UMKC CS5542

**Team 3**

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**Increment 1 Report and Software Overview**

**Project objectives**

The project presented by our team is to be an intelligent, multi factor score prediction software specifically targeted for basketball. This project contributes to the current state of research by leveraging both shallow and deep learning techniques on video data to create a time based linear score prediction, as well as demonstrating the effectiveness of multi factor prediction with software modeling. By leveraging competing software models against each other we believe we can significantly enhance correct software prediction of the desired output, the score of the basketball game.

**Features:**

The following can be use case scenario in our project

* Best score all the time
* Winning prediction over time
* Percentage of the score over the time
* Fouls rate prediction

**Approach**

This project will attempt a threefold approach to accurately model the score of any provided basketball footage. First, a TensorFlow deep learning model will be trained on a dataset with prominent scoreboard and scoring play footage to create an untrained model. Secondly, all footage will be compared to two supervised, trained models.

**Data Sources:**

Our data source is different high deficiency basketball videos. We collected some videos to train our model for different scoring action. YouTube 8M is more helpful in the data collection of the labeled video data

<https://research.google.com/youtube8m/>

**Expected Input/Output:**

Our Input will be the long basketball video. We will separate the frames from our videos. We will train our image classification models with the extracted frames. Then find the main frames on the basis different actions and hot spot areas.  
Our output will be a summarized video with the highlights of the match.

**Algorithms:**

We will use roughly following algorithms

* Decision Tree
* Random Forest
* NLP (BOW)

**Related Work:**

Relevant paper/work we found

* This paper on deep learning-based basketball video analysis helped us a lot in giving the basic idea of the project and different techniques to accomplish the task of video analysis

<https://link.springer.com/content/pdf/10.1007%2Fs11042-017-5002-5.pdf>

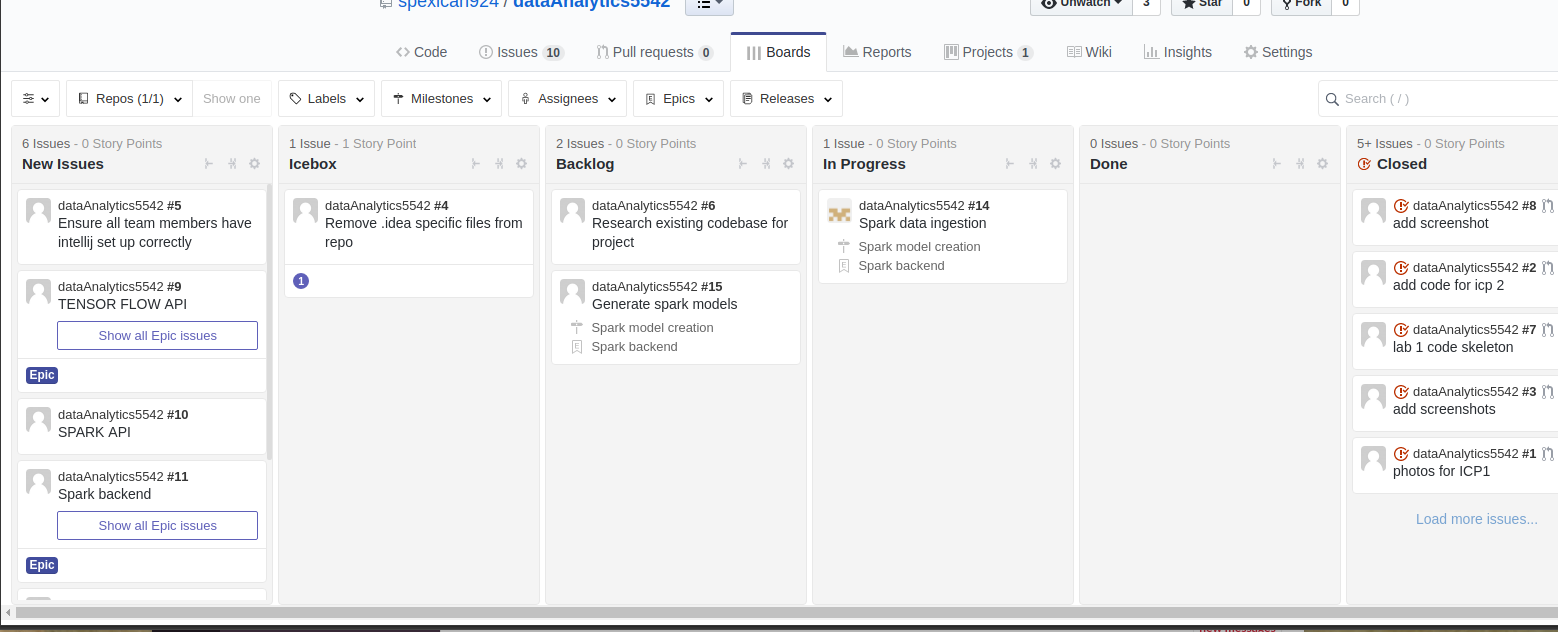
* The Kinetics Human Action Video dataset by Joao Carreira

