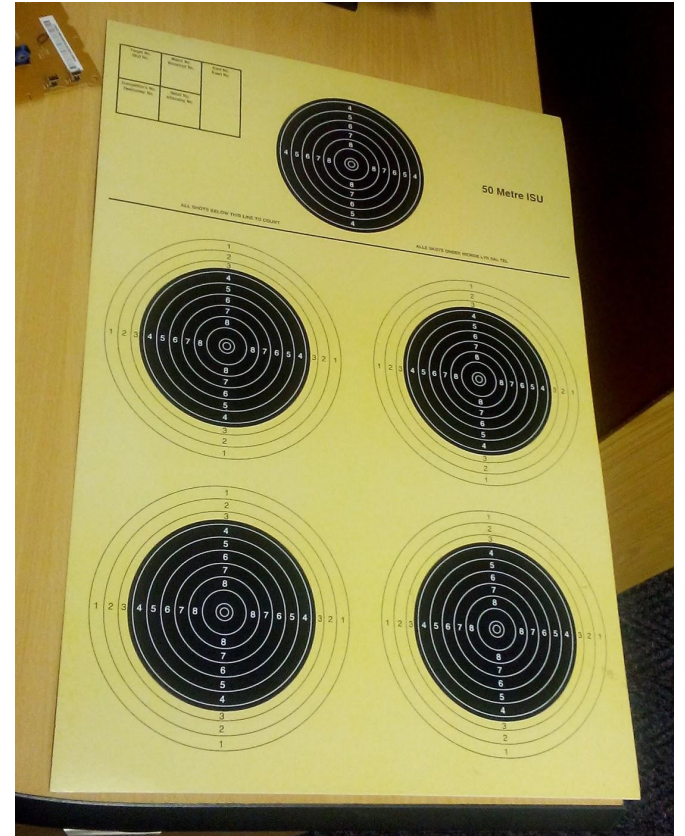
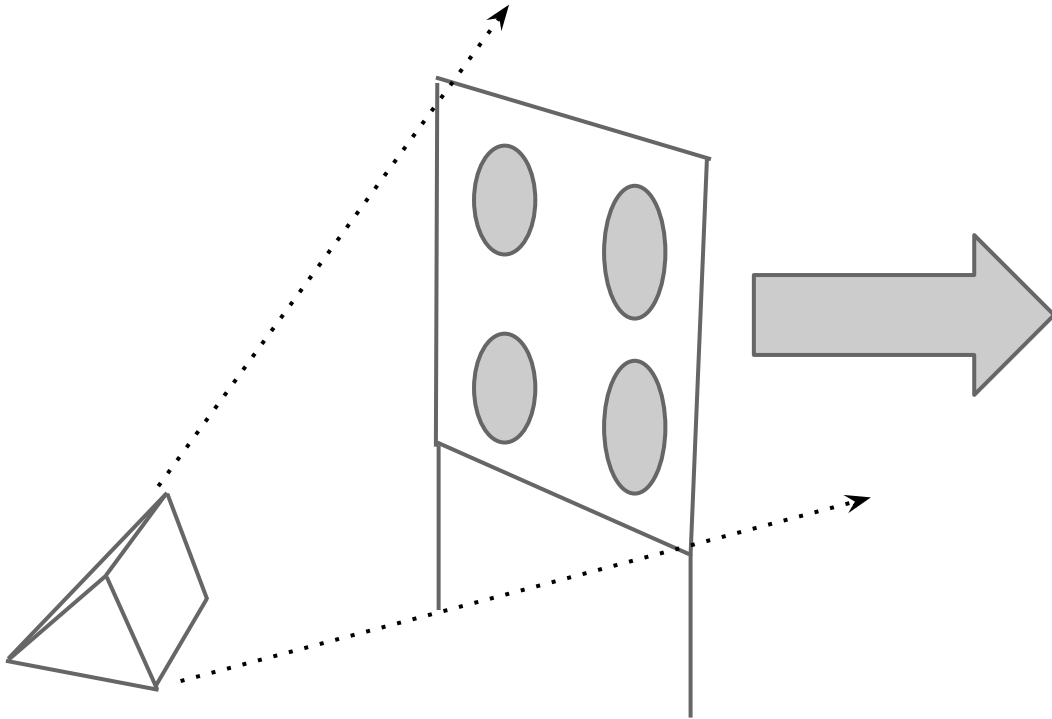


