Lens Smear Detection

Saad Mahmood & Saeed Patel
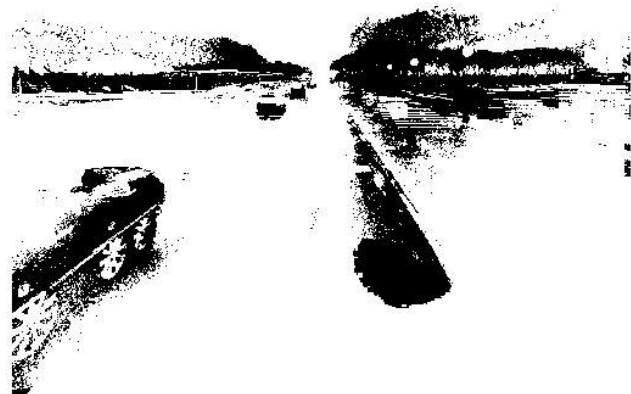February 20, 2014
CS 495

Preliminary Approaches

* Imported 5 images into 5 different variables

- used *bitand()/bitor()* to combine all rgb pictures

- converted image to binary output

- result was poor: output was showing too much white noise, when the smearing was not that large
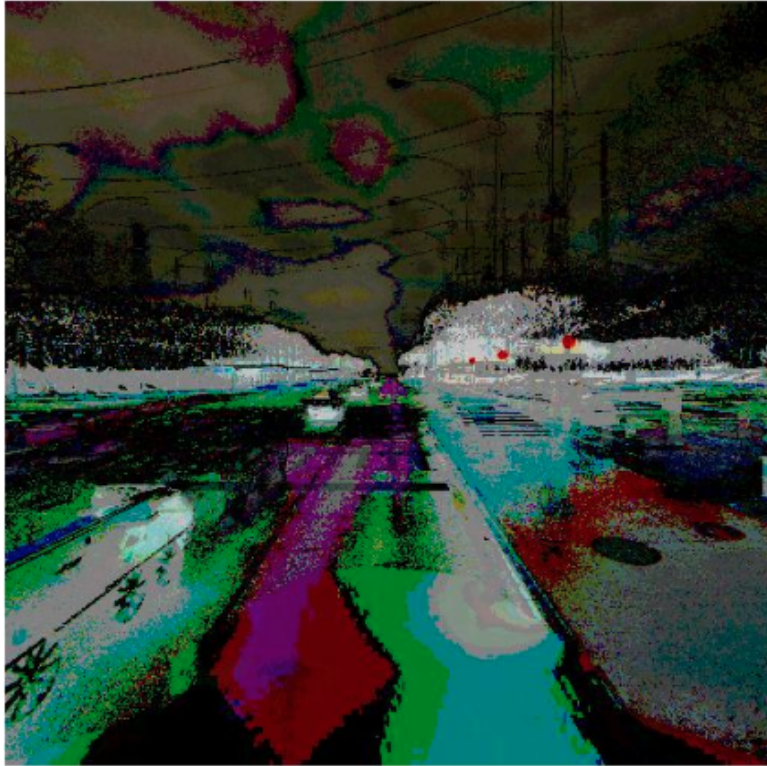
- also objects were not removed in this operation

bitand() < ------- > bitor()

imcomplement() with bitand()

* took negative of the 5 images into 5 variables

- *bitand()*-ed each inverted image together

- lastly, converted the image to black and white binary output

- results for the rgb inverted image showed original image objects like car, pavement, etc.

rgb inverted --> binary inverted

Final Approach: Image Addition

* our most successful approach was image composition
  - we stacked images on top of each other
  - created a mask of zeros (black image) that was equivalent size of input images
  - added each incoming image to the mask, creating a new mask which was added to next image input

