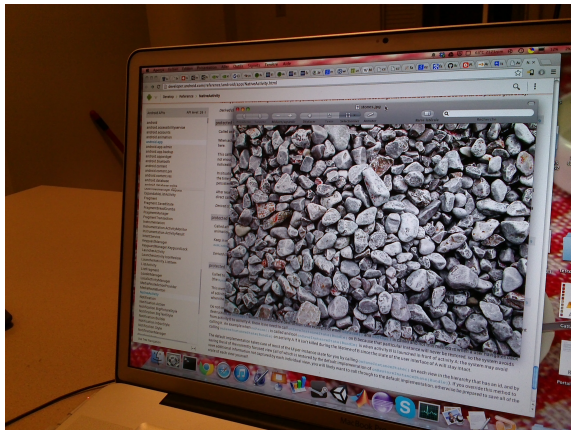


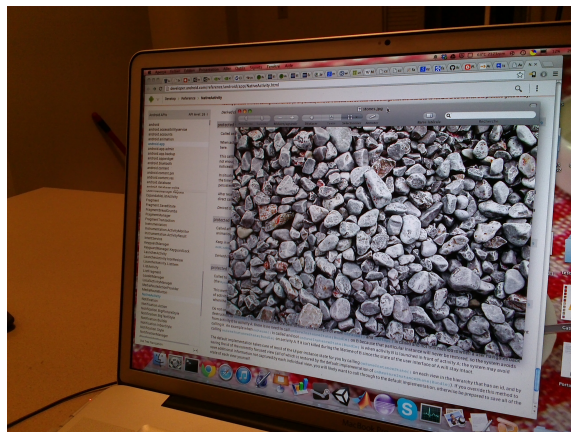
# Improving feature tracking using motion sensors

Jean-Baptiste Boin

# Motivation – Augmented reality



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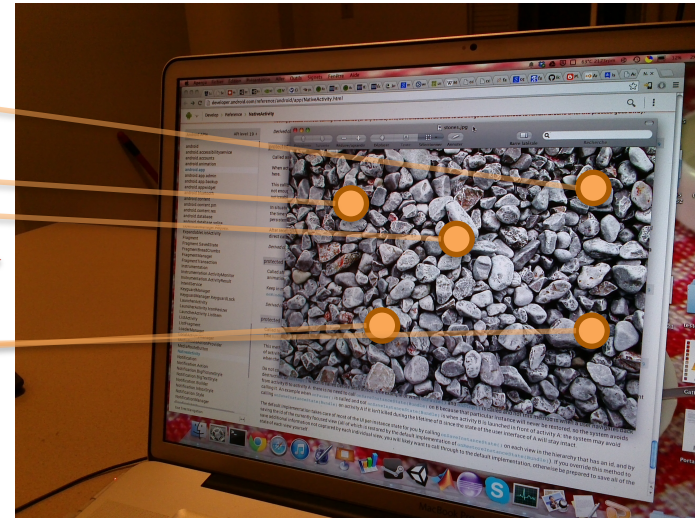
# Motivation – Augmented reality



# Baseline for tracking



2000 ORB features  
pre-computed

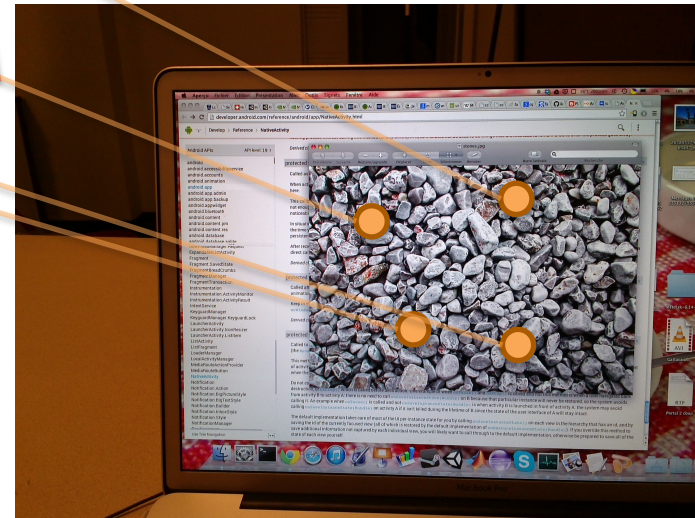
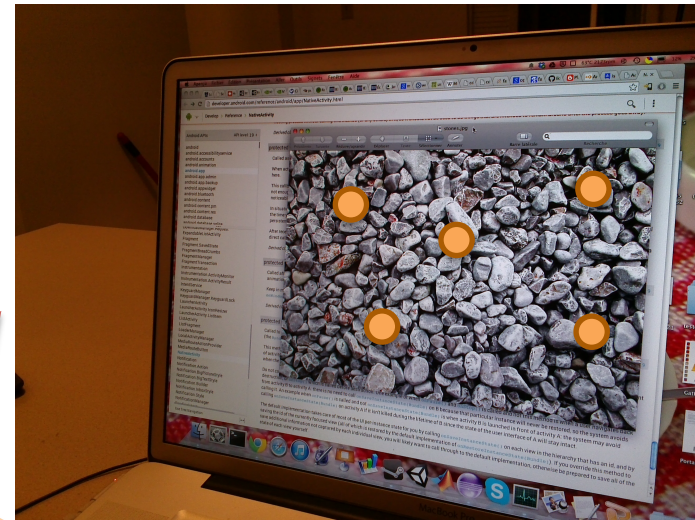


500 ORB features  
computed for each frame

# Baseline for tracking



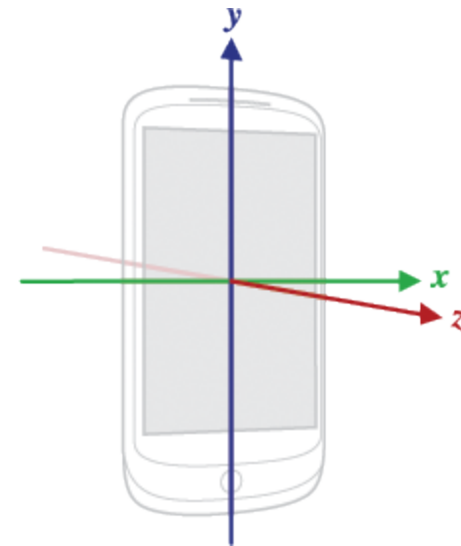
2000 ORB features  
pre-computed



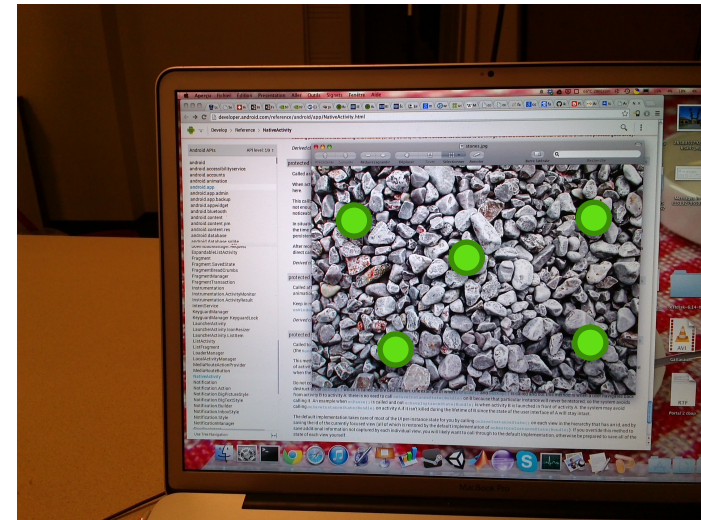
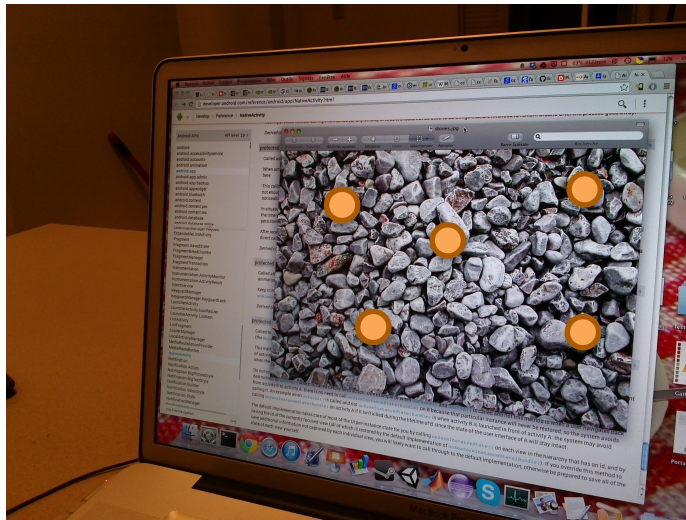
# Introducing the sensors

- Gyroscope: precise high-frequency motion
- Accelerometers + magnetometer (compass): low-frequency motion
- Sensor fusion handled by the Android API

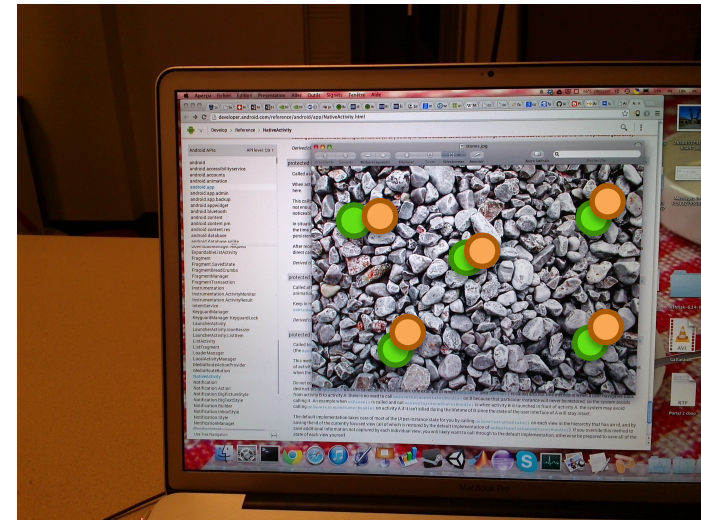
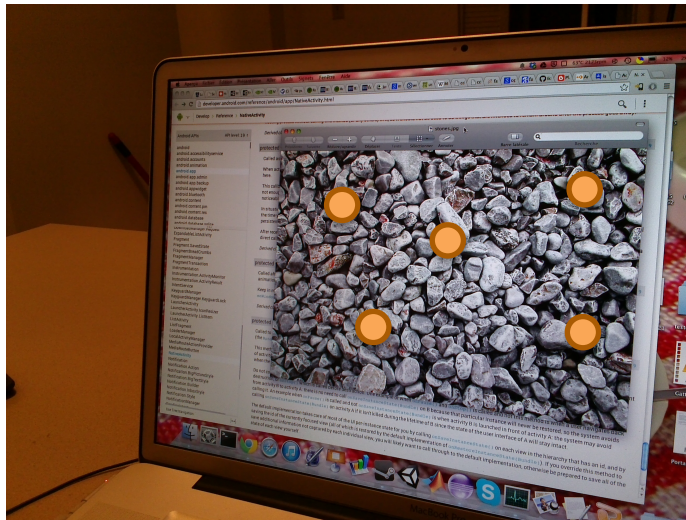
Sensor.*TYPE\_ROTATION\_VECTOR*



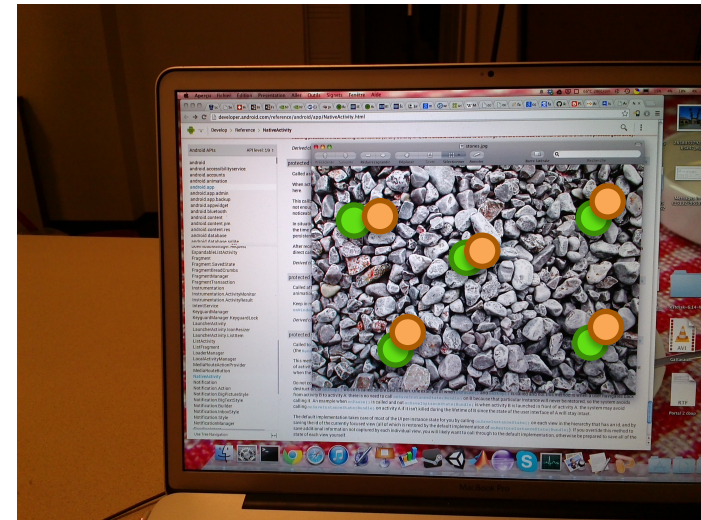
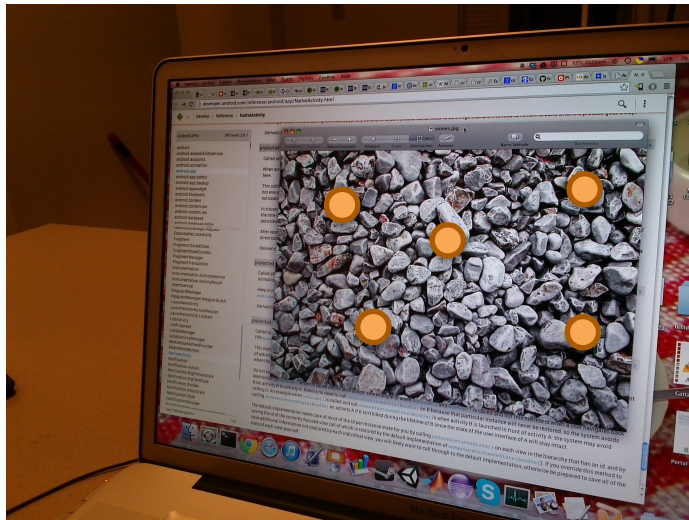
# Improved tracking



# Improved tracking

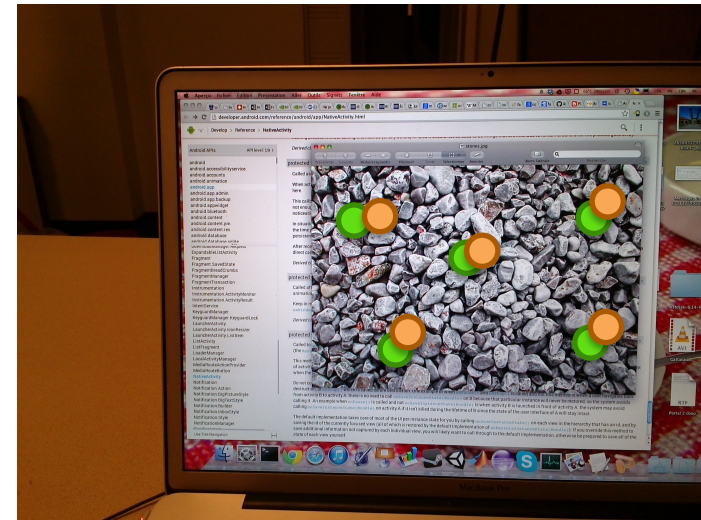
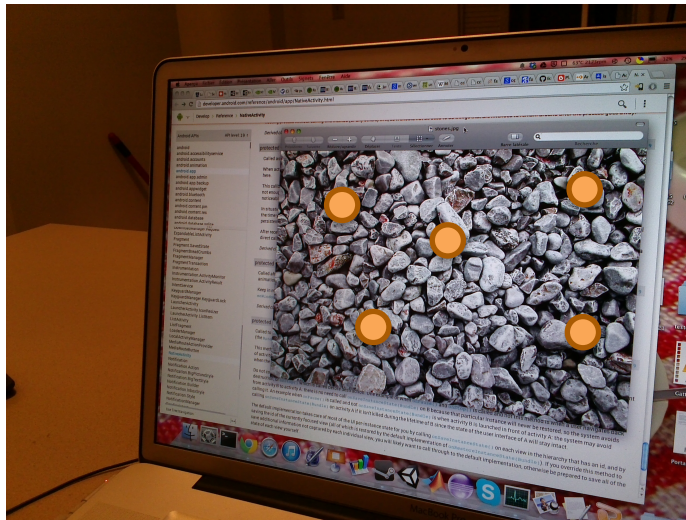


# Improved tracking



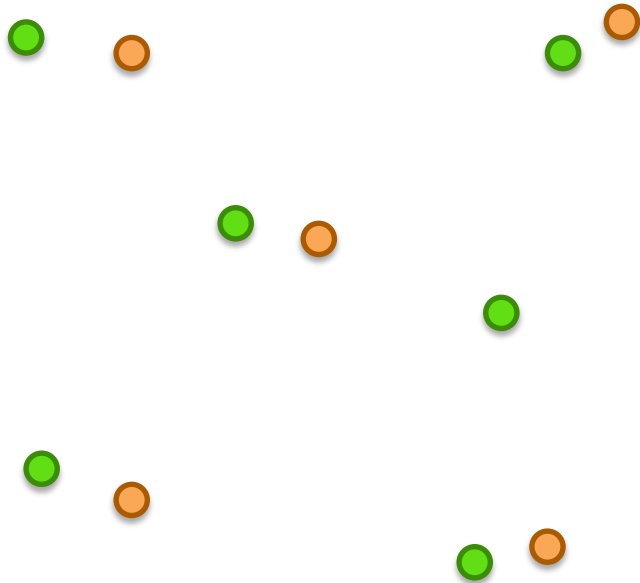
- 1<sup>st</sup> attempt: reduce matching time by matching descriptors in a neighborhood

# Improved tracking

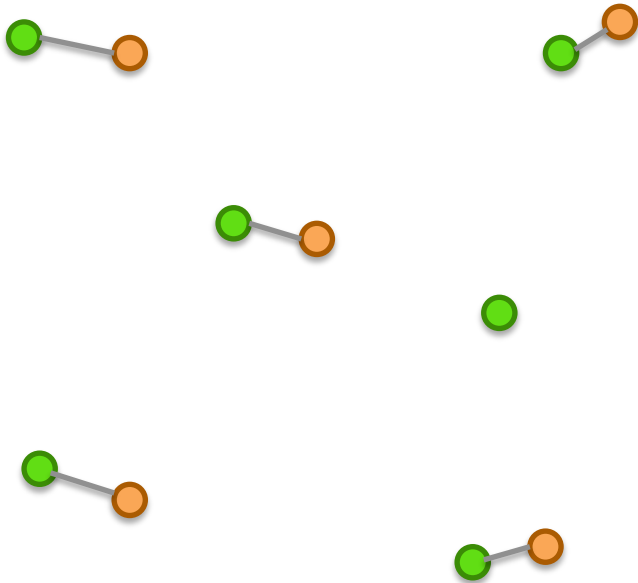


- 1<sup>st</sup> attempt: reduce matching time by matching descriptors in a neighborhood
- 2<sup>nd</sup> attempt: remove descriptor extraction step

