

# Advanced Vision Assignment 2 Report

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## 1 Final Touch

Final clean up and ball identification was made using matlab bwlable and regionprops functions. The function bwlable takes our intermediat file, which we got after applying all the masks, and labels all the connected objects in the file. Later, this file is supplied to regionprops function, which mesuers and returns set of the properties for each connected object in the file. We only needed 'Area' , 'PixelIdxList' and 'PixelList' properties. These options gave us these properties of the region:

1. 'Area' - number of actual pixels in the region,
2. 'PixelIdxList' - vector containing the linear indices of the pixels in region,
3. 'PixelList' - matrix specifying the locations of pixels in the region.

The idea was:

1. to find maximum connected object in the file by the pixels area,
2. set all other connected object areas pixel to 0 (delete these areas),
3. find the middle point of the largest connected objects area.

Second point cleaned the image of all the noise, because the object with biggest area was the ball itself. Third point was needed for evaluation, to evaluate how much our detected ball differs from ground truth. We had four diffrent approches how to calculate the mass of the ball:

1. Use the mean of the area pixels,
2. use the median of the area pixels,
3. use the maximum and minimum pixels in y and x coordinates and find the mean between them. It sort of creates a bounding box of the area and finds it centre.
4. use first and third aproch and find the mean between those two found centres.

The evaluation of these aproches are reported in the section below. We decided to use just normal mean, but left an option to change if needed and found that other aproches with diffrent data sets works better. We stored all found centres in the matrix. The format of that matrex is excatly the same as the format for the ground truth. In next stage we just plot the found mass centres on each image with the centre from ground truth and draw the trajectory at the end by connecting all the points.

## 2 Experiments and results

### 2.1 References

References should be numbered in order of appearance, for example [1], [2], and [3]. You *can* use `bibtex` to prepare references, or do it by hand if there are very few.

### References

- [1] Smith, J. O. and Abel, J. S., “Bark and ERB Bilinear Transforms”, IEEE Trans. Speech and Audio Proc., 7(6):697–708, 1999.
- [2] Lee, K.-F., Automatic Speech Recognition: The Development of the SPHINX SYSTEM, Kluwer Academic Publishers, Boston, 1989.
- [3] Rudnick, A. I., Polifroni, Thayer, E. H., and Brennan, R. A. ”Interactive problem solving with speech”, J. Acoust. Soc. Amer., Vol. 84, 1988, p S213(A).