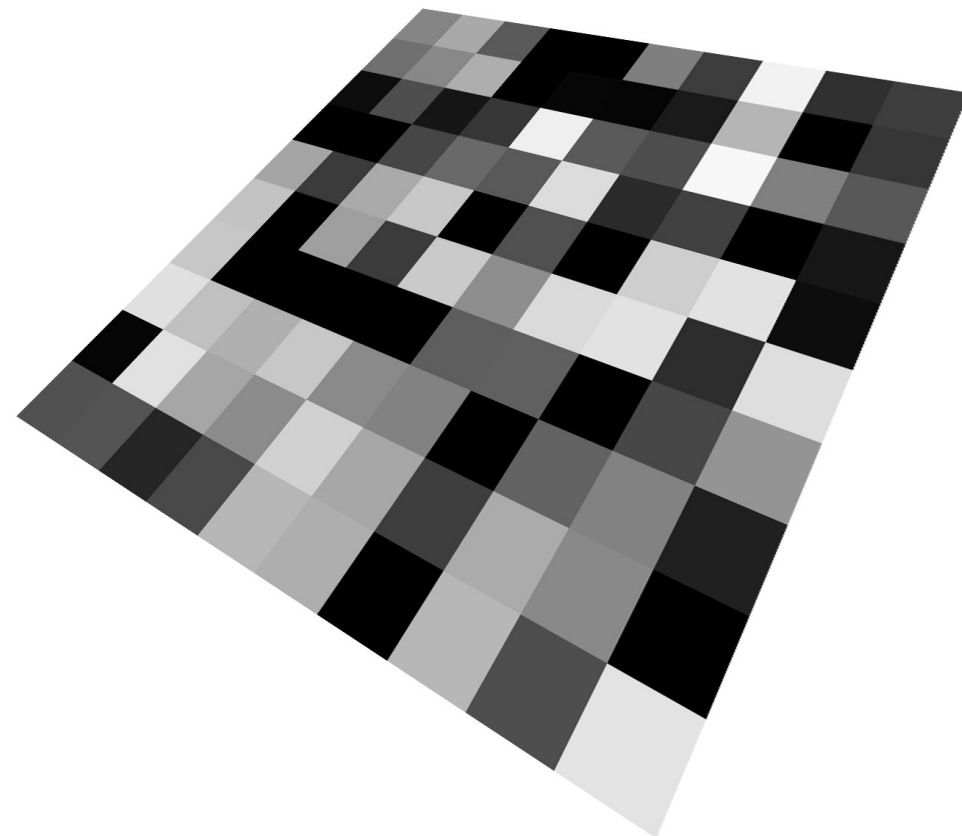
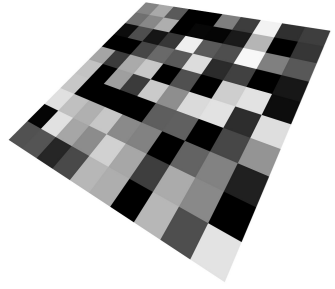


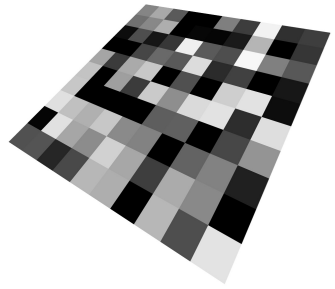
# Five Shades of Grey for Fast and Reliable Camera Pose Estimation





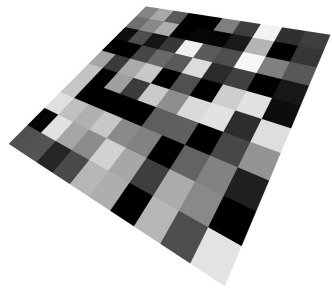
# Contents

- Roadmap
- Implementation details
- Obstacles & problems

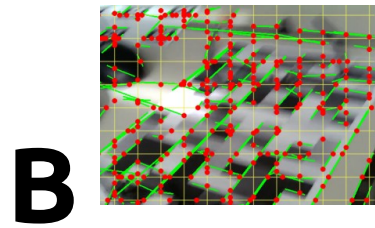


# Contents

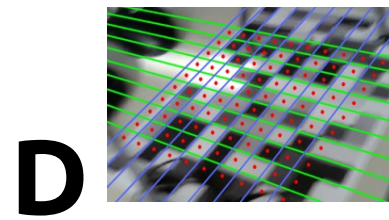
- Roadmap
- Implementation details
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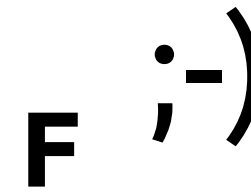
# Roadmap



