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**Handwritten Signature Identification and Verification**

**By**

**SC\_34**

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**Data preparation**

1. Read images paths using OS library while ignoring csv files at stage 1.
2. Passed the paths to OpenCV to read images and resize them based on the technique we are going to use.
   * **Stage 1**
     1. **HOG** model image size were (64, 128, 1)
     2. **CNN** model image size were (128, 128, 1)

* **Stage 2**
  1. **BOW** model image size were (128, 128, 3)
  2. **Siamese** model image size were (128, 128, 3)

1. Created labels for CNN model at stage 1, labels were one hot encoded (e.g [0, 0, 0, 1, 0] for personD ), labels for the **HOG** model were a number between 0 and 4, same technique were used in **BOW**, but classes were either 0 or 1.
2. Same methods were used in Stage 3 but additionally text files were read corresponding to each image in the data set.

**Models and Techniques**

1. **Signature Identification (Stage 1)**

For first Stage the task was to apply image classification on signatures to Identify who it belongs to. We used two different models for that task.

* 1. **CNN – Model**

We applied simple **CNN** architecture consists of 4 convolution layers and 1 pooling layer, followed by 2 full connected layers.

**The full Architecture is:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Layer** | **# filters/ neurons** | **Filter Size** | **Stride** | **Size of feature map** | **Activation Function** |
| Input | - | - | - | 128 x 128 x 1 | - |
| Conv 1 | 32 | 5x5 | 2 | 62 x 62 x 32 | ReLU |
| Conv 2 | 32 | 5x5 | 1 | 58 x 58 x 32 | ReLU |
| Max Pool 1 | - | 3x3 | 1 | 19 x 19 x 32 | - |
| Conv 3 | 32 | 5x5 | 2 | 8 x 8 x 32 | ReLU |
| Conv 4 | 32 | 5x5 | 1 | 4 x 4 x 32 | ReLU |
| FC 1 | - | - | - | 512 | ReLU |
| FC2 | - | - | - | 128 | ReLU |
| FC3 | - | - | - | 5 | Softmax |