UNIVERSITY OF BAHÇEŞEHİR
Department of Computer Engineering
CMP5550

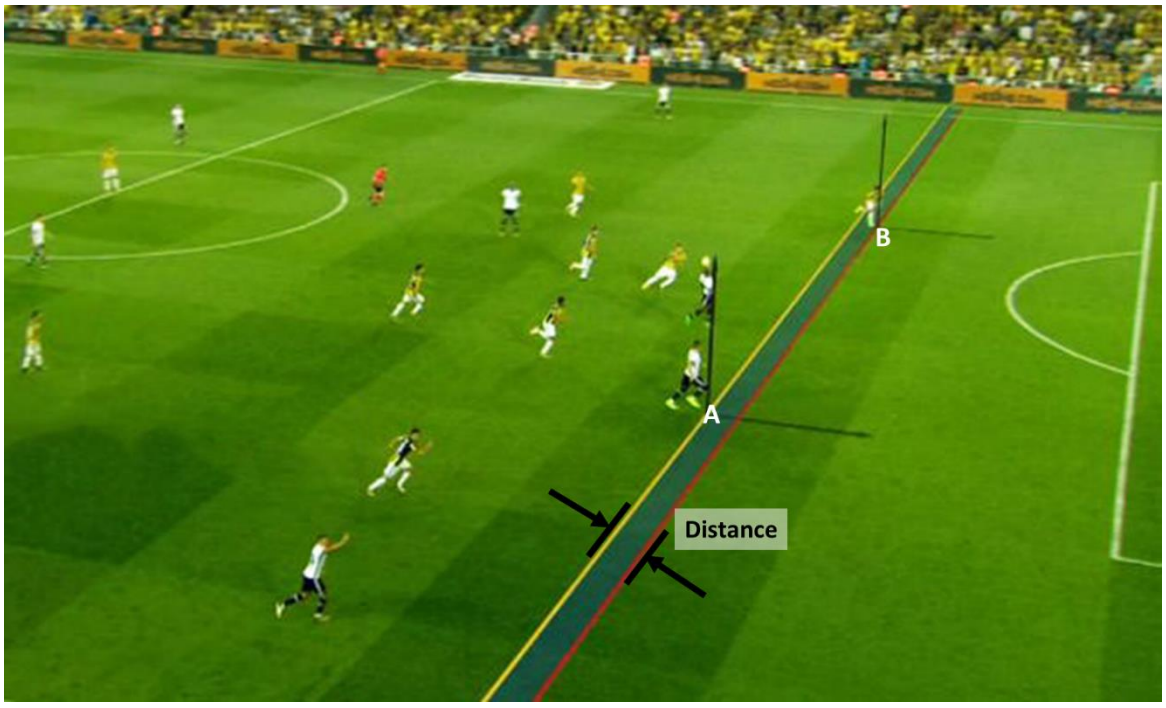
Programming Assignment #3

Due: Monday, Dec 30 (23:59)

Offside decision system in football

The offside law states that A player is in an offside position if he is nearer to his opponent's goal line than both the ball and the second last opponent. In this project, you are requested to create a software that helps to detect offside situations in football games.

The software inputs a picture (taken with an arbitrarily positioned camera) at the moment the ball is kicked, and a user has to click on the two players involved (player A and player B in the figure). From the positions on the screen, the distance between the two players along the x-axis of the field is computed (see Figure).



Requirements:

- Depending on the implementation you are free to get additional information from the user (i.e. dimensions of the field). Minimal input from the user is two points clicked.
- Your program should draw two vectors at the clicked points, perpendicular the field (ground plane).
- Your program should draw two lines to the image, parallel to the goal line. The program should also compute the distance between these lines in metric units.

Sample Code to get mouse input from user in Matlab

```
%The code draws line between points selected.
f=figure;
imshow('moon.tif');
[x, y] = getpts(f);
%click two point and hit Enter
line(x,y,'Color','red','LineWidth',2 );
```

Functions you may want to use in Matlab

```
cpselect(I1,I2, points1,points2);
fitgeotrans
transformPointsForward
transformPointsInverse
```

What to submit:

- Source codes
- Input/output images
- Report explaining details and theoretical background of your algorithm (equations, algorithms, numerical methods/solution of Linear/non-Linear Equation that you have used).