# Optional Assignment  7 Report
# Single Image Rectification: Remove Projective and Affine Distortions

# MSEE18005
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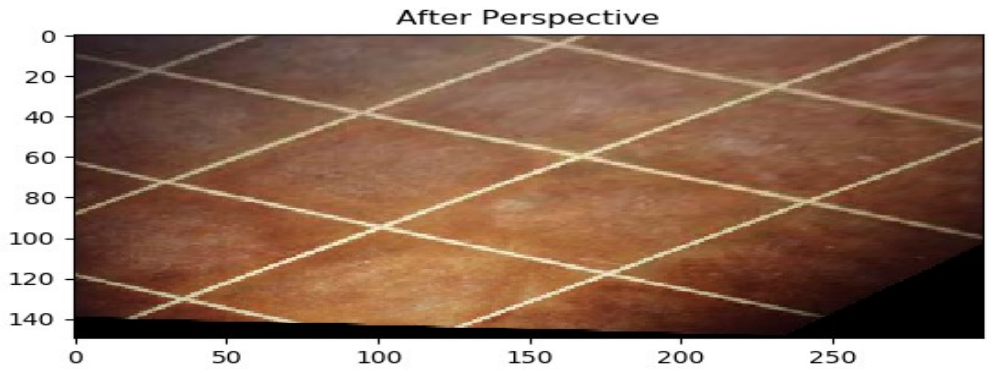
# Projective Distortion

In first part of this assignment, we have to remove the Projective distortion in the image due to which two parallel lines in the physical word doesn't remain parallel in the image domain. To remove this kind of distortion we require two lines which are parallel in physical world but not in the image domain.
To make these lines parallel we have to find such a perspective transformation that can make two lines parallel using this fact equations are set up and solved using least squares.

