

## EE368 Project

Title: Whiteboard Detection and Tracking of Presenter in a Video Lecture

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### Motivation

Online video lectures are a very effective way to revisit the material after having watching live, or to have access to the lecture when impossible to attend it. A very common occurrence, both live and in video, is that the lecturer will stand in front of the whiteboard when trying to explain a concept (Figure 1). There is little that one can do being live in the audience, except maybe to change seat. However, having access to the video frames provides the possibility of removing the lecturer in order to see the material being presented. This problem has been addressed in [1] and [2]. We propose a simpler solution where we can track the presenter and its translucency can be adjusted, even in low contrast situations [3].

### Goals

Main goal of this project is to implement an image processing technique to keep the whiteboard information always available on the frame, which could be blocked by an object(lecturer). Further goal is to apply our algorithm into more challenging situation; low contrast between the lecturer and the whiteboard. For instance, this would be when the lecturer (object) is wearing a shirt, highly correlated with the whiteboard, making it hard to distinguish the two.

### Approach

For each frame we have to identify the whiteboard or background of interest. By identifying the whiteboard and coregistering it with previous frames we can have an idea of where the lecturer (blocking object) is and what has been written in the whiteboard/background. Once the lecturer or object has been identified, we can replace its shape with the content of a previous frame. In this manner the content is always presented and accordingly updated when the lecturer/object is no longer blocking the whiteboard/background. This process is illustrated in Figure 1.

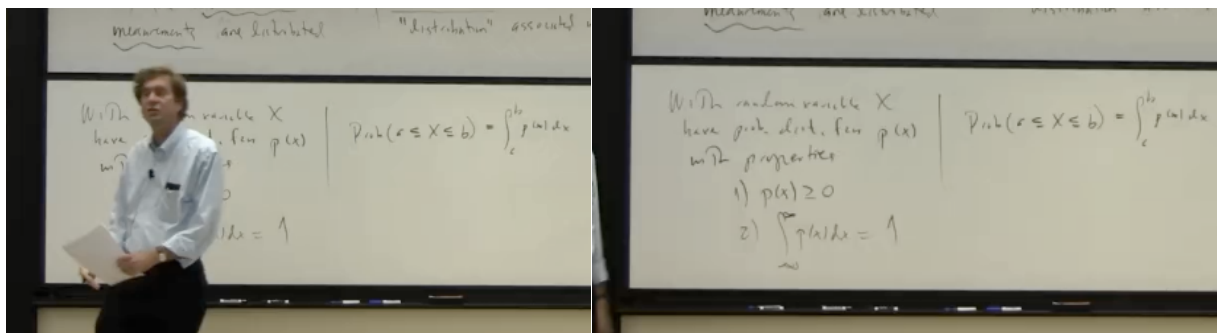


Figure 1. Left: The lecturer is blocking the whiteboard. Our goal is to detect the lecturer and

remove him to preserve the whiteboard(or make it transparent). Right: The ideal image after applied image processing algorithm.

### **References**

[1] He L., Zhang Z. *Real-Time Whiteboard Capture and Processing Using a Video Camera for Teleconferencing*. ICASSP 2005.

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[2] Wienecke M., Fink G.A., Sagerer G. *Towards Automatic Video-based Whiteboard Reading*. ICDAR 2003.

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[3] Davis D., Palmer P., Mirmehdi M. *Detecting and Tracking of Very Small Low Contrast Objects*. BMVC 1998.

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