Improving Gaze Estimate Accuracy for Eye Tracking Device

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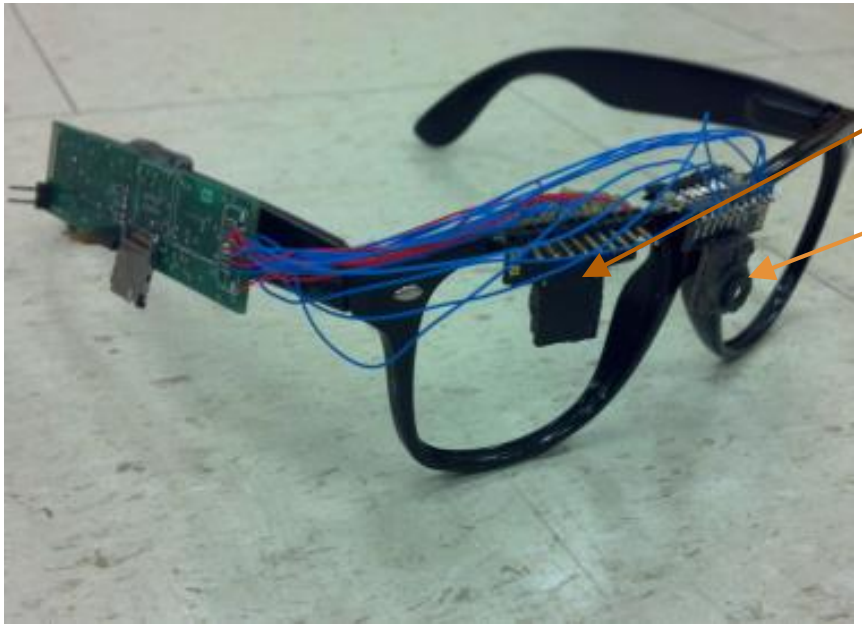
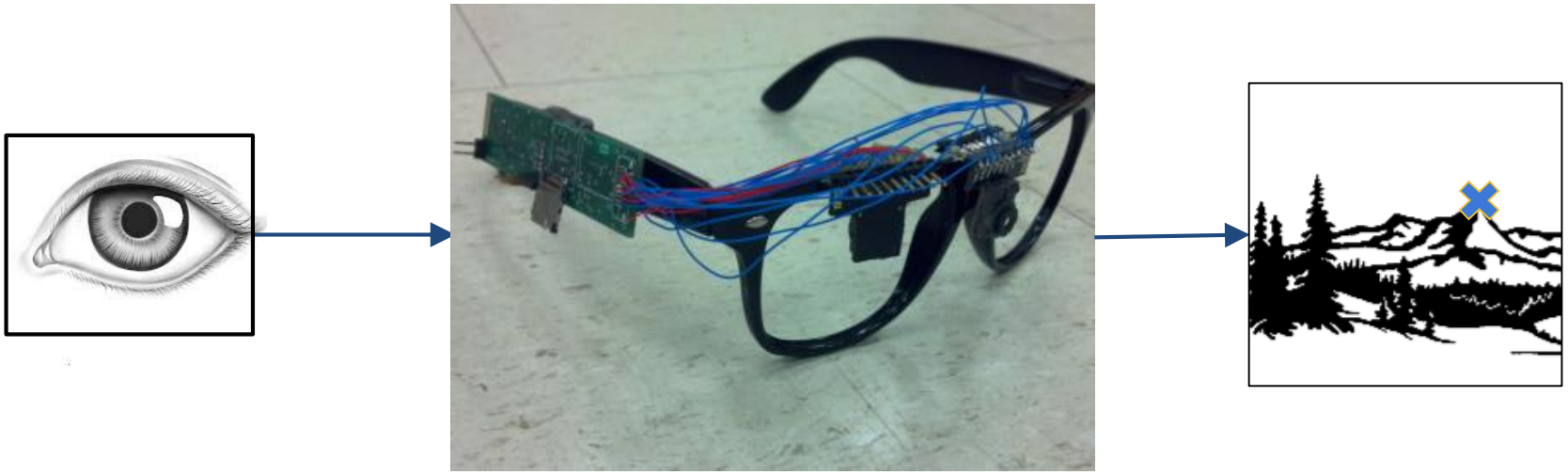
Gaze Tracking