Seminar 2

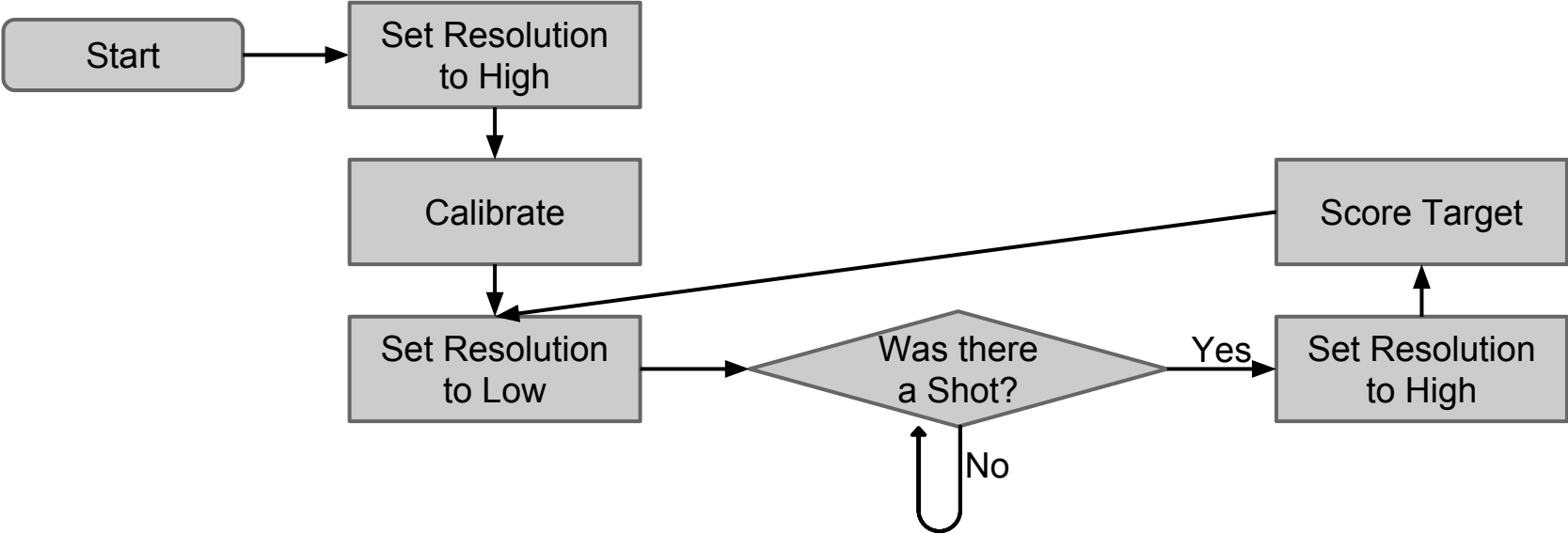
Image Processing to Score Rifle Targets

Courtney Pitcher

Setup



How it Works



Lighting Robust
Image Capture

Calibration

Find Location of
Targets in Image

Find Rotation of
Targets

Perspective
Matrix

Rotation and