**B**  
Edge(ls)  
Detection



**D**  
Fit  
Calculated  
Grid



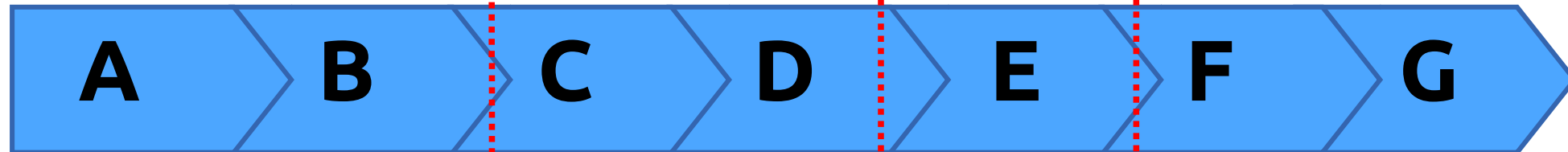
**F** ;-)  
Fix steps  
B to E

**Week 1**

**Week 2**

**Week 3**

**Week 4**

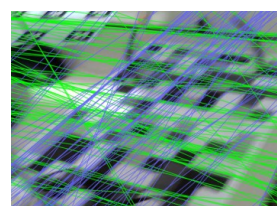


**A**



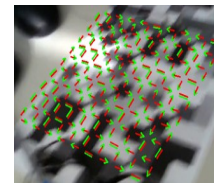
Request  
marker  
sample

**C**



RANSAC:  
Two  
direction  
s

**E**

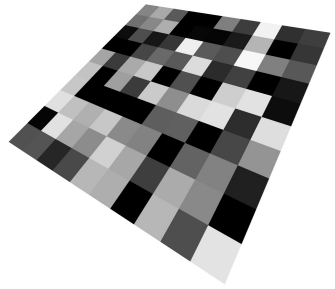


Marker  
Identifi-  
cation

**G**

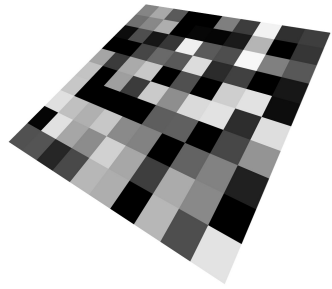


Place  
Simple  
AR Object



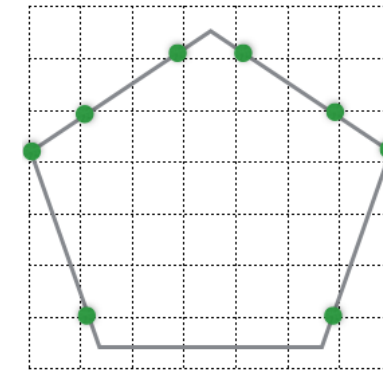
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- Roadmap
- **Implementation details**
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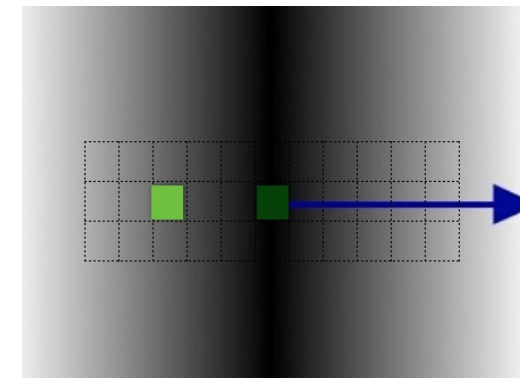


