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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

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* **Paper Details**
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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: ( 224,224,3)

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

test:

Total:92

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

Description automatically generated

Testing accuracy:

Graphical user interface, text, application

Description automatically generated

Confusion Matrix:

Chart, scatter chart, box and whisker chart

Description automatically generated