c_rf_cls.py**: this class takes one retina object and generate set of population of spiking neurons representing the RF layer. It connect the retina neurons to these RF layer with weights corresponding to the orientation of Gabor filter. All th eparameters can be changed according to the data set.
  - **c_cnet_cls_v5.py**: This class takes two RF (left and right RF with same orientation) and it creates the disparity detector layer corresponding to that orientation. It uses the six connections list that were generated in the second step.
- The output of each RF_layer and DD_layer will be stored in folder called **rslts**, the data are stored using the SpiNNaker format using 1D coordinates represented by the the neurons ID:
  - Run **spin_cnvrt_rslts2TDXY.py**: to convert the output of RFs_layer to 2D coordinates (x,y).
  - Run **spin_cnvrt_cnet2TDXY.py** to convert the output of DDs_layer to 2D coordinates (x,y) for each layer in the 3D grid.
  - Run **spin_anmy_TDXY.py** to show the output of RFs_layer in 2D using animation.
  - Run **spin_anmy_cnet.py** to show the output of the DD_layer in 3D.