Astana IT University

Advanced Programming

Deep Learning

Mr. Yeleu Sultanmurat

Final Project Report

Students:

IT-2105

Serikov Yerasyl

Serik Sultan

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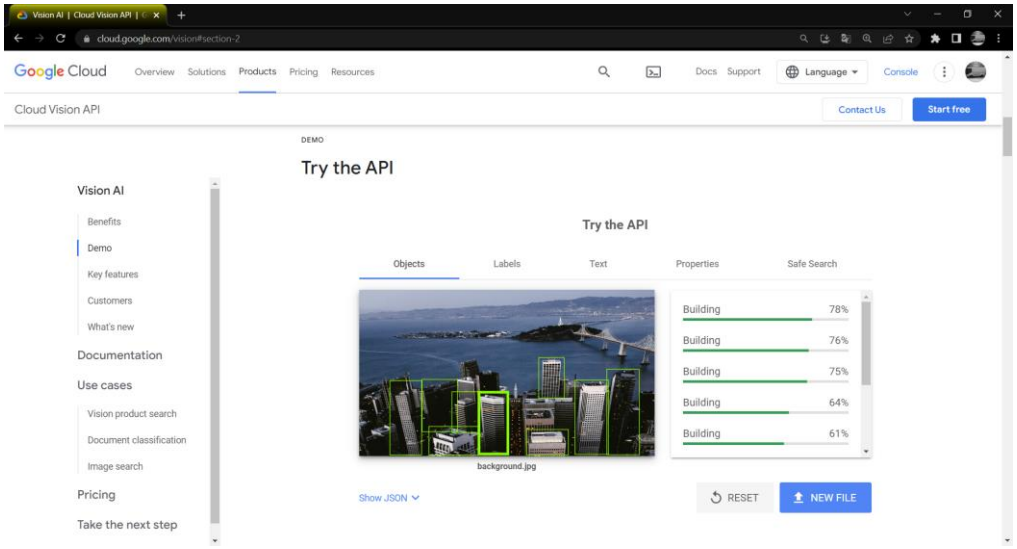
Introduction:

Basically, idea was to train model that will be to classify images, giving it's prediction like "in this picture I saw a cat". Obviously there is lots of other solution available such as Amazon Rekognition, Google Vision AI and many more.

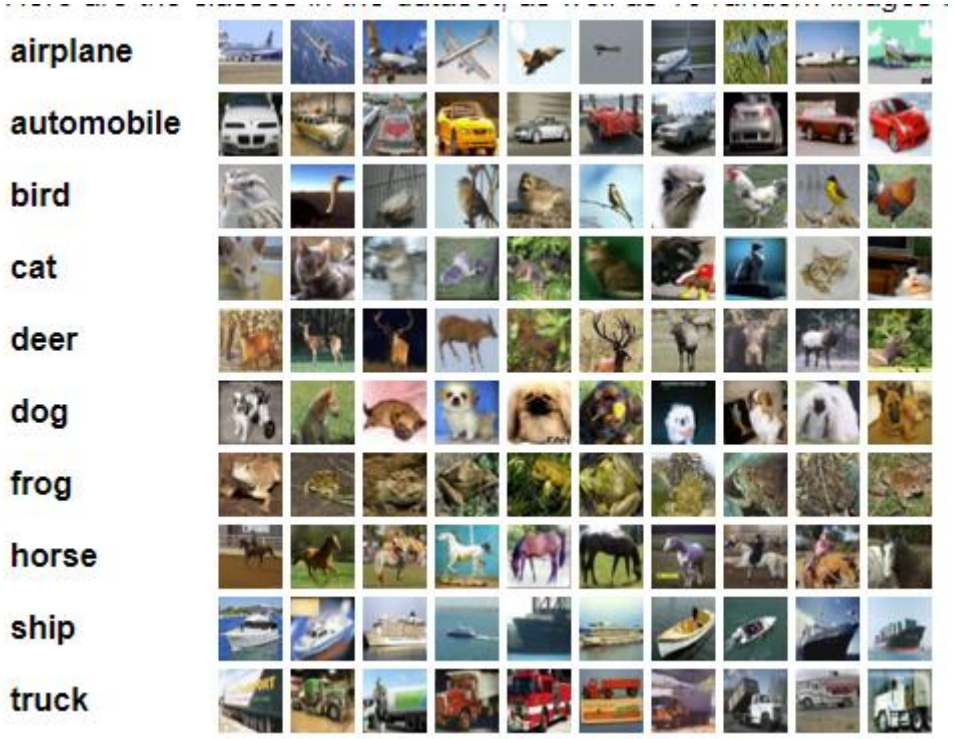


It is clear that such professional software is used to solve real-world problems and makes countless number of task easier. Also it worthy to mention that such enterprice software is been developed and supported by professional and it obviously generates huge amont of profit.

We tried to make telegram bot which classifies images sent by using pre-trained model and predicts to which class of images it mostly similar.