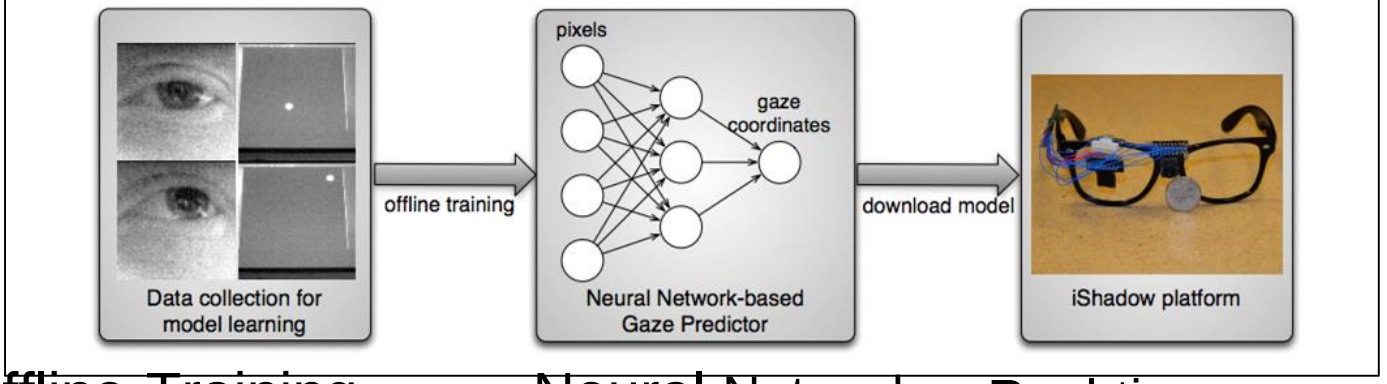



iShadow: Real-Time Gaze Tracker



iShadow: Real-Time Gaze Tracker





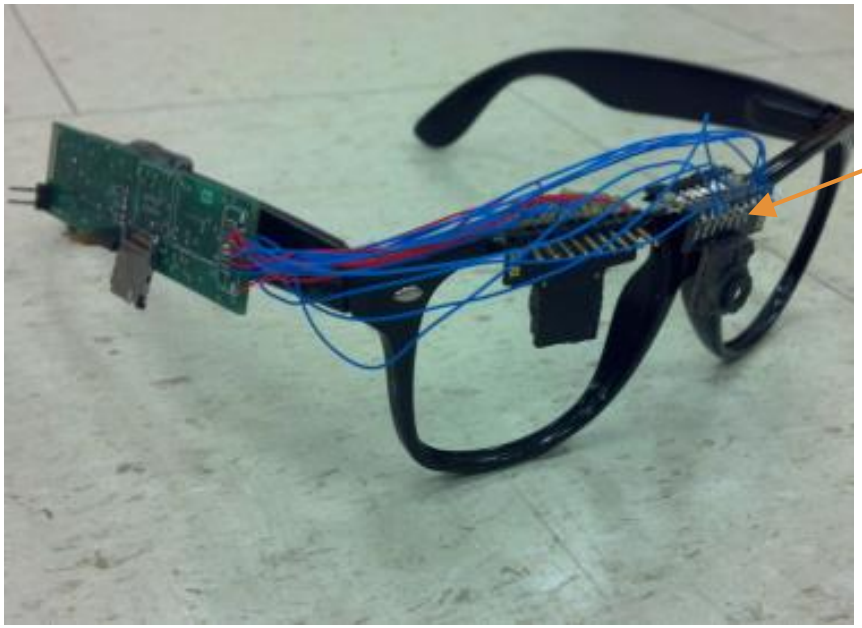
Offline-Training

Neural Network

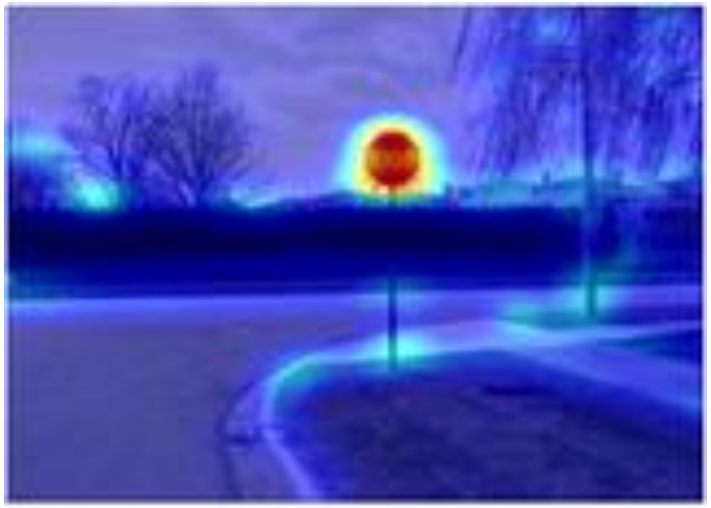
Real-time Gaze Tracking

Project Goal

- Improve Gaze Estimate Accuracy of Gaze Tracker Offline Using Saliency Information

