Group 31 | Project Report

**Study of Convolutional Neural Networks for Early Detection of Diabetic Retinopathy**

SECTION A: Project profile

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| **Group number** | 31 |
| **Topic** | Study of Convolutional Neural Networks for Early Detection of Diabetic Retinopathy |
| **Project members** | Rafael Mosheyoff, Shoval Yehuda, Yosef Zoubi, Or Eliyahu |
| **Project environment** | Python, Google Colab |
| **Project libraries** | Tensorflow, Keras, Numpy, Sklearn, Pandas |

SECTION B: Project report and reflection

1. **Project description:** The projects main objective is to study and adapt the CNN for the classification of DR stages, based on the Rachel Cai Convolutional Neural Networks for Early Detection of Diabetic study results, and to understand deeply how a Convolutional Neural Network works.
2. **Process of the project study:** We took a week to learn and improve the knowledge on the given CNN project then we meet twice a week on Zoom to speak about the subject and ideas of how implement base on what we learned till that point. Then we started to implement the study solution using Google Colab because our personal computers are weak. Lastly, we prepared the presentation together.
3. **Project study & dataset:**

* Study of Convolutional Neural Networks for Early Detection of Diabetic Retinopathy

<https://ysjournal.com/study-of-convolutional-neural-networks-for-early-detection-of-diabetic-retinopathy/>

* Diabetic Retinopathy Detection dataset

<https://www.kaggle.com/c/diabetic-retinopathy-detection/>

1. **Project flow**:

• The project uses the Kaggle DR competition dataset.

• Dataset selection keeping the original ratio.

• Image pre-processing (vertical flip, horizontal flip, scaling, degree rotation).

• Pretrained model build using VGG16 model as base.

• Training the Diabetic retinopathy model using weights.

• Check the training results.

• Use the model to predict random pictures.

• Check the predict results.

1. **Project results:** The results were as expected from the study of convolutional neural networks for early detection of diabetic retinopathy, moreover we tried several combinations at the image pre-processing stage getting around 5-7% improved results.
2. **Project conclusion:** For research on convoluted neural networks for early detection of diabetic retinopathy has various advantages as ruggedness to shifts and distortion in the image, fewer memory requirements and easier and better training still we think that using more accurate images or balanced dataset would give us better results However 5-stage DR classification is still a hard problem, especially when differentiating between the middle stages of DR.