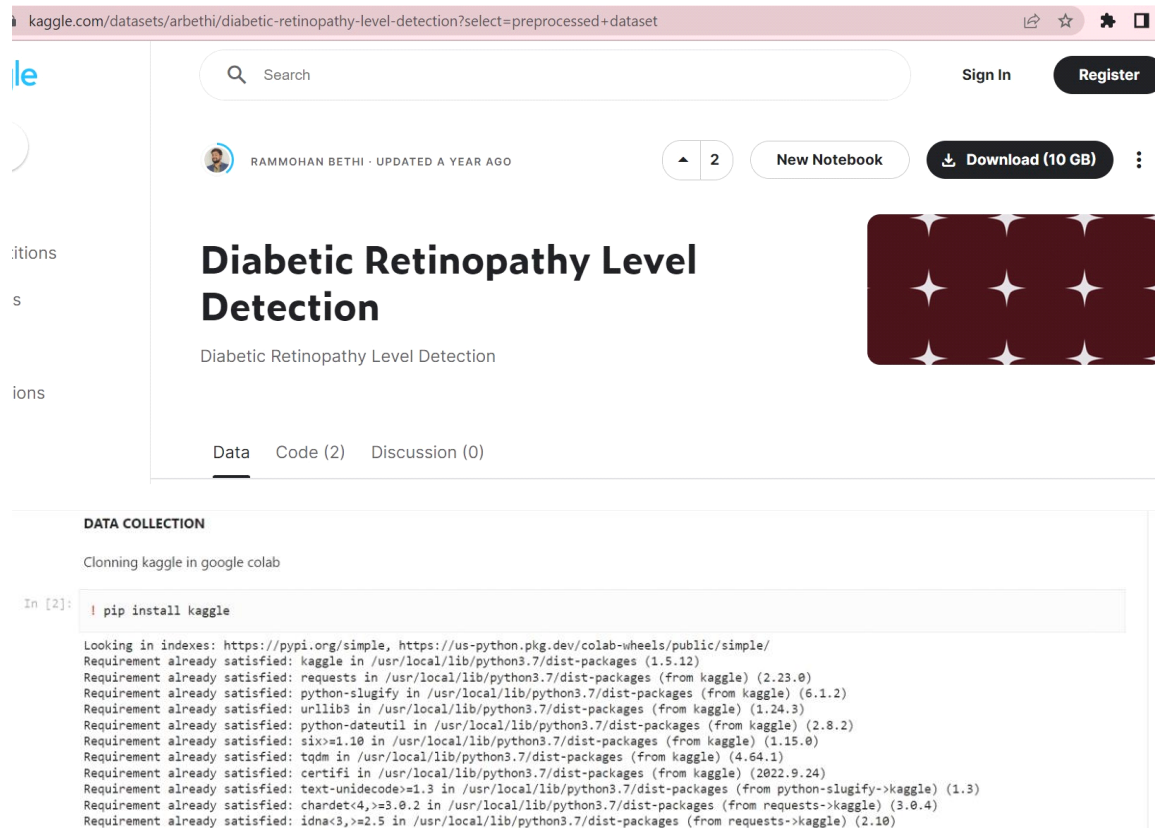


# Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy

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## Data Collection

DL depends heavily on data, it is the most crucial aspect that makes algorithm training possible. So this section allows you to download the required dataset.



The screenshot shows the Kaggle dataset page for 'Diabetic Retinopathy Level Detection' by Rammothan Bethi. The page includes a search bar, a 'Sign In' button, and a 'Register' button. The dataset is updated a year ago and has 2 notebooks. A 'Download (10 GB)' button is visible. The dataset description is 'Diabetic Retinopathy Level Detection'. Below the title, there is a grid of fundus images. The 'Data Collection' section shows a terminal output of 'pip install kaggle' and a list of requirements that are already satisfied.

```
In [2]: pip install kaggle

Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: kaggle in /usr/local/lib/python3.7/dist-packages (1.5.12)
Requirement already satisfied: requests in /usr/local/lib/python3.7/dist-packages (from kaggle) (2.23.0)
Requirement already satisfied: python-slugify in /usr/local/lib/python3.7/dist-packages (from kaggle) (6.1.2)
Requirement already satisfied: urllib3 in /usr/local/lib/python3.7/dist-packages (from kaggle) (1.24.3)
Requirement already satisfied: python-dateutil in /usr/local/lib/python3.7/dist-packages (from kaggle) (2.8.2)
Requirement already satisfied: six>=1.10 in /usr/local/lib/python3.7/dist-packages (from kaggle) (1.15.0)
Requirement already satisfied: tqdm in /usr/local/lib/python3.7/dist-packages (from kaggle) (4.64.1)
Requirement already satisfied: certifi in /usr/local/lib/python3.7/dist-packages (from kaggle) (2022.9.24)
Requirement already satisfied: text-unidecode>=1.3 in /usr/local/lib/python3.7/dist-packages (from python-slugify->kaggle) (1.3)
Requirement already satisfied: chardet<4,>=3.0.2 in /usr/local/lib/python3.7/dist-packages (from requests->kaggle) (3.0.4)
Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.7/dist-packages (from requests->kaggle) (2.10)
```

## Create Training And Testing Path

To build a DL model we have to split training and testing data into two separate folders. But In the project dataset folder training and testing folders are presented. So, in this case we just have to assign a variable and pass the folder path to it. Four different transfer learning models are used in our project and the best model (Xception) is selected. The image input size of xception model is 299, 299.

### Creating Training And Testing Path

```
In [9]: imageSize = [299,299]
        trainPath = r"/content/preprocessed dataset/preprocessed dataset/training"
        testPath = r"/content/preprocessed dataset/preprocessed dataset/testing"
```