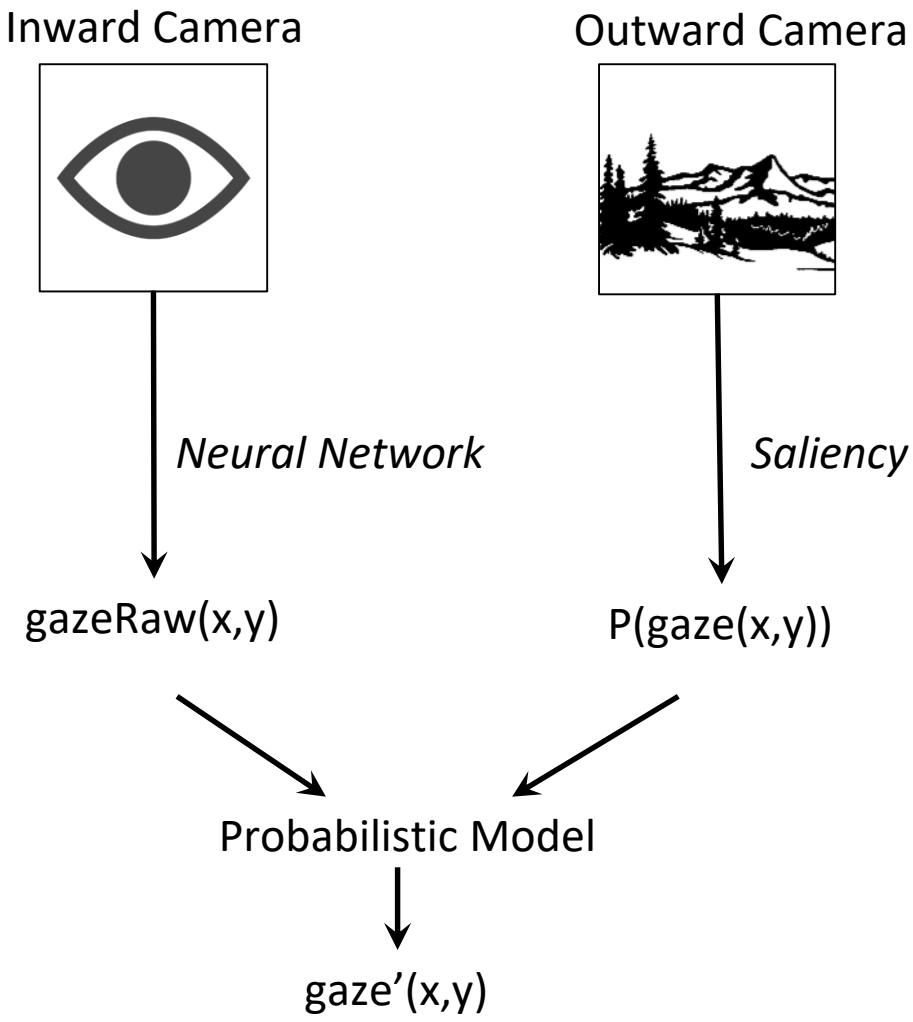


Saliency Map

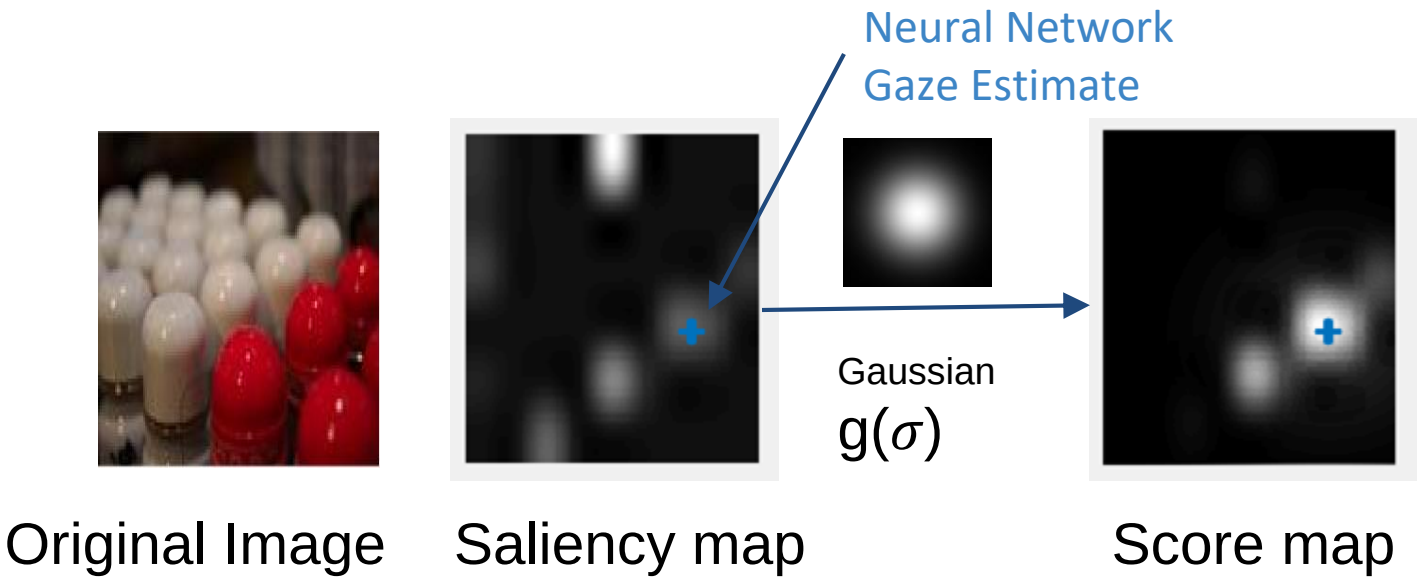


- Color
- **Intensity**
- **Orientation**
- Face
- Motion

Project Overview