Data and Methods:

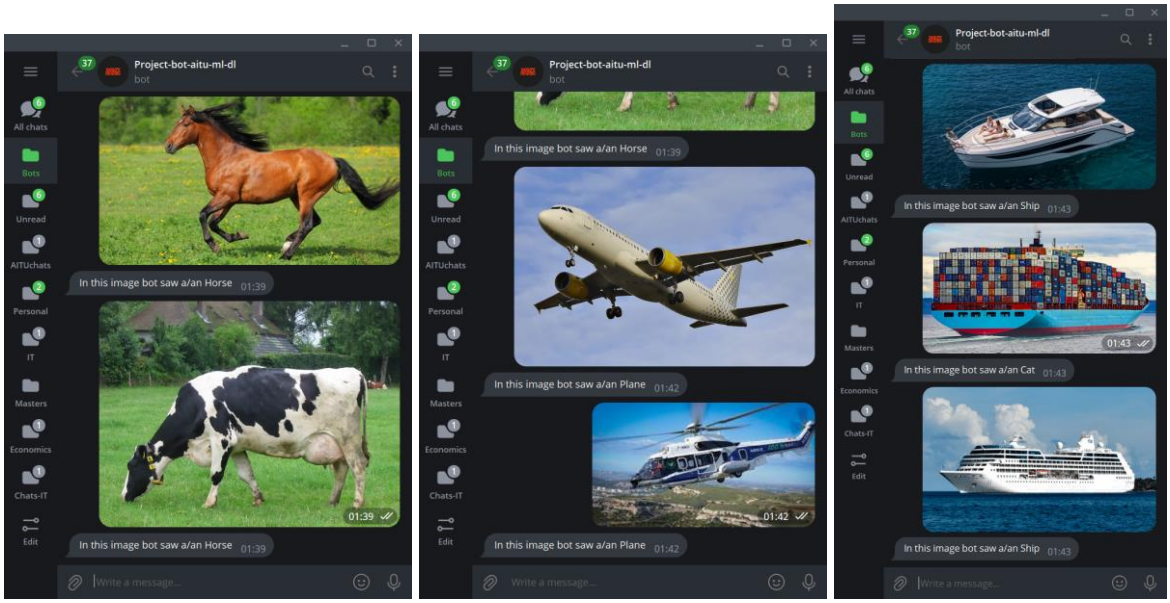
Images on which our model is trained are all from well-known CIFAR-10 dataset. This dataset consists of 60000 32x32 color images. There are 10 classes, 6000 images per class. There are 50000 training images and 10000 test images.



In our model we used CNN (Convolutional Neural Network) and TensorFlow to train the model as CNN is the best choice for image classification. To work with images from user we used OpenCV and NumPy to decode, convert color from RGB to BGR and then resize image to 32x32.

Result of Project:

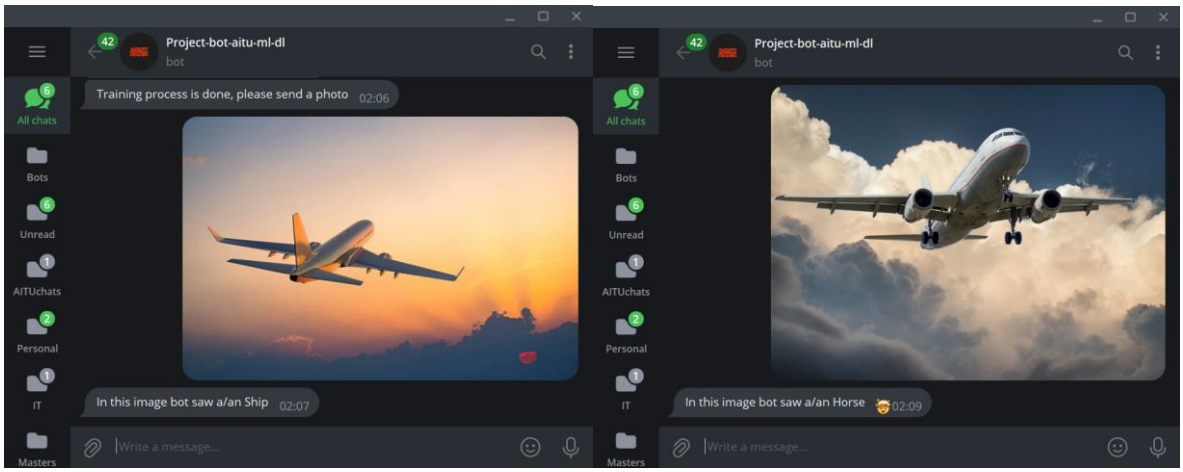
(Images were randomly picked from web)



Firstly, we must train model and then send an image. After we sent an image bot will reply with text message like “I saw a Cat”.

As we can see from screenshot above model can clearly classify obvious images of plane, horse and cruise ship; but as we have only 10 classes in dataset CIFAR-10 similar images classified within that 10 classes. Images of cow, helicopter and small yacht are provided above.

But in real world most of images not obvious and our model could somehow see ship and horse. Factors such background and color of object are important.



Summary:

To sum up, the project implementation process was entertaining as well as challenging. We have used our theoretical knowledge in practice. Although our idea is not unique or uncommon, we have used additional technologies such as new machine learning libraries and bot creation tools. At some stages of the project, we could understand some aspects of provided theory from a new perspective.

After completion of this course from a long-term perspective we can consider improving theoretical knowledge and hard skills such as mastering Python fully, mathematical algorithms, and many more. In process of knowledge acquiring, we can improve this project by using more effective datasets and altering model logic to increase the accuracy of prediction. In particular, we can use the CIFAR-100 dataset with more subclasses and alter model logic to get the best result.

Sources:

https://aws.amazon.com/rekognition/

https://cloud.google.com/vision

https://www.cs.toronto.edu/~kriz/cifar.html

https://www.deeplearningbook.org/contents/convnets.html