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Faculty of Computers and Artificial Intelligence

Computer Science Department

2021/2022

**CS 396 Selected Topics in CS-2**

***Team No. 5***

|  |  |  |  |
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PAPER DETAILS

1. About The Paper

* 1. **Authors Names:**

Karar Ali, Zaffar Ahmed Shaikh, Abdullah Ayub Khan and Asif Ali Laghari

* 1. **Paper Name:**

Artificial intelligence in brain informatics

Multiclass skin cancer classification using EfficientNets – a first step towards preventing skin cancer

* 1. **Publisher:**

2021 The Author(s). Published by Elsevier Masson SAS.

* 1. **Article History:**

Received 24 October 2021

Received in revised form 1 December 2021

Accepted 6 December 2021

2. Dataset Used

**a. Dataset Name:**

The standard HAM10000 dataset. It stands for Human Against Machine with 10000 training images.

**b. Number of classes and their labels**

The HAM10000 Dataset consists of 7 Classes.

1. *Akiec*
2. *Bcc*
3. *Bkl*
4. *Df*
5. *Mel*
6. *Nv*
7. *Vasc*

**c. Implemented Algorithms:**

-EfficientNets B0-B7

**Table

Description automatically generated**

PROJECT DESCRIPTION DOCUMENT

1. General information on the selected dataset

**a. Name:**

Augmented Skin cancer ISIC

**b. Link:**

<https://www.kaggle.com/datasets/ayaanmustafa/augmented-skincancer-isic?resource=download>

**c. No samples:**

9118

**d. Dimensions:**

(767,1022,3)

**e. NO classes:**

9

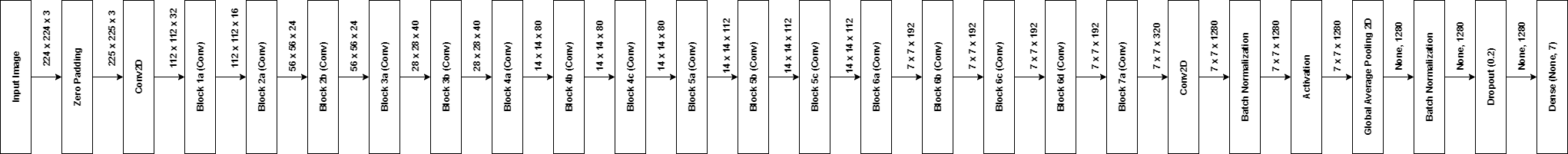
**f. Labels:**

1. actinic keratosis
2. basal cell carcinoma
3. dermatofibroma
4. melanoma
5. nevus
6. pigmented benign keratosis
7. seborrheic keratosis
8. squamous cell carcinoma
9. vascular lesion

2. Implementation details:

**a. Ratio:**

* Train = 0.8 => 6564 images
* Test = 0.2 => 1824 images
* Validation = 0.1 => 730 images

** b. Block Diagram:**

**c. Hyperparameters used:**

1. **Training Model From Scratch**
   1. Initial learning rate: 0.001
   2. Include top: True
   3. Shape: (244, 244, 3)
   4. Weights: None
   5. Optimizer: “Adam”
   6. Loss: Sparse Categorical Crossentropy
   7. Batch size: 32
   8. Epoch size: 40
2. **Transfer Learning From Pre-Trained Weights**
   1. Shape: (224, 224, 3)
   2. Include top: False
   3. Weights: “ImageNet”
   4. Optimizer: “Adam”
   5. Used Average pooling
   6. Loss: Sparse Categorical Crossentropy
   7. Regularization Dropout: 0.2
   8. Learning rate: 0.0001
   9. Batch Size: 32
   10. Epoch: 25
3. **Unfreezing Model**
   1. Added Batch Normalization
   2. Optimizer: “Adam”
   3. Loss: Sparse Categorical Crossentropy
   4. Batch size: 32
   5. Epoch size: 10
   6. Learning rate: 0.0001

c. Results details:

1. **Training Model From Scratch**

a. Test accuracy: 63%

b. Train accuracy: 68%

c. Validation accuracy: 61%

**2. Transfer Learning From Pre-Trained Weights**

*Evaluated model in weight to be ImageNet, added Regularization Dropout 20%, updated Learning rate to 0.0001, and added Average Pooling.*

a. Test accuracy: 50%

b. Train accuracy: 51%

c. Validation accuracy: 49%

**3. Unfreezing Model**

*We Transferred the Learning and added Batch Normalization*

1. Test accuracy: 69.7%
2. Train accuracy: 74%
3. Validation accuracy: 69%