**Group Members:**

Abdullah (SP18-BCS-037)

Muhammad Mubeen (SP18-BCS-034)

Faizan Nadeem (SP18-BCS-058)

**Title:** Blood cell type classification

**Dataset:** Blood Cell Images.

<https://www.kaggle.com/paultimothymooney/blood-cells>

**Dataset details:**

This dataset contains 12,500 augmented images of blood cells (JPEG) with accompanying cell type labels. There are approximately 3,000 images for each of 4 different cell types grouped into 4 different folders (according to cell type).

The main folder contains following four types of images given below:

* Eosinophil
* Lymphocyte
* Monocyte
* Neutrophil.

**Details**

After the loading of the dataset, we will structure our dataset into test and train and further and further subject it to multiple machine learning models in order to find useful patterns in the images which can then be used to use to classify the type of the blood cells among the four.

|  |  |
| --- | --- |
| A screenshot of a computer game  Description automatically generated with medium confidence | A screenshot of a computer game  Description automatically generated with low confidence |

After the initializing of data and labels we scale the raw pixels intensities, applying the train test model and at the end we output the confusion matrix which tells us the accuracy of the model.

We have taken the types of white blood cells, which are identified on the basis of the presence of granules, shape of nucleus and size that is relative to that of RBC’s. A doctor can identify the type of blood cell through histopathology (H & E Staining). Histopathology is basically the study and diagnosis of disease under the examination of microscope.

**EOSINOPHIL:**

* Eosinophil can be identified by the presence of a nucleus having two lobes.
* Large eosinophilic granules of uniform size.

**LYMPHOCYTE:**

* Lymphocyte can be identified by the presence of round, uniform, densely stained nucleus.
* Small amount of pale cytoplasm.

**MONOCYTE:**

* Monocytes can be identified by their large size.
* They have large bean or kidney shaped nucleus.
* Monocytes have extensive “frosted glass” cytoplasm.

**NEUTROPHIL:**

* Neutrophil contains the single, multilobed (between 2 to 5 lobes) nucleus.
* Neutrophil has condensed chromatin in the nucleus