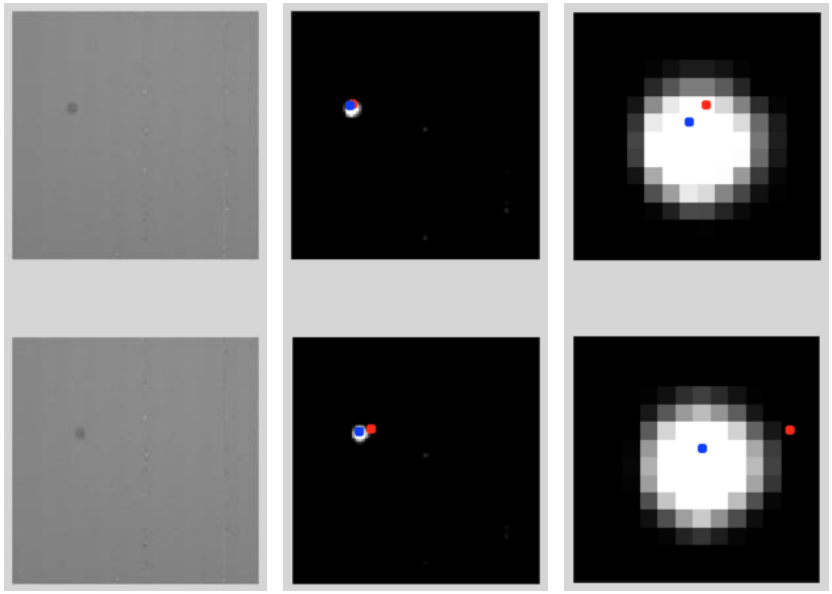
Algorithm Outline



Gaze' s.t max (saliency_score * g(σ))

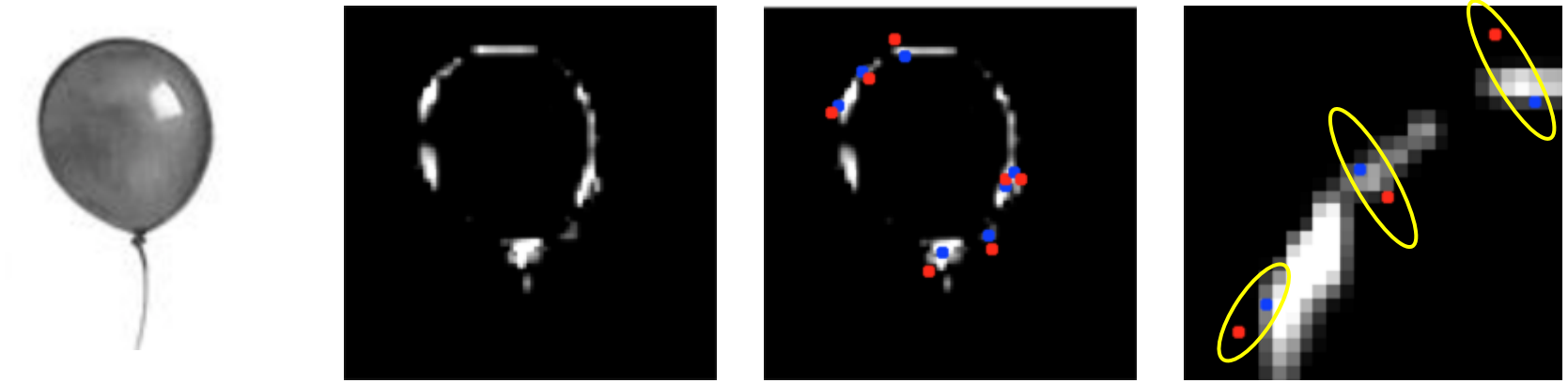
Experiment - data

iShadow DataSet



- iShadow's data (3469 images)
  - gaze_true + gaze_est points
- Generating Simulated Data
  - select high saliency score points
  - find "similar" points close to high saliency regions from iShadow DataSet

