**Basketball video Analysis**

**Project Proposal**

The project proposal should be one paragraph (200-400 words). It must be done by following one of the tracks provided by the instructors, and it should describe:

* What is the problem that you will be investigating? Why is it interesting?

Our project will focus on the analysis of basketball games with the aim of detecting some metrics of interest, such as the points scored by each player, the distances traveled and the key moments.

In our opinion it could be an interesting and innovative project because it allows us to automate many activities that are currently carried out manually and which therefore require a great effort in terms of time and costs

* What literature will you examine to have context and background?

We’ll focus on research papers dealing with object recognition and multiple object detection, especially in the sport realm. The tracking of the player will be also a fundamental part of the project and so we’ll examine techniques to re-identify players in the following frames of the video. Our research in the literature also focuses on the study of ball and field detection techniques, as well as we will delve into homographies with fish eye cameras in order to have a perspective of the court from above.

* What data will you use? If you are collecting new data, how will you do it?

The dataset we will use will be created by us from scratch starting from videos of basketball games recorded by a stationary camera placed in a fixed place. Then we may need a labeling phase to classify the objects in the images

* What method or algorithm are you proposing? If there are existing implementations, will you use them and how? How do you plan to improve or modify such implementations? You don't have to have an exact answer at this point, but you should have a general sense of how you will approach the problem.

The main algorithms we will use will be the mask-RCNN for the recognition of players and the basket rim and the homographies for the geometric transformation of the basketball court.

Firstly we will start from existing implementations which will be customized to our field of analysis if necessary

* How will you evaluate your results? What kind of results do you expect (e.g. which measures)? What kind of approaches will you compare your results against (e.g. which methods from the literature and/or which baselines)?

The final goal is to compare the accuracy of the predicted metrics such as points scored or ball possession to our reference baseline, the human.

Some metrics we will use to evaluate the results could be:

Identification precision(IDP)

Identification recall(IDR)

Identification F1(IDF1)

The pipeline of your project should contain:

* The use of classical image-processing operators (e.g., Filters, morphological operators, etc.)
* The use of at least a geometric-based algorithm or component (e.g., Perspective distortion correction, visual SLAM, etc.)
* The use of a retrieval algorithm or component.
* A Deep learning-based component, designed and trained by you. You are free to include and use any existing network, but there should be at least one component which has been originally conceived and trained by you.

You are free to include these elements anywhere in your pipeline, as long as they are clearly recognizable. You might also design a single component which accomplishes more than one requirement (e.g. a DL-based retrieval approach, designed and trained by you).

**Submission**: Please submit your proposal as a PDF on AImageLab Courses. Only one person on your team should submit.

**Deadline**: There is a strict deadline to submit your project proposal (see the “Important dates” section above).

**Evaluation**: The proposal will be reviewed by the instructors and you will receive an acceptance or rejection notification. In case the proposal is rejected, you must revise and resubmit it again in a few days, until it is accepted.

**Bozze idee:**

* Momenti salienti in base all' audio del pubblico