Scale Offset

Find Target
Rings

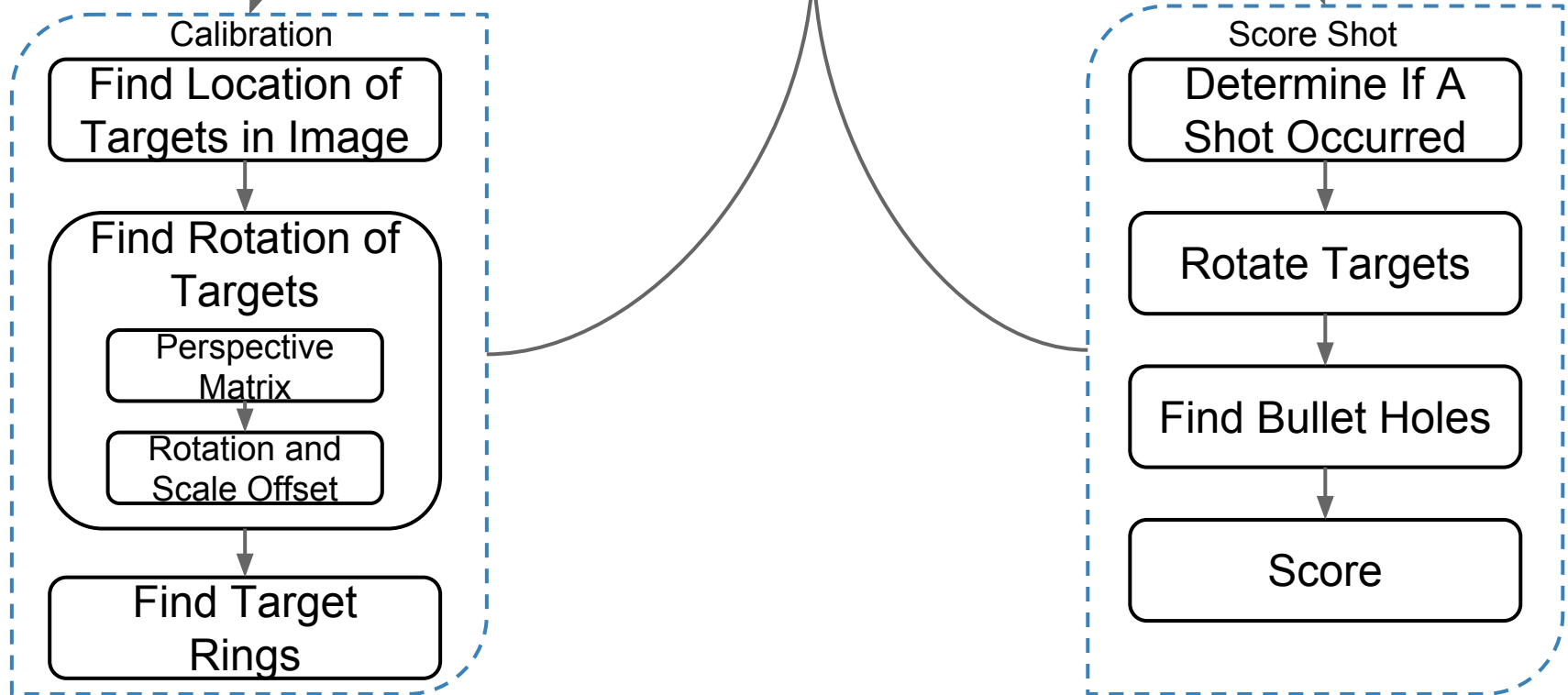
Score Shot

Determine If A
Shot Occurred

Rotate Targets

Find Bullet Holes

Score



Progress

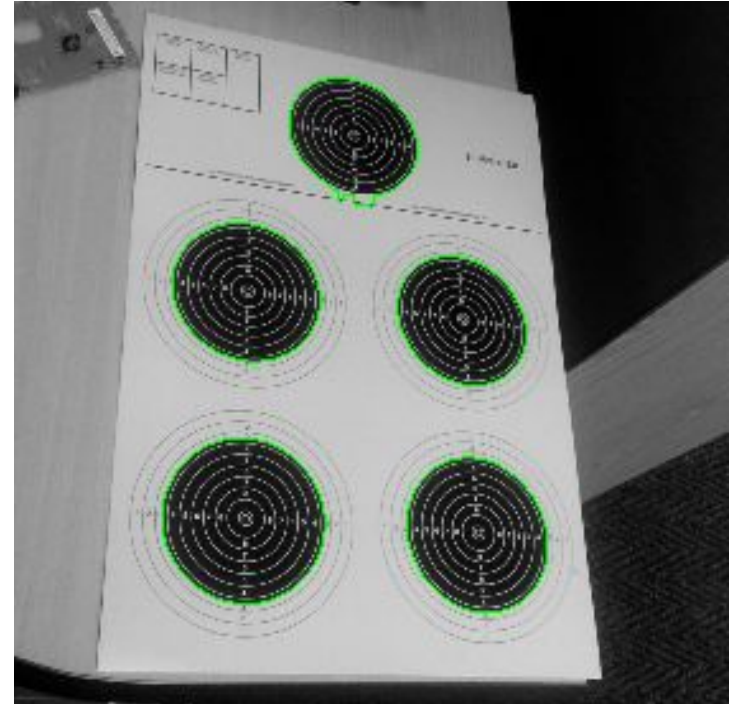
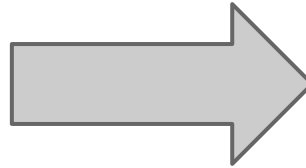
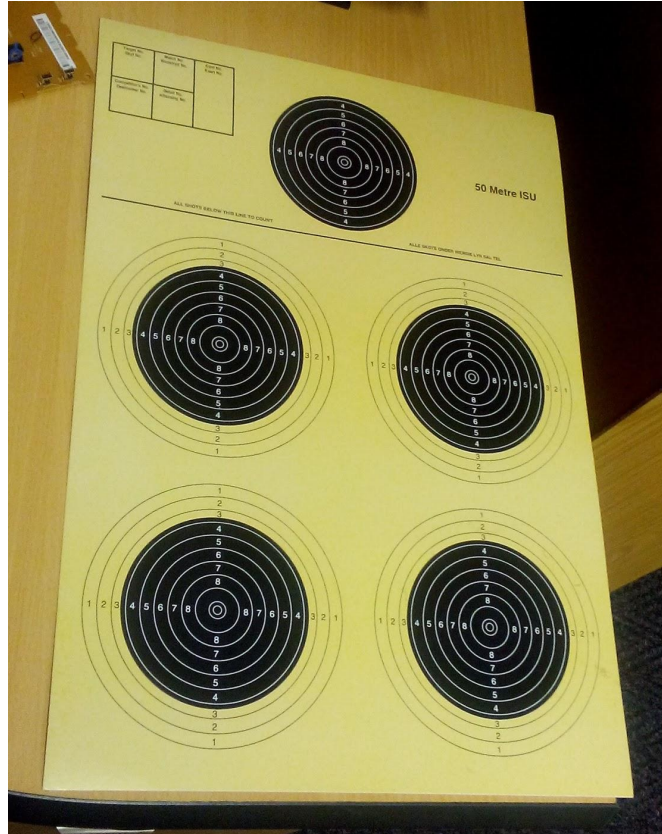
1. ✘ Lighting Robust Image Capture
2. ✔ Find Location of Targets in Image
3. ✔ Find Rotation of Targets
 - a. ✔ Find Initial Rotation
 - b. ✔ Make Corrections
4. ½ Find Target Rings
5. ✔ Rotate Targets
6. ✘ Determine If A Shot Occurred
7. ✘ Find Bullet Holes
8. ✘ Score