# First Step: **Edgel detection**

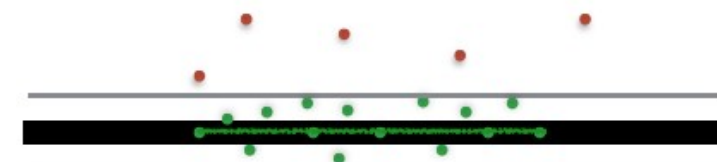
1. Scanline



2. Sub-pixel suppression

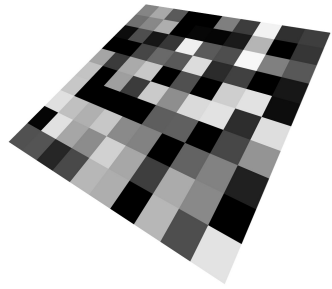


3. Ransac



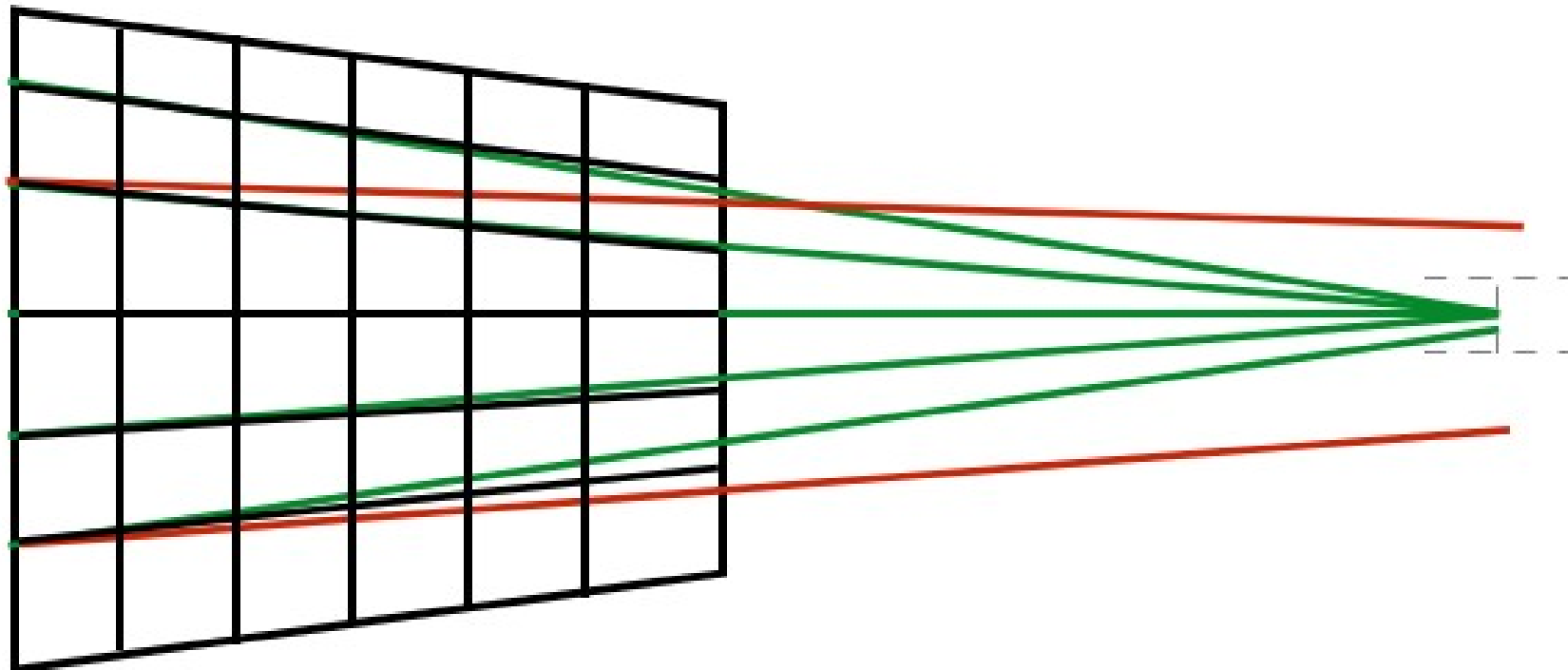
4. Fit line

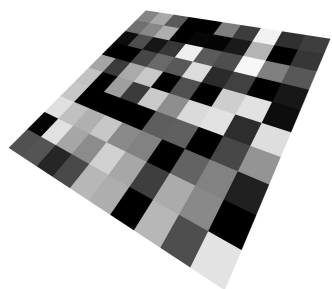




## Second Step: **Line grouping**

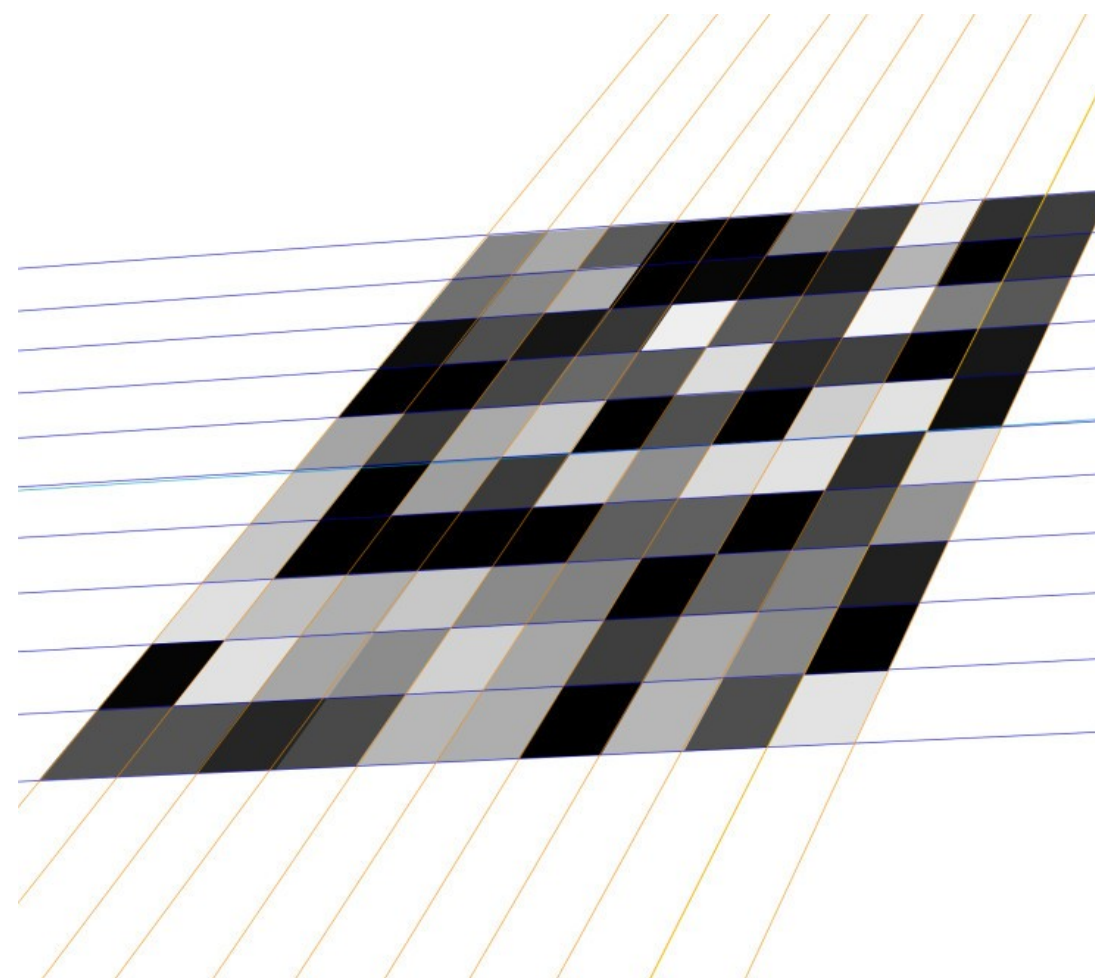
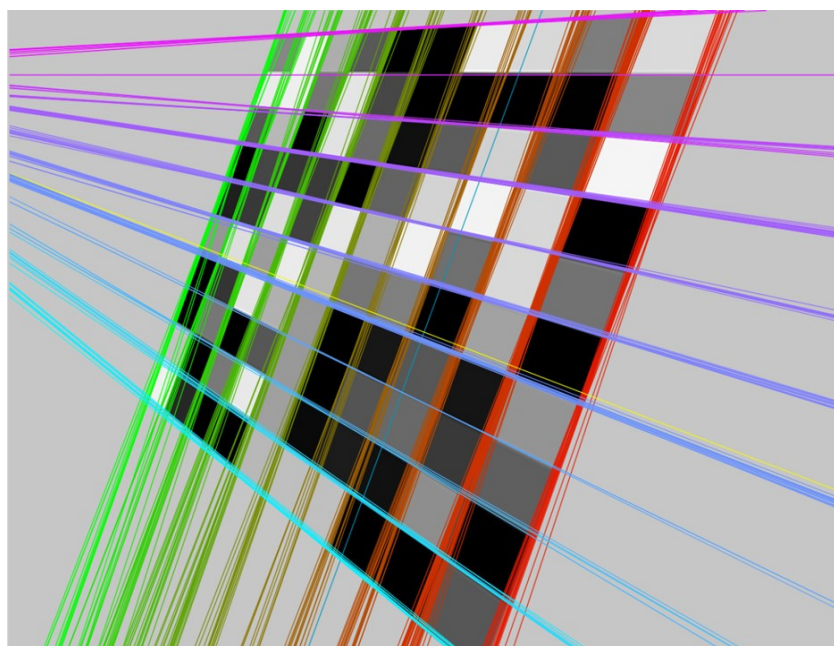
- Divide edges into vertical and horizontal lines
- Homogeneous Coordinates
- Ransac Algorithm



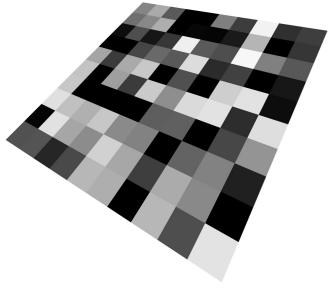


## Third Step: **Group clustering**

- One line per grid index
- Mean shift filtering
- Mapping from line to cluster

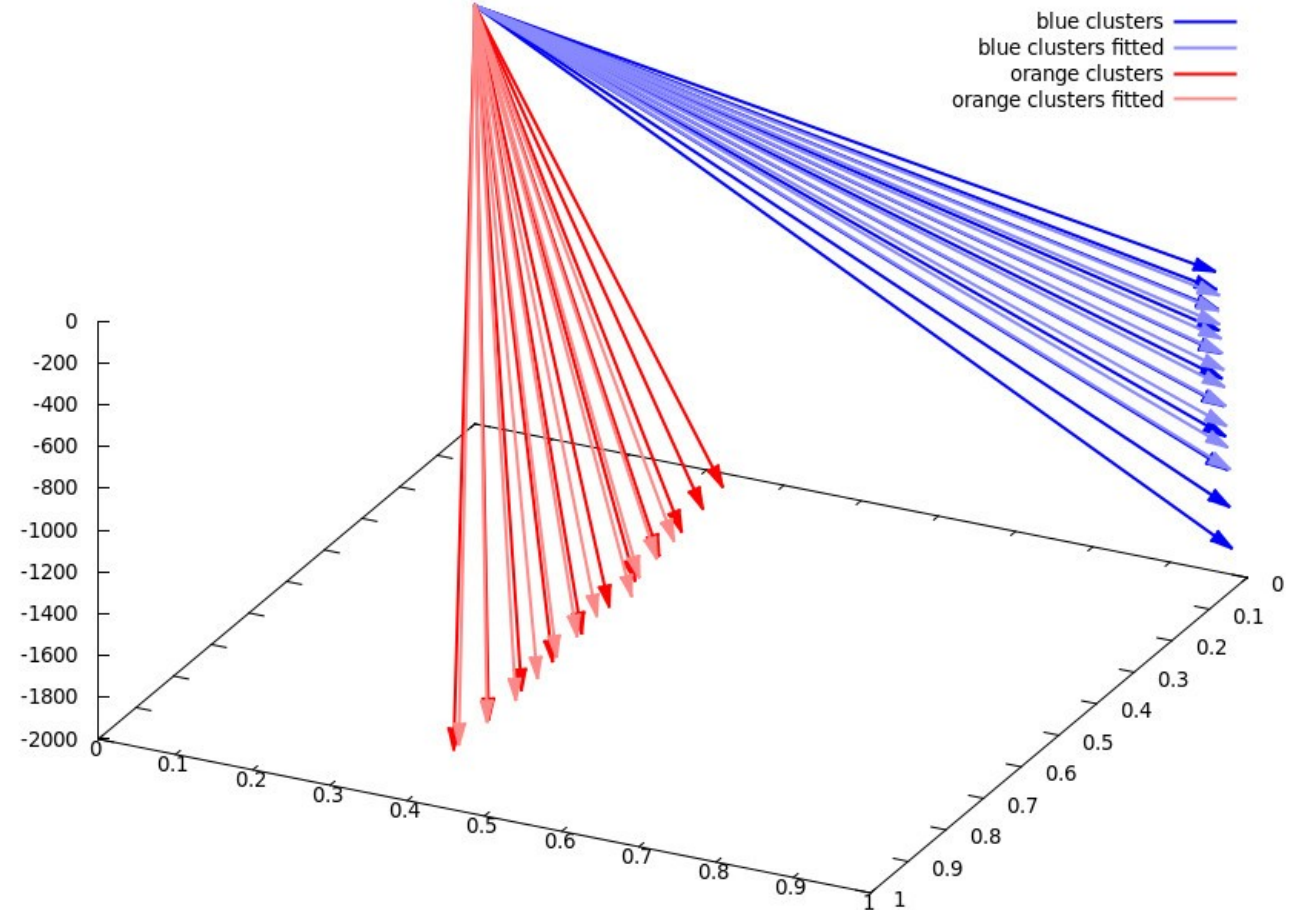
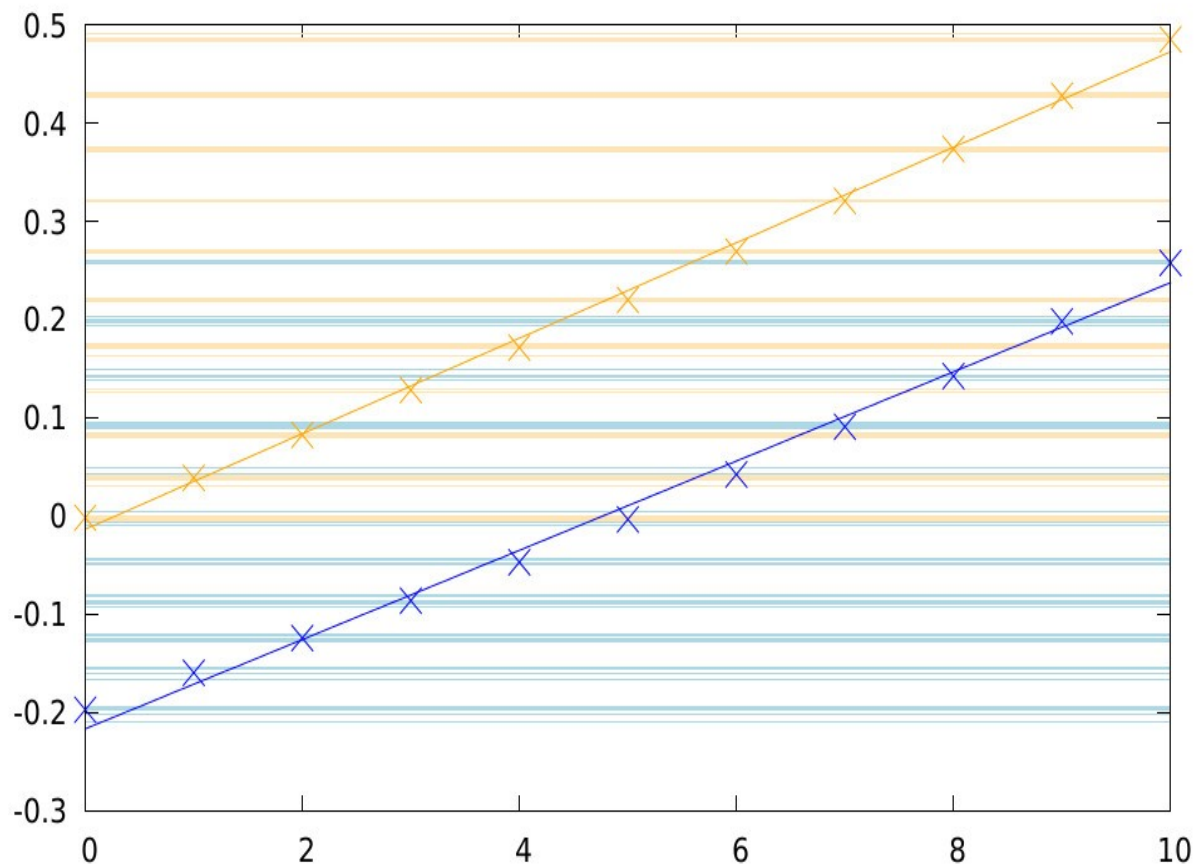


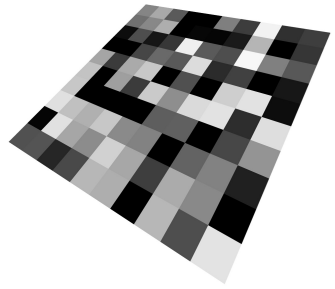




## Fourth Step: **Grid fitting**

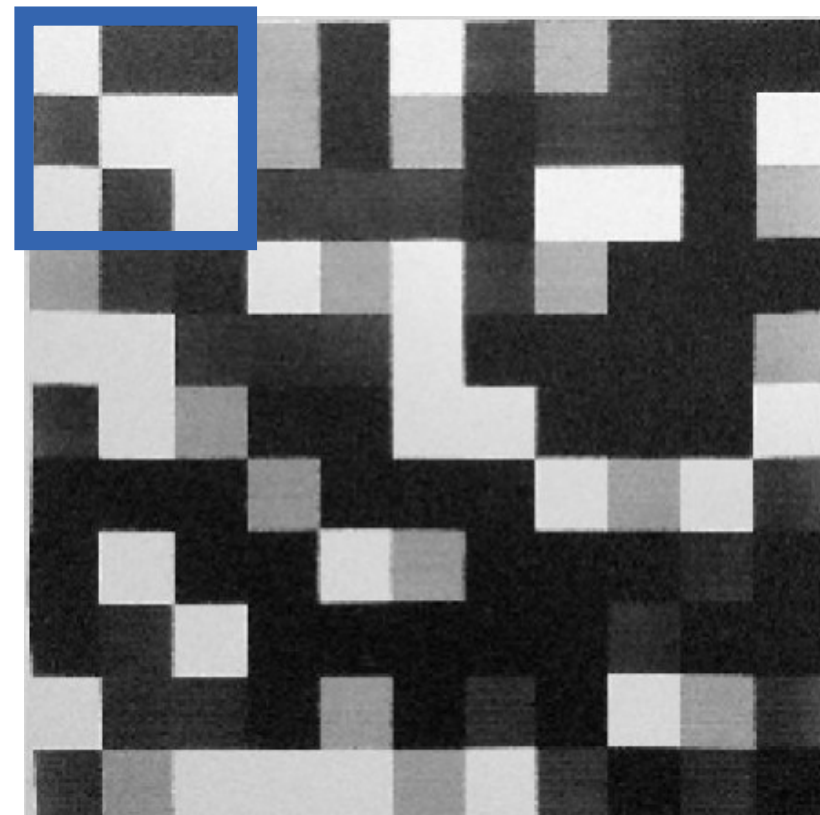
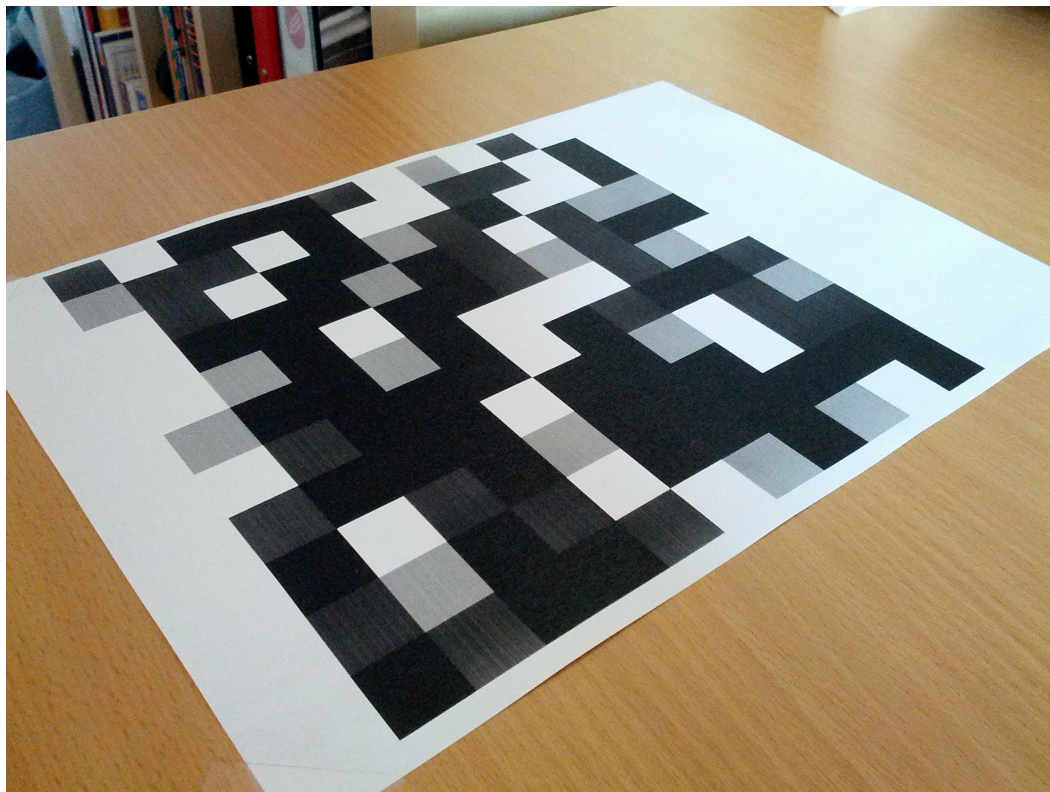
- Linear Regression of cluster lines
- Find grid equation:  $\text{baseline} + (\mathbf{k} * i + \mathbf{q}) * \text{horizon}$



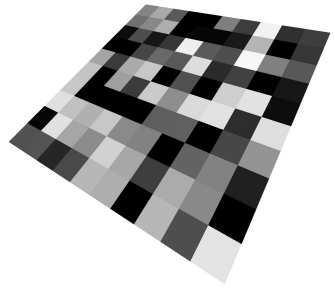


## Fifth Step: **Marker identification**

- Estimate homography from grid corners
- Calculate shade differences & search decision tree

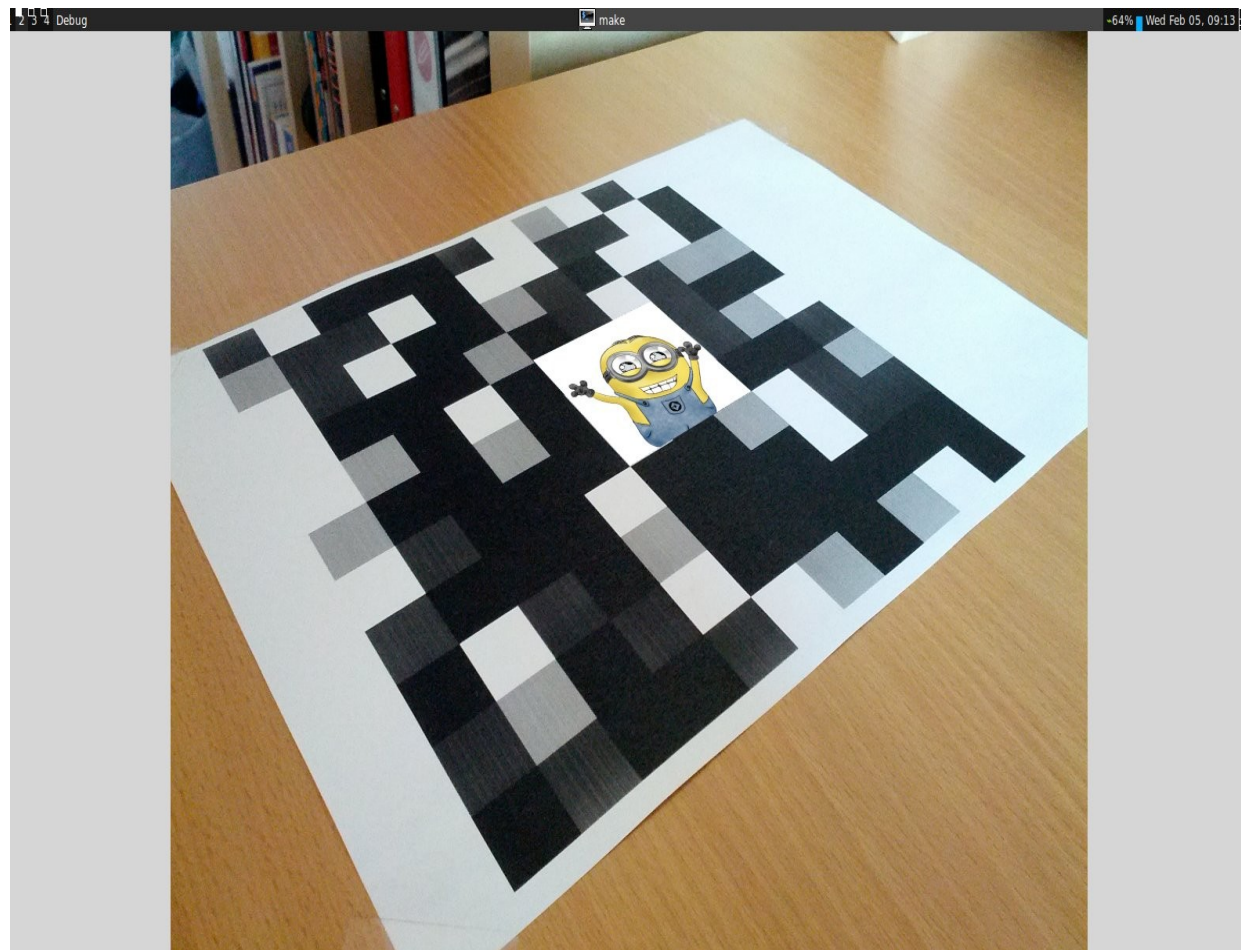


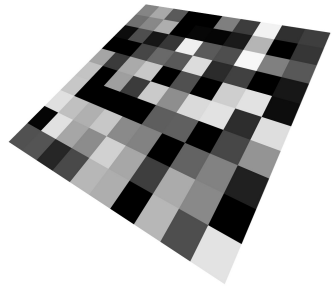




## Sixth Step: **Grid augmentation**

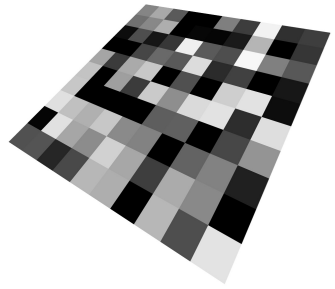
- Position & rotation within marker obtained from decision tree





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## Obstacles and Problems

- Image Pipeline: Sequential, suboptimal for Teamwork :-/
- Sparse implementation information in the paper
- LineGrouping: Unstable
- Grid fitting: Wrong understanding of the paper
- Linear algebra
- Homogeneous lines (+Singularities)
- Time
- ...

