

Automating Enhancement of Blackboard Diagrams for Online Presentations

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Abstract

The goal of this project is to design a system to enhance blackboard writing in video post-production. The use of online lectures has been increasing over time and, with universities moving their studies online over the past few months due to Covid-19, they have become even more prevalent. Making these diagrams easier to view for quick absorption of the information is therefore increasingly important.

The system described in this project breaks the enhancement process into three sections: blackboard location, writing location and writing enhancement.

The blackboard is located by finding the four corners of the board using the intersections of Hough lines. These corners are used to crop and warp the board, so the camera appears directly in front of the writing.

The writing is located using four kernels to find the lines in the image. Excess lines are removed by locating static objects and the lecturer. Static objects are located by finding what does not move for the duration of the video. The lecturer is located by tracking the largest area of motion in the video.

Finally, the writing is enhanced by fitting lines to the writing points in the scene. The lines are fit to extracted groups of points. To prevent only straight edges being added to the scene Hough circles is used to add to the enhanced image.

The developed system is proof of concept that it is a viable area which can be expanded upon. Adding text recognition and curve fitting to the scene will greatly improve the output.