Neural network
for image recognition

The program is written in Python and is based on a neural network. The main goal of the program is a prediction for loaded images. The categories (classes) in which the program is able to classify the object on the image:

- T-shirt

- Trouser

- Pullover

- Dress

- Coat

- Sandal

- Shirt

- Sneakre

- Bag

- Ankle boot

For this purpose, it has been used the free and open-source software, Tensor Flow. The program predictions work with an accuracy of about 85% and have be trained on the basis 6,000 photos (fashion, keras model). In addition, the program learns to recognize more. For example in case of wrong prediction, user can indicate what is given on the image and program will be re-trained.

Photos are loaded in .png format. The selection rule for photos is that their pixel number should be NxN, where $N >= 28$. In the case of photos with a higher quality, the program will reduce it to 28 by 28 pixels. For simplicity, when loaded photo is close to square, the program has function which checks it and for 10% difference of rectangle sides return square. So, the loaded photo has not to be ideal square.

2 CONTENS AND PATHS

Paths:

- */images*, includes examples of photos, here should be photos which user want to use

- */results*, folder contains predictions for each photo

- */28x28*, folder with uploaded photos prepared by the program to classification

3 ENVIRONMENT AND REQUIRED LIBRARIES

Project has been created in Python 3.7.5 so it's a recommended version of Python. Before the use, it should be installed the following libraries:

- Tensor Flow 2.0.0

- Numpy 1.17.4

- Matplotlib

- PIL 6.2.1

- Argparse

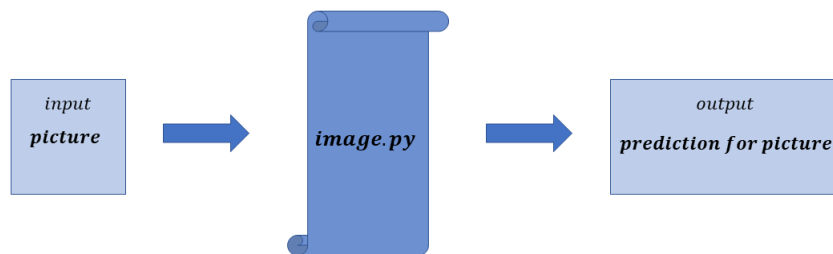## 4 RUN

Figure 4.1: scheme

Basic commands:

- **python3 main.py --help** or **python3 main.py -h**
  help option

Run program commands should be with all criterias according to:

- **python3 main.py -m name -n image_3.png**

- **python3 main.py -m name+ -n image_6.png -a 0**

- **python3 main.py -m series -i 7**

- **python3 main.py -m reset**