½ Partially Complete

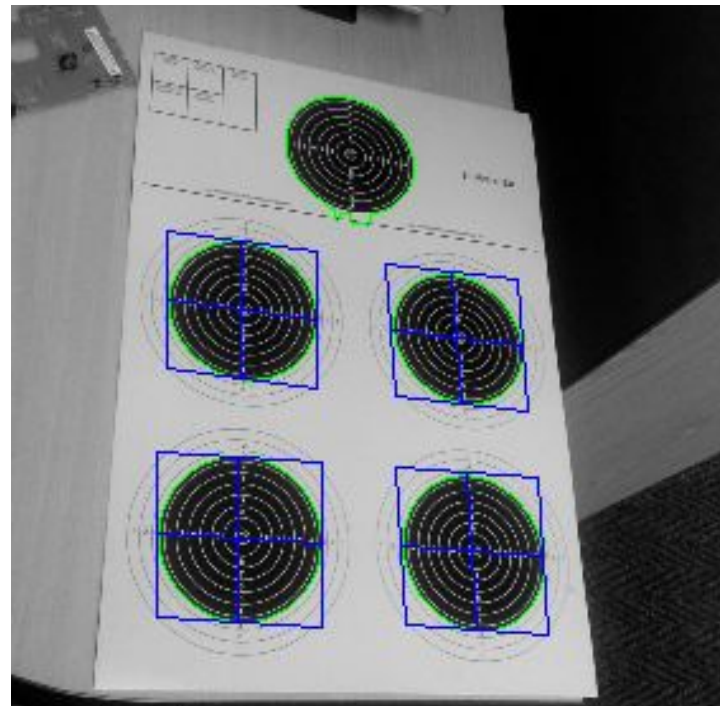
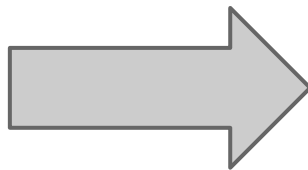
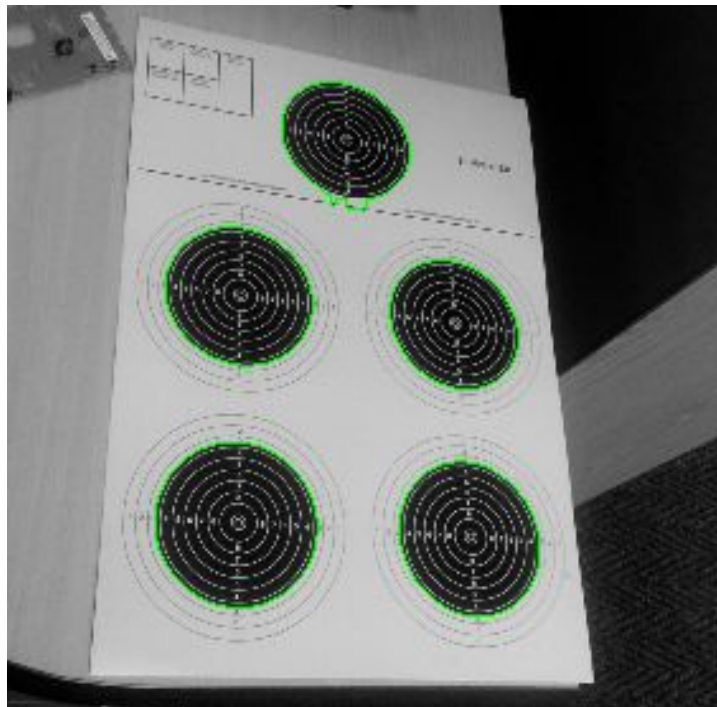
✔ Complete

