****

Faculty of Computers and Artificial Intelligence

Computer Science Department

2021/2022

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

**Research Project**

Report Submitted for Fulfillment of the Requirements and ILO’s for Selected Topics in CS-2 course for Fall 2021

Team ID No. 24

|  |  |  |  |
| --- | --- | --- | --- |
|  | ID | Name | Grade |
|  | 201900845 | ممدوح عمر ممدوح عمر مشعل |  |
|  | 201900344 | سلمى احمد عيسى |  |
|  | 201900855 | مهران اشرف محمد مصطفى |  |
|  | 201900435 | عبدالرحمن محمد فاروق فؤاد |  |
|  | 201900348 | سلمى سمير عبدالفتاح محمد |  |
|  | 201900500 | عمر احمد عبدالعزيز يونس |  |
|  |  |  |  |

Delivered to:

**Dr. Wessam El-Behaidy**

**Eng. Salma Doma**

**Eng. Ahmed Nady**

* **Paper Details**
* Authors Name:
* Name: Qasem Abu Al-Haija.
* Email: [Qabualha@Tnstate.edu](mailto:Qabualha@Tnstate.edu)
* Name: Mahmoud A.Smadi
* Email: [Smadi@hu.edu.jo](mailto:Smadi@hu.edu.jo)
* Name: Saleh Zein-Sabatto
* Email: [Mzein@Tnstate.edu](mailto:Mzein@Tnstate.edu)

Paper Name:

Name: Multi-Class Weather Classification Using ResNet-18 CNN for Autonomous IoT and CPS Applications.

Paper Link: https://american-cse.org/sites/csci2020proc/pdfs/CSCI2020-6SccvdzjqC7bKupZxFmCoA/762400b586/762400b586.pdf

Publisher Name:

International Conference on Computational Science and Computational Intelligence (CSCI)

Year of Publishing:

2020

Dataset used in paper: Weather Recognition dataset with 4 Classes

The implemented Algorithm: ResNet18

Results:

Graphical user interface, application

Description automatically generated

Graphical user interface, application

Description automatically generated

* **Project Description**

1. General Information on the selected dataset:

Dataset name: Weather Classification

Link: <https://www.kaggle.com/code/kamalkhumar/weather-classification-with-augmentation/data>

Total Number Of Samples in the dataset: 1500

The Dimension of images: ( 256,256,3)

Number of Classes:

There are 5 classes ['cloudy', 'foggy', 'rainy', 'shine', 'sunrise']

**B. Implementation details**

we divided the dataset into train and validation(Testing) by ratio of 75% to the train data

number of images in each:

train:

Training cloudy images are: 225

Training foggy images are: 225

Training rainy images are: 225

Training shine images are: 187

Training sunrise images are: 262

Total: 1124

Validation(testing data):

Valid cloudy images are: 75

Valid foggy images are: 75

Valid rainy images are: 75

Valid shine images are: 63

Valid sunrise images are: 88

Total:376

Block Diagram:

**A picture containing chart

Description automatically generated**

# Hyperparameters: stochastic Gradient Descent with momentum and decay

Optimizers: Adam

{ opt = SGD(learning rate=0.15,momentum=0.9,decay = 1e-04)}

Results Details:

Learning Curves:

Accuracy:

Chart, line chart

Description automatically generated

Loss:

Chart, line chart

Description automatically generated

Testing accuracy:

Graphical user interface, text, application, email

Description automatically generated

Confusion Matrix:

Chart, box and whisker chart

Description automatically generated