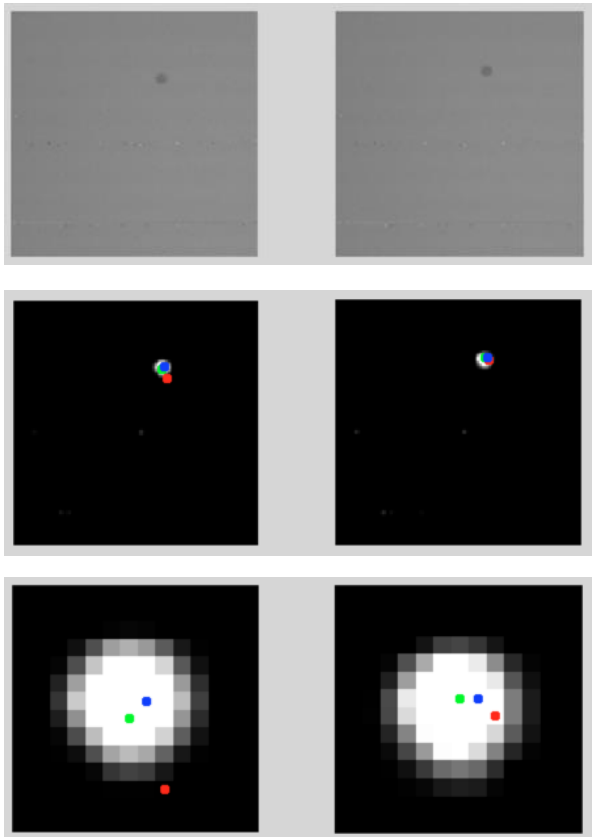
Simulated DataSet



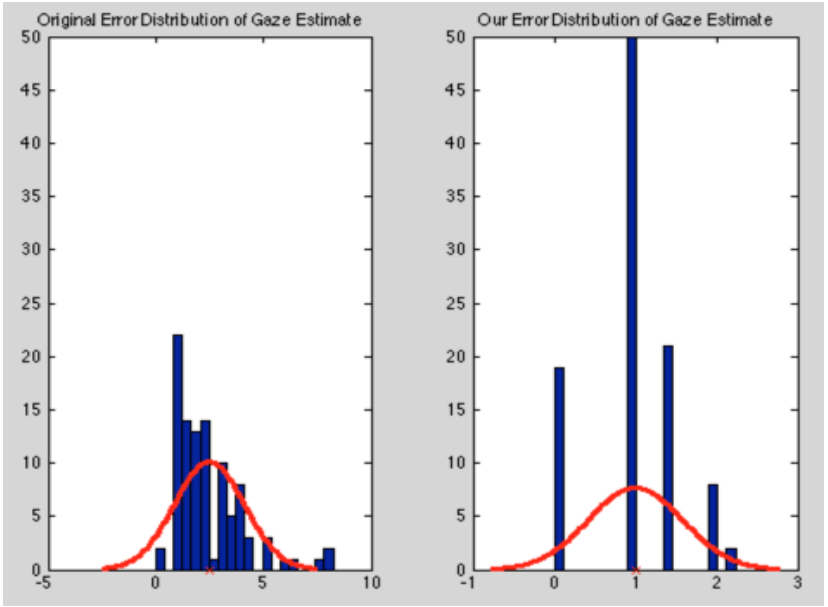
Experiment - results (1)

- Training on 150 images (positions)
- Best Sigma = 5
- Testing on 100 images (positions)

	errors-average	errors-std
Original result	2.48	1.63
Our result	1.00	0.58



Gaze_true
Gaze_est
Gaze_new (with saliency)

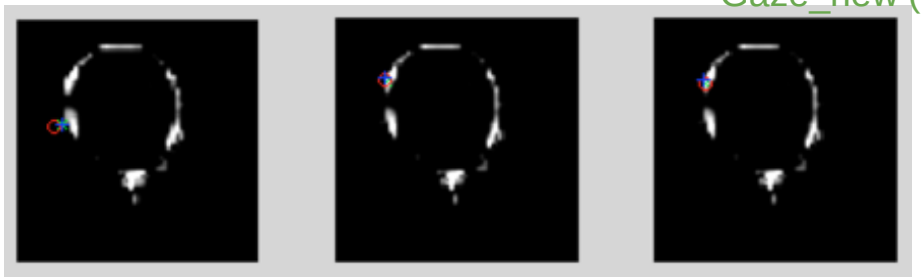


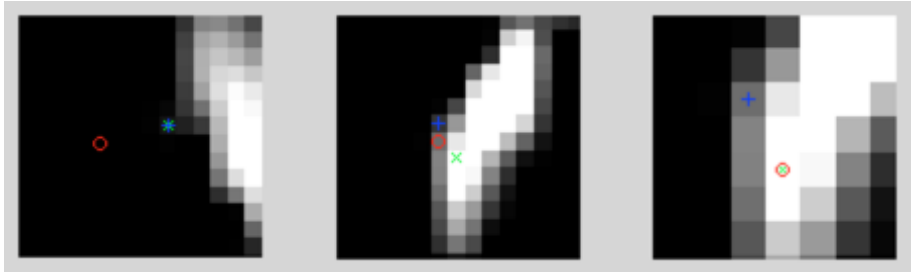
Experiment - results (2)

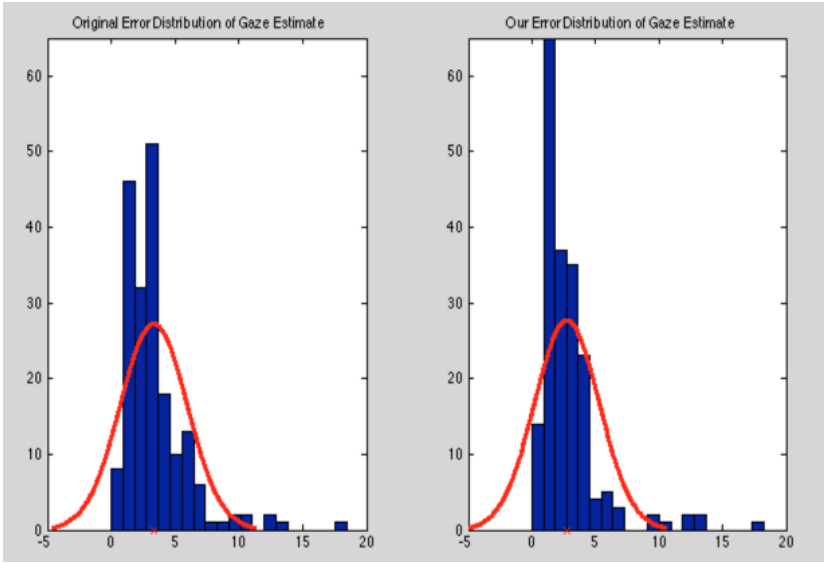
- Training on 146 positions
- Best Sigma = 1.5
- Testing on 49 positions

	errors' average	errors' std
Original result	2.96	2.07
Our result	2.41	1.52

Gaze_true
Gaze_est
Gaze_new (with saliency)

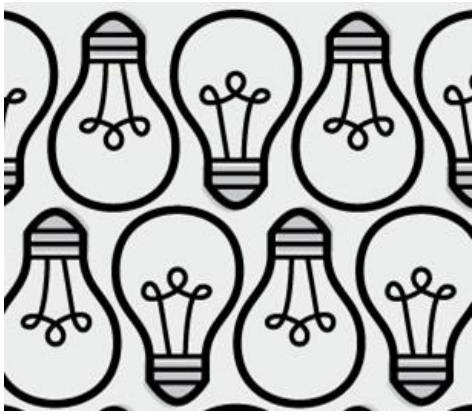






Limitation

- No color information
- Saliency map is only probabilistic



Future Work

- **Saliency Information from Motion and Face Detection**
- Saliency Information from Colored Camera
- Affine Transformation for Glasses Movement
- Simplify Algorithm for Real-Time Error Reduction

References

1. http://people.cs.umass.edu/~dganesan/papers/MobiSys14-iShadow.pdf
2. http://users.soe.ucsc.edu/~milanfar/research/rokaf/.html/SaliencyDetection.html
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Thank you!