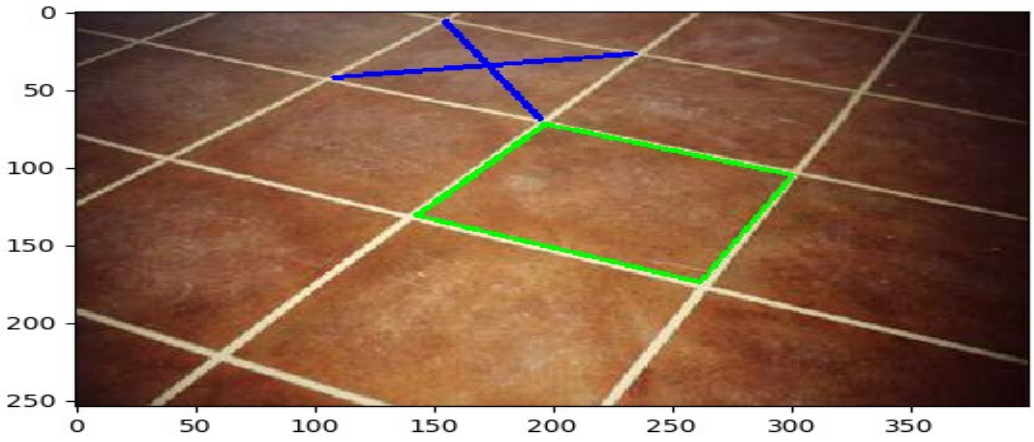
## Results

### Original

### prCorrected

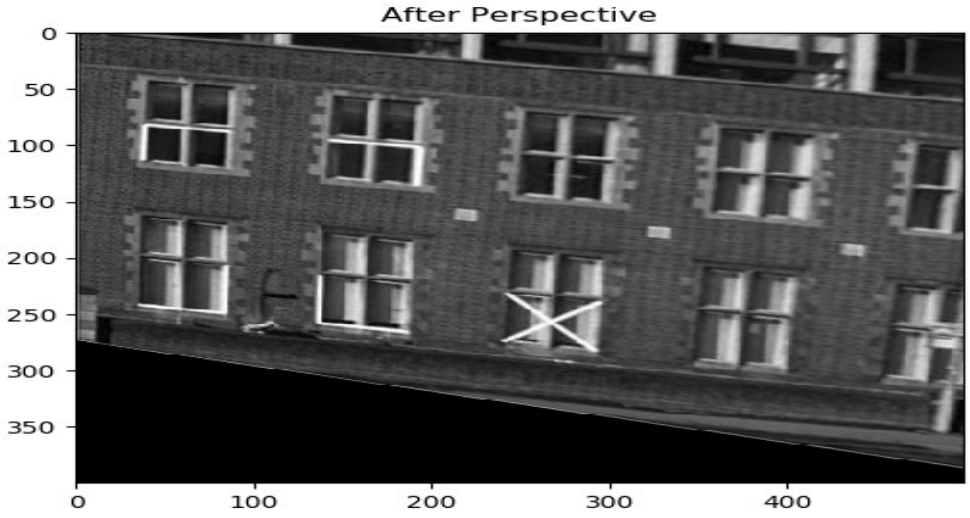


## Points Selected

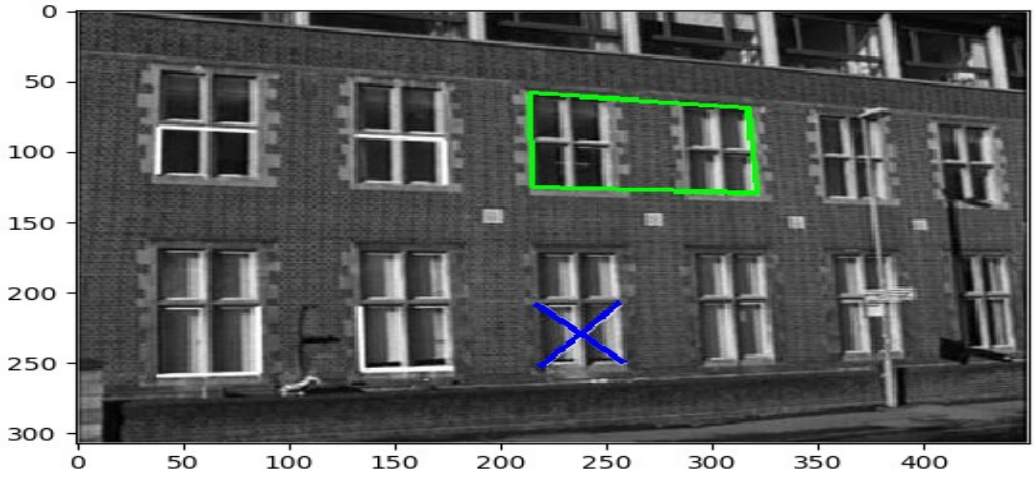



## Original

## prCorrected

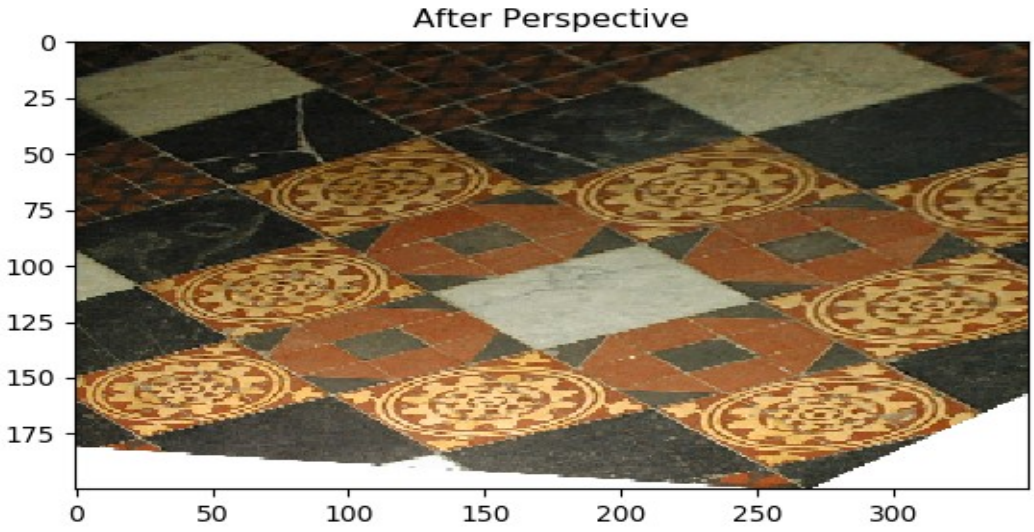



## Points Selected

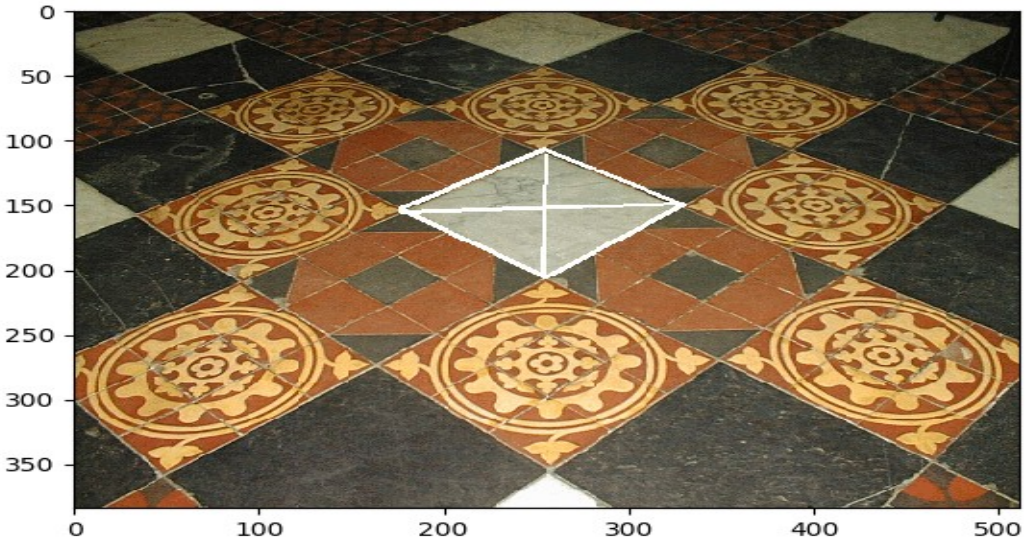


**Original**

**prCorrected**

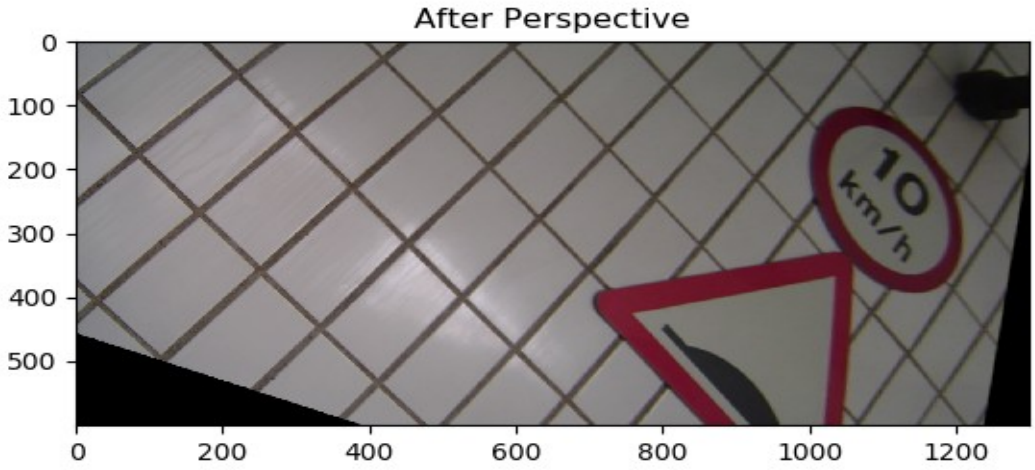


