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**NN & DL Project 22-23**

**Sports Image Classification Project**

**TEAM: CS\_H12**

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| --- | --- | --- |
| Model | Augmentation? | Accuracy |
| Inception | **yes** | **Train : 99%**  **Validation:96%**  **Test(Kaggle):80%** |
| Customized Model(CNN) | **Yes** | **Train:98%**  **Validation:77%**  **Test(Kaggle):78%** |
| VGG 16 | **Yes** | **Train : 97%**  **Validation:89%**  **Test : 70%** |
| AlexNet | **Yes** | **Train:98%**  **Validation:85%**  **Test : 69%** |

**Preprocessing Step:**

* Image Resizing.
* Encoding for Labels to (0, 1, 2, 3, 4, and 5).

**Augmentation Process:**

* Random flip.
* Random Zoom.
* Random Rotation.
* Random crop
* Translation
* Adjust brightness and darkness
* Random noise
* Blur
* Different transforms

**Inception 80 % :**

Architecture:

* Inception module:
* Convolution layer with filters each of them [1x 1].
* Convolution layer with filters each of them [3x 3].
* Convolution layer with filters each of them [3x 3].
* Convolution layer with filters each of them [5x 5].
* Convolution layer with filters each of them [5x 5].
* -Maximum pooling layer with pooling size [3x3].
* Output 🡪 Concatenate the above layers.

**Customized Model 78 % (CNN):**

Architecture:

- Convolution layer with 32 filters each of them [5x 5].

-Maximum pooling layer with pooling size [2x2].

- Convolution layer with 64 filters each of them [5x 5].

-Maximum pooling layer with pooling size [2x2].

- Convolution layer with 128 filters each of them [5x 5].

-Maximum pooling layer with pooling size [2x2].

- Convolution layer with 256 filters each of them [5x 5].

-Maximum pooling layer with pooling size [3x3].

-Maximum pooling layer with pooling size [3x3].

- Flatten layer.

- Dense layer with 64 neurons.

- Drop out 0.2

- Dense layer with 32 neurons.

- Output layer with 6 neurons

**VGG16 70 % :**

Architecture:

* Convolution layer with 64 filters each of them [3X3].
* Convolution layer with 64 filters each of them [3X3].
* Maximum pooling layer with pooling size [2x2].
* Convolution layer with 128 filters each of them[3X3].
* Convolution layer with 128 filters each of them[3X3].
* Maximum pooling layer with pooling size [2x2].
* Convolution layer with 256 filters each of them[3X3].
* Convolution layer with 256 filters each of them[3X3].
* Convolution layer with 256 filters each of them[3X3].
* Maximum pooling layer with pooling size [2x2].
* Convolution layer with 512 filters each of them[3X3].
* Convolution layer with 512 filters each of them[3X3].
* Convolution layer with 512 filters each of them[3X3].
* Maximum pooling layer with pooling size [2x2].
* Convolution layer with 512 filters each of them[3X3].
* Convolution layer with 512 filters each of them[3X3].
* Convolution layer with 512 filters each of them[3X3].
* Maximum pooling layer with pooling size [2x2].
* Flatten layer.
* Dense layer with 4096 neurons.
* Drop 0.5
* Dense layer with 4096 neurons.
* Output layer with 6 neurons.

**AlexNet 69 % :**

Architecture:

- Convolution layer with 96 filters each of them [11x 11].

- Batch normalization

- Maximum pooling layer with pooling size [2x2].

- Convolution layer with 256 filters each of them [5x5].

- Batch normalization

- Maximum pooling layer with pooling size [3x3].

- Convolution layer with 384 filters each of them [3x3].

- Batch normalization

- Convolution layer with 384 filters each of them [1x1].

- Batch normalization

- Convolution layer with 256 filters each of them [1x1].

- Batch normalization

- Maximum pooling layer with pooling size [2x2].

- Flatten layer.

- Dense layer with 100 neurons.

- Drop 0.5

- Dense layer with 100 neurons.

- Drop 0.5

- Output layer with 6 neurons.