# Current scheme

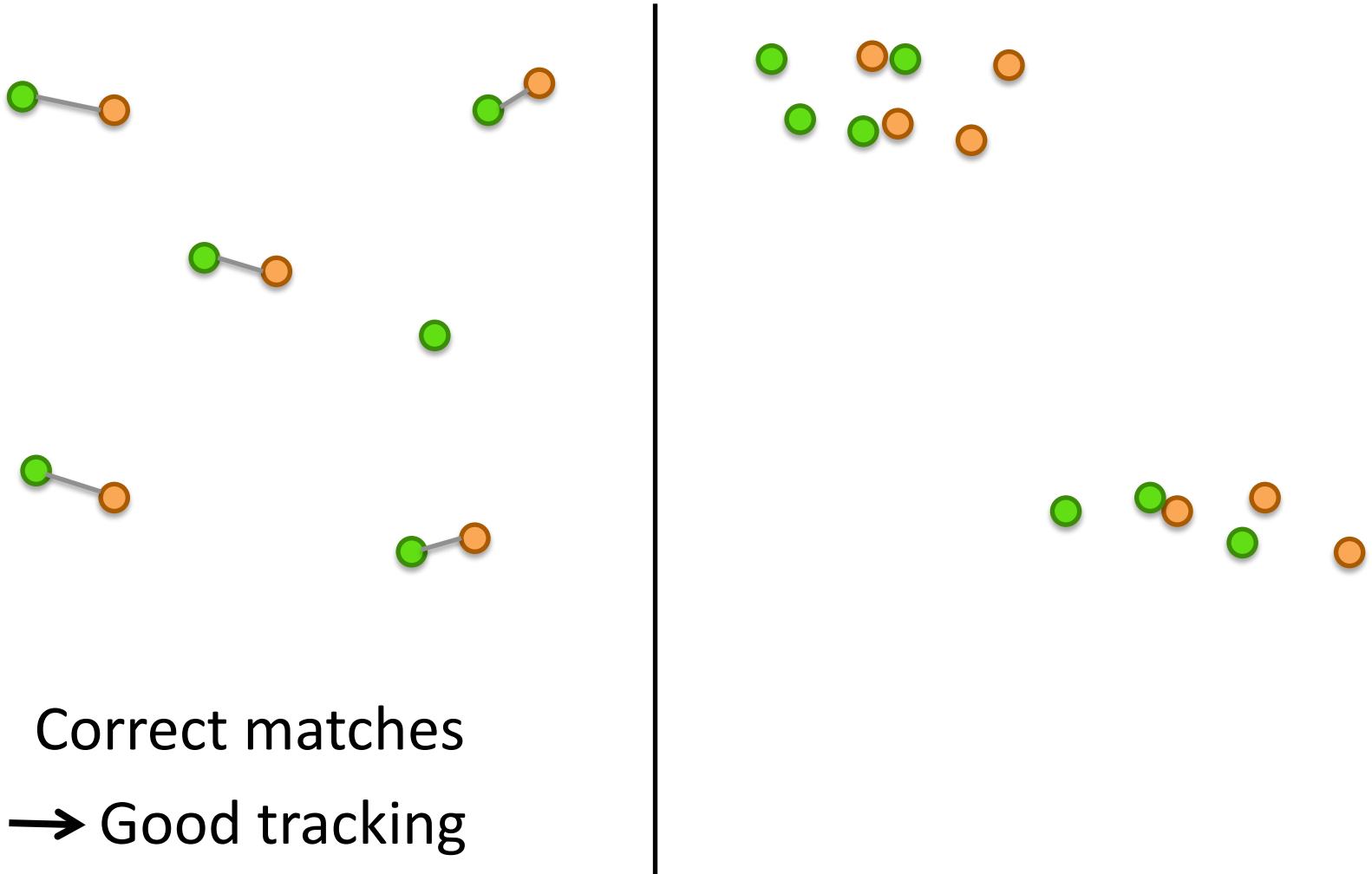


# Current scheme