Final Approach: With 5 Images

With 5 images, buildings, are noticeable, and smear location (bottom right) is not as distinct from other white areas which are other objects
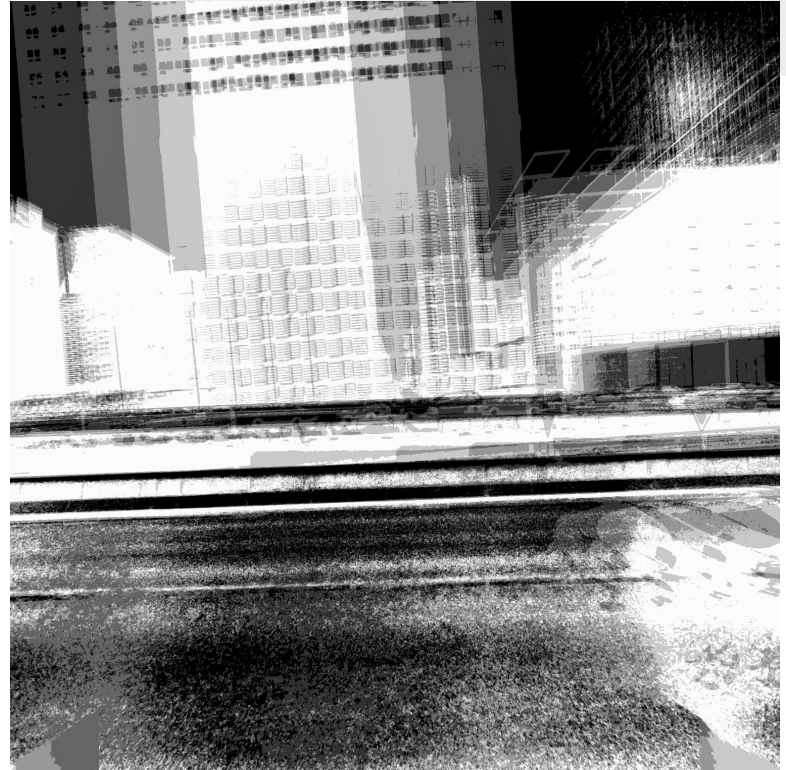
Final Approach: With 200 Images

With 200 images, the buildings in the background are getting blurred out because of the mask, and the smear (dot) is more visible

Final Approach: With All Images

With all the images, the smear is prominent while the rest of the image has nearly been masked. The remaining white streaks are due to the constant road in the background in each image which like the smear is unaffected by the mask
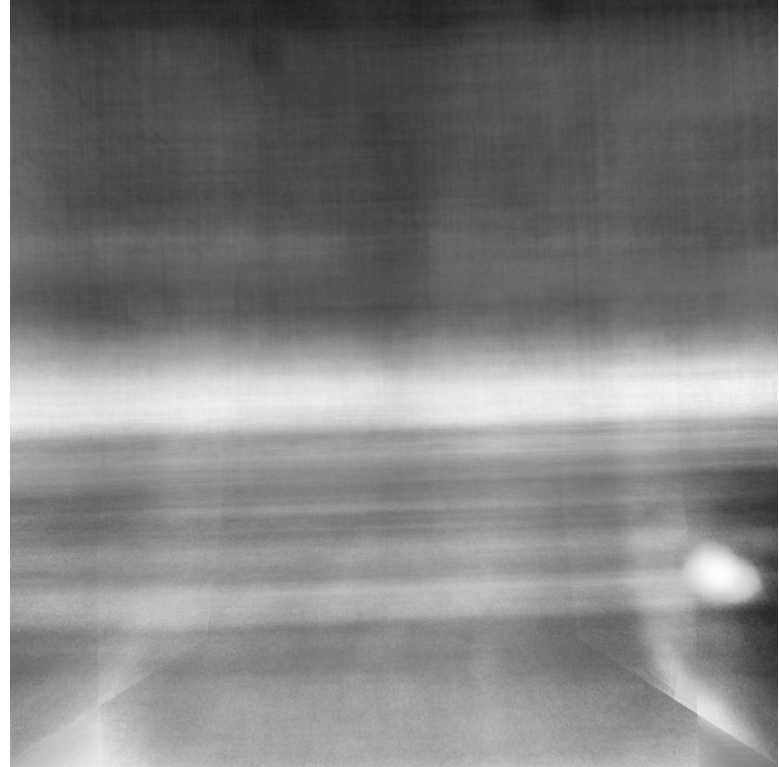
Conclusion

Although not perfect, our image superposition and composition technique produced the best results the more images we used as input. Some reasons for remaining white marks which are not smears are due to the fact that the background was very similar in many of the images, and thus the final output pixels for that region of the image was not affected by the mask.