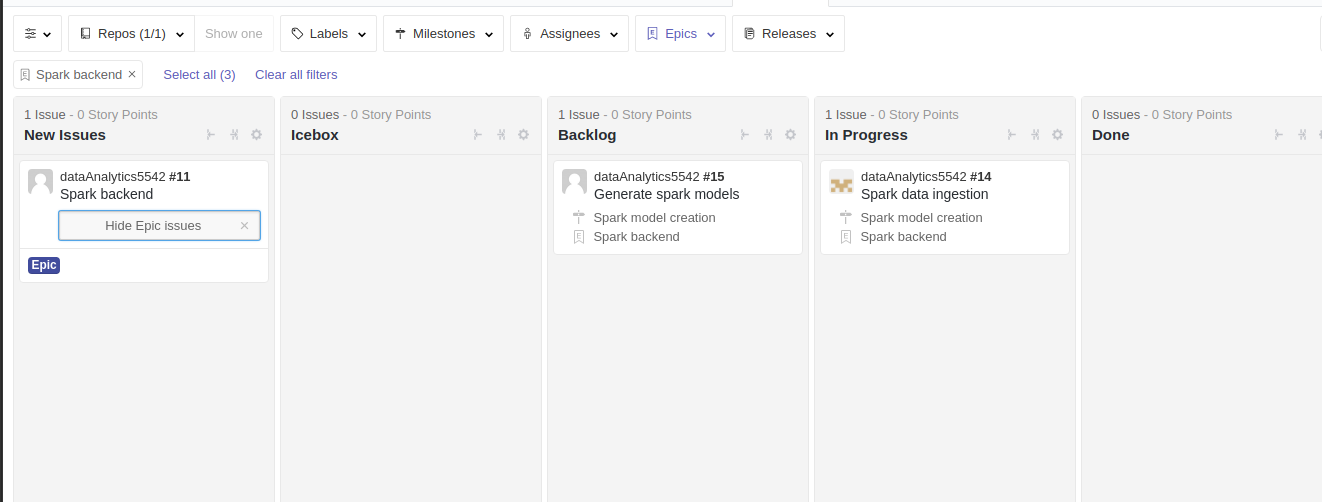
<https://arxiv.org/abs/1705.06950>

* To apply the Scala NLP the useful resource is

<https://github.com/scalanlp>

**Project Management and Plan:**

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**Work Completed:**

We have download the dataset of almost 4,5 actions/classes. We have build 2 classification model named random forest, naïve Bayes. We have successfully separated the frame from the videos and extracted the main frames from the set of already extracted frames. We have successfully predicted images on the web server by configuring the Akka services.

**Task division** among the team members is random and parallel. Most of the time everyone working on the same task and best results get merged in the final selection. There is rough estimation

Jaohn worked on random forest model building and training of the model with frames extracted from the data. Finding the related work and searching related models. Currently working on Deep learning TensorFlow Scala implementation

Zeshan worked Naïve Bayes building and training model. Finding the related work and searching related models. Current working status, Deep learning with TensorFlow API implementation

Jin Hongkun working on Data Collection and documentation. Training the models with more data collected. Finding the related work and searching related models.

Jin Mouqing working on Data Collection and documentation. Training the models with more data collected. Finding the related work and searching related models

**Work to be Completed:**

We have following thing in our to do list

* Create an android app
* TensorFlow API connection
* Spark web end points setup
* Colleting more data for good training of the model