## Points Selected

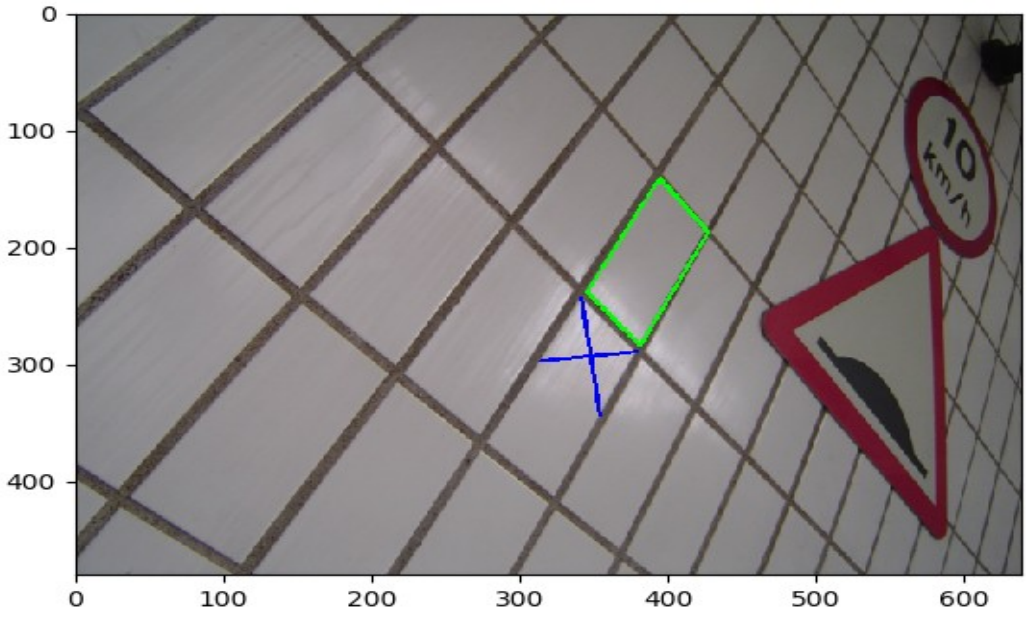



## Original

## prCorrected

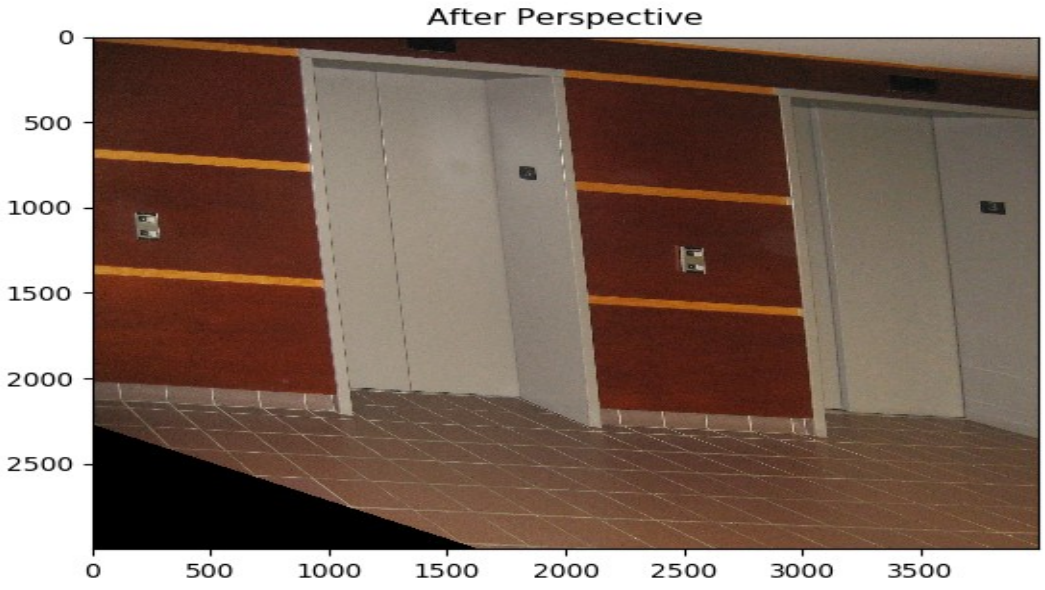



## Points Selected

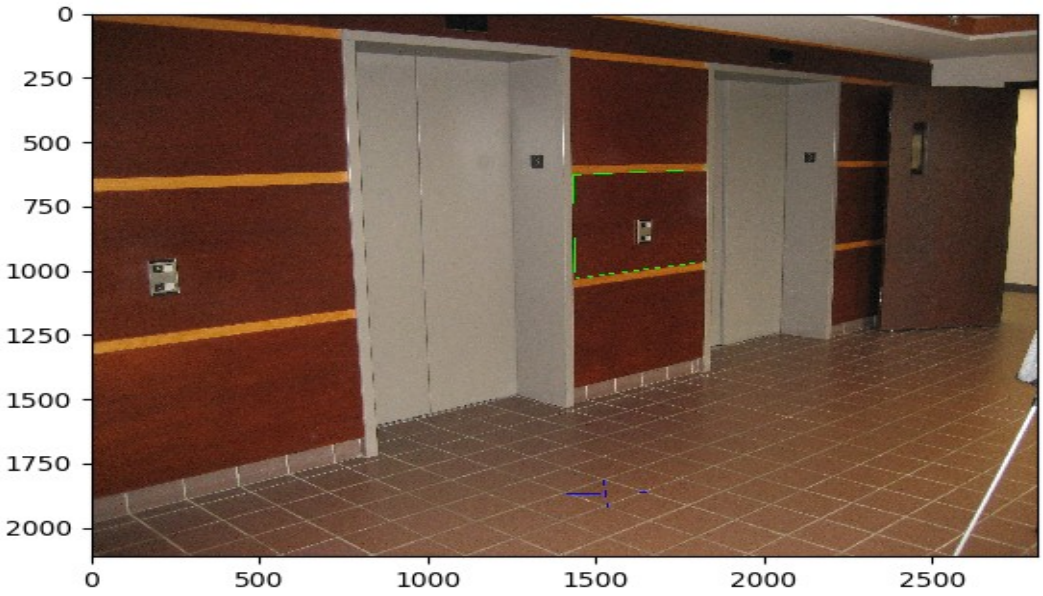



**Original**

**prCorrected**

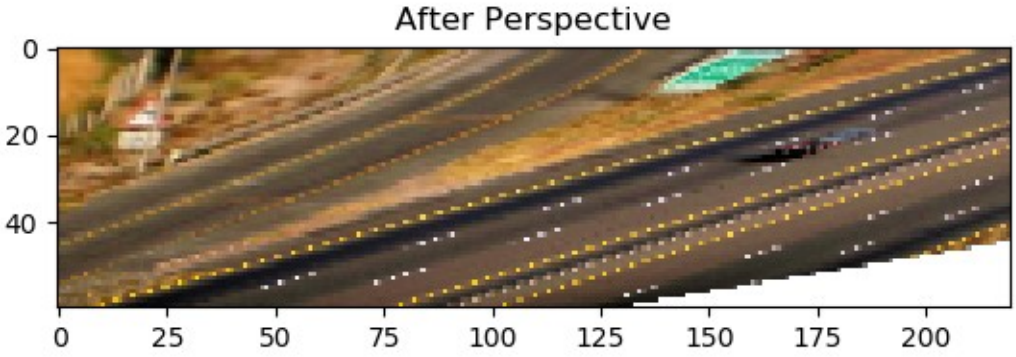


# Points Selected

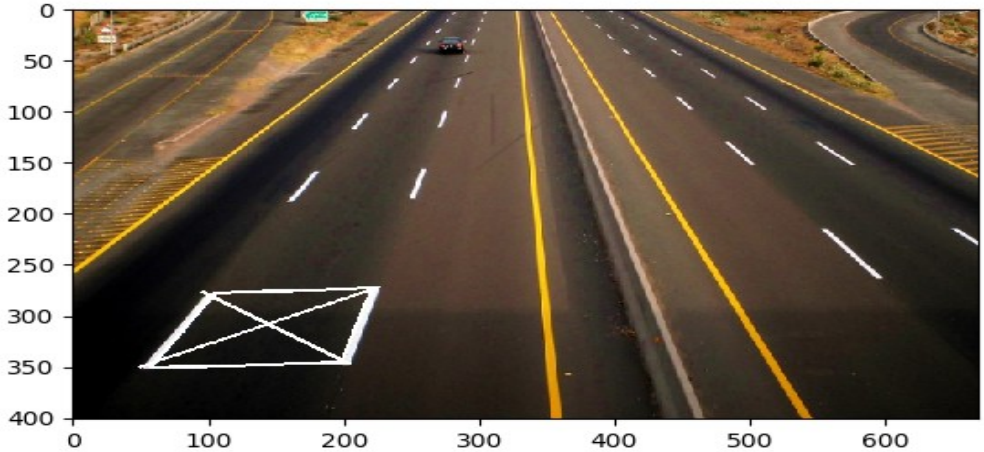



# Original

# prCorrected




# Points Selected



# Affine Distortion

After removing projective distortion now the lines are parallel but the true orthognal lines are not orthognal in the image due to rotation and scaling present in the image.
To make the lines appear ass in original scene image these distortions can be removed by taking two pair of othognal lines which are physically orthognal in the scene.
By finding the affine transformation that can make it orthognal we can find the transforamtion.

1. Find two pair of lines which are physically orthognal
2. Setup equations to find X
3. Find S matrix using X
4. Now take SVD of S=UGU'
5. Take square root of eigen values and then compute A
6. Finally A is used in the affine transformation matrix.