

Project Goal:

To develop and implement an algorithm that will track and interpret action from a soccer video.

Minimum Deliverable:

From a detection standpoint, there are 3 things that I should be able to accomplish:

- 1) Field detection: Based on shapes of lines on field, determine where the camera is shooting and major features (ie midline, sideline, the box, goal). This will likely be done with hough line and circle transforms
- 2) Player detection: Identify as many players on the field as possible, differentiating between teams based on jersey color. This will likely be done by thresholding and region segmentation based in the HSV spectrum (easier to filter out green field?)
- 3) Ball detection: from a certain frame, be able to identify where the ball is in the image. This may be a bit harder due to the faster motion of the ball. Perhaps a circle hough transform combined with some tracking algorithm

Maximum Deliverable:

To round out this project, we could implement some sort of algorithm that connects the frames. This would probably be some sort of tracking algorithm for the ball and the players, while keeping track of which players are who.

Also it would be great if we could implement some sort of interpretation from linking the frames. This would include who has possession of the ball, whether or not they are passing or shooting, or just the general movement and flow of the game. This would probably be done with a finite state machine linked to the tracking implementation

Timeline and Milestones:

- Week of 4/29: Set up C project with infrastructure to read and process video
- Week of 5/6: Develop and implement field detection. Develop player detection
- Week of 5/13: Implement player detection. Develop ball detection.
- Week of 5/20: Develop and implement ball detection and tracking
- Week of 5/27: Try to include interpretation. Finalize and document code.
- Week of 6/3: Finalize project report and poster

References:

- 1) Youness, Tabii & Rachid, Oulad Haj Thami. A Framework for Soccer Video Processing and Analysis Based on Enhanced Algorithm for Dominant Color Extraction
- 2) Ahmet Ekin, A. Murat Tekalp, Fellow, IEEE, and Rajiv Mehrotra. Automatic Soccer Video Analysis and Summarization. IEEE Transactions on Image Processing, vol. 12, no. 7, July 2003
- 3) T. D'Orazio, N. Ancona, G. Cicirelli, M. Nitti. A Ball Detection Algorithm for Real Soccer Image Sequences. Istituto Elaborazione Segnali ed Immagini - C.N.R.