

Turzhanov Bektas. IT-2107

1. **Problem or idea description:** Develop a multiclass image classification model to accurately identify and classify different types of sports balls in images.
2. **Background information:** Sports ball identification and classification is a common task in sports industry, but it can be challenging due to the variety of shapes, sizes, and colors of different types of balls. Automating this task can improve efficiency and accuracy in sports equipment inventory management, coaching, and training.
3. **Available solutions:** There are several open-source projects and pre-trained models available for image classification using deep learning, such as TensorFlow's Object Detection API (https://github.com/tensorflow/models/tree/master/research/object_detection) and VGG16 (<https://keras.io/api/applications/vgg/>).
4. **How to get the data:** I will use publicly available datasets of sports balls images, such as “Sports Balls Dataset”. It’s a dataset of images of various types of sports balls, labeled with the corresponding class (<https://www.kaggle.com/samuelcortinhas/sports->

[balls-multiclass-image-classification](https://www.kaggle.com/datasets/gpiosenska/balls-image-classification)) or “30 Types of Balls - Image Classification”. In this dataset there are 30 different types of balls, train set includes 3615 files in 30 subdirectories, one for each type of ball. (<https://www.kaggle.com/datasets/gpiosenska/balls-image-classification>)

5. **Brief description of the solution:** I will use transfer learning approach to fine-tune the pre-trained VGG16 model on the available dataset of sports ball images. I will modify the last layer of the VGG16 model to output predictions for the 30 different types of balls. The model will be trained and validated on the available datasets to improve its accuracy.
6. **Tech stack that will be used:** Python, TensorFlow, Keras
7. **Additional information:** I will also evaluate the performance of the model using commonly used metrics such as accuracy and precision. The model will be tested on new images to assess its generalization capabilities.