✘ Incomplete

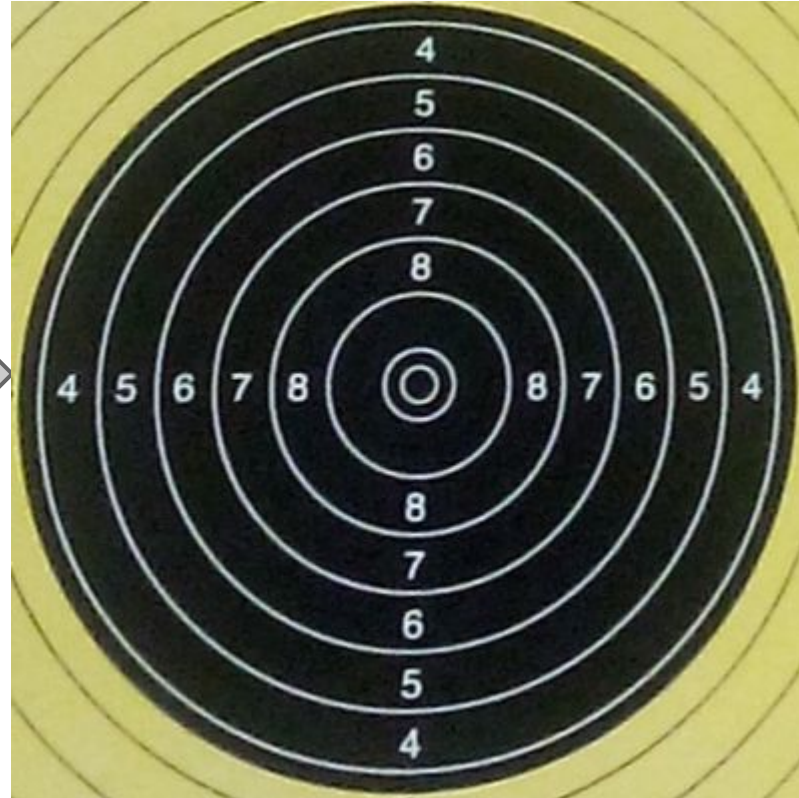
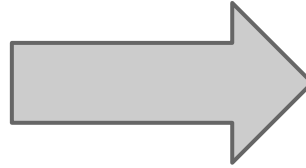
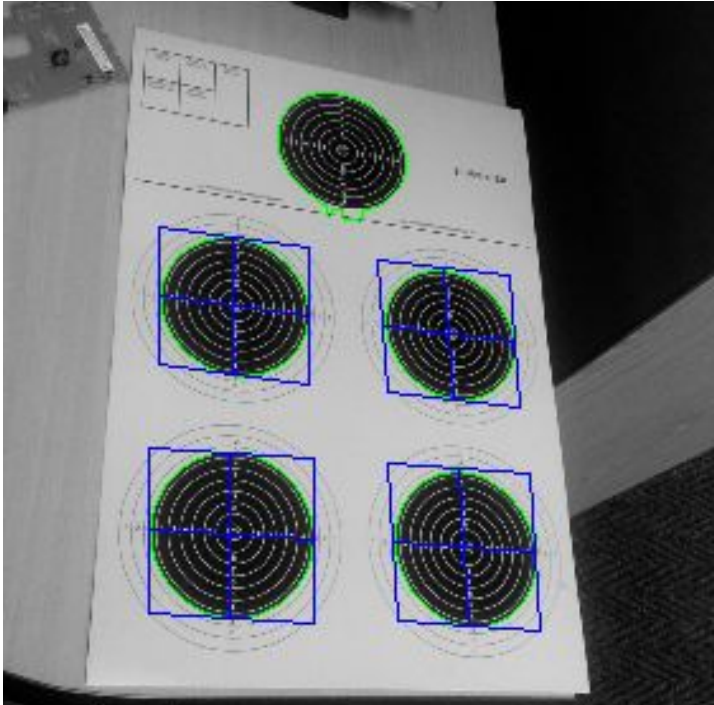
Identify “black’s”



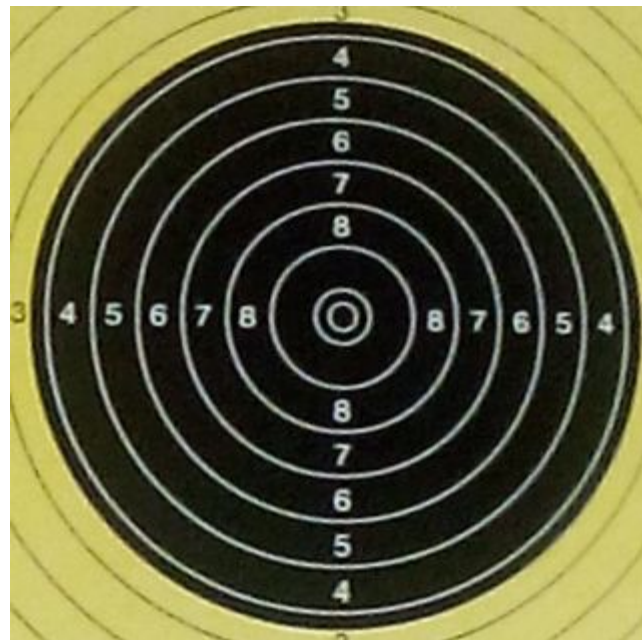
Find perspective matrix of each individual “black”



Apply Perspective Transform



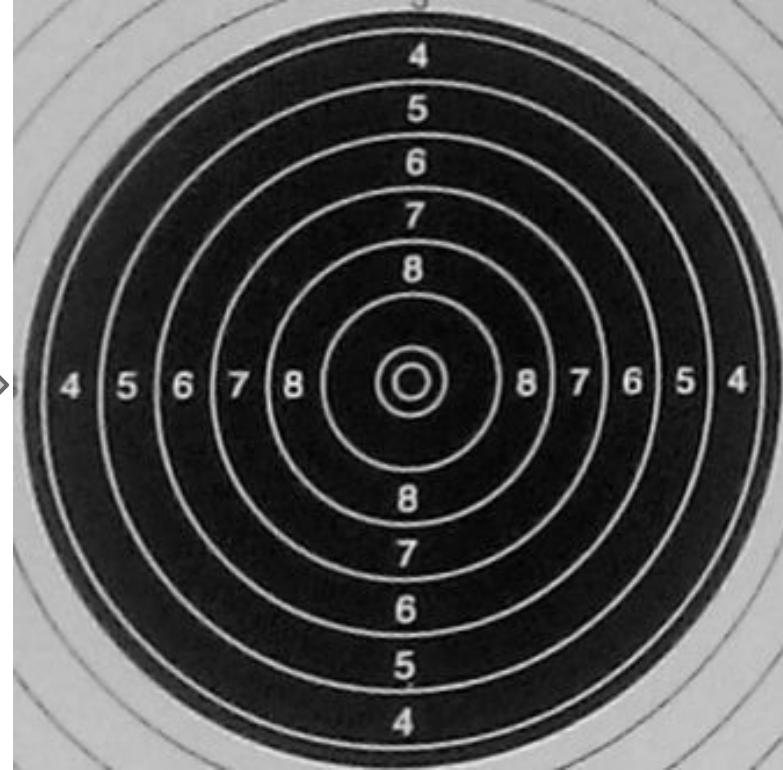
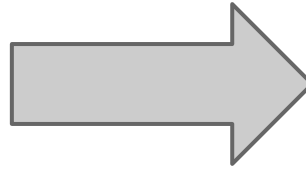
Top Targets



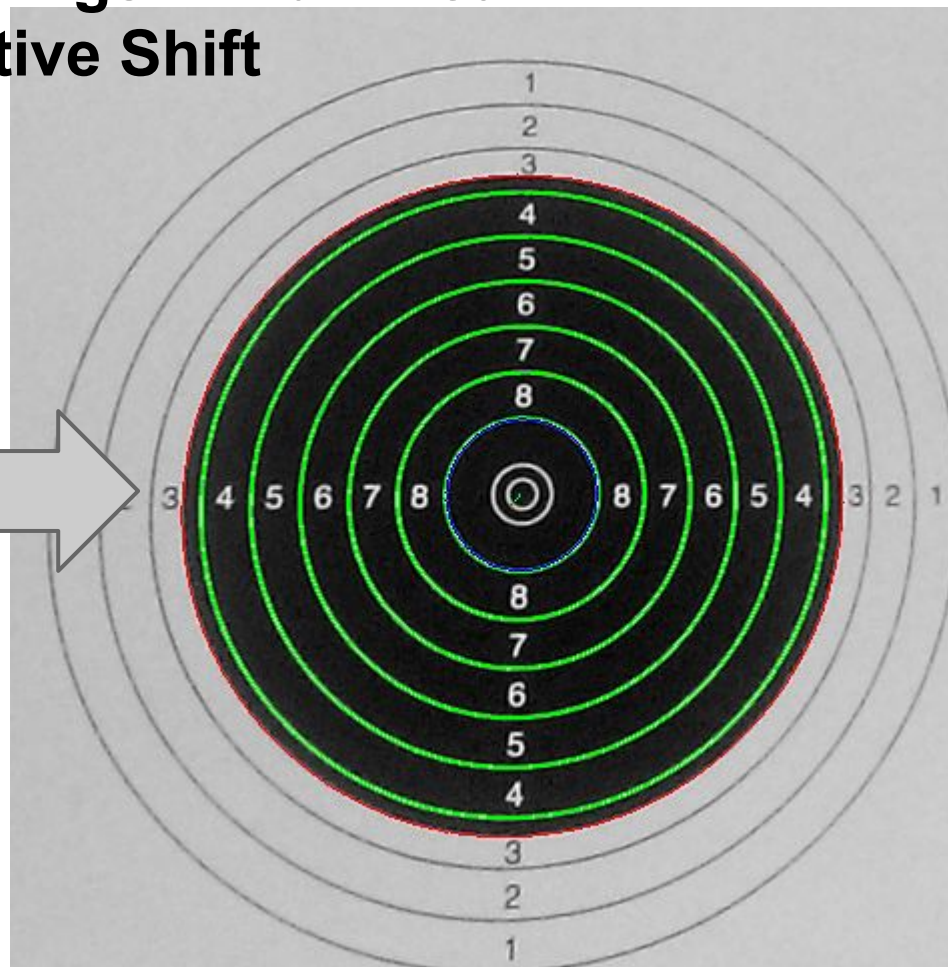
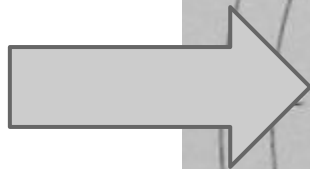
Bottom Targets



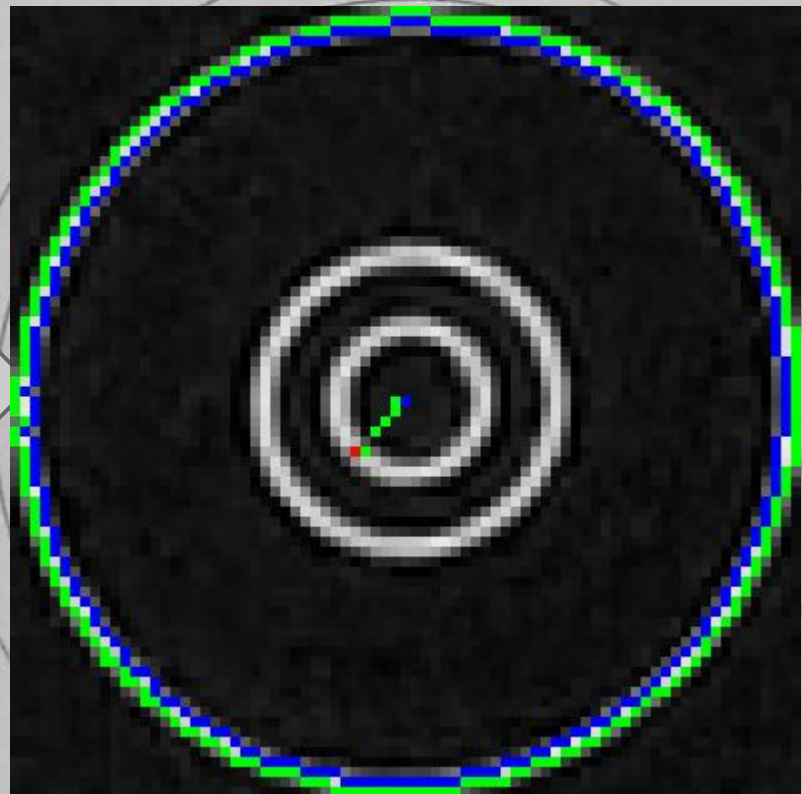
Heuristics Identify Perspective Errors and correct the transform matrix



Estimate Target Rings: Find Linear Perspective Shift



Estimate Target Rings: Find Linear Perspective Shift



Estimate Target Rings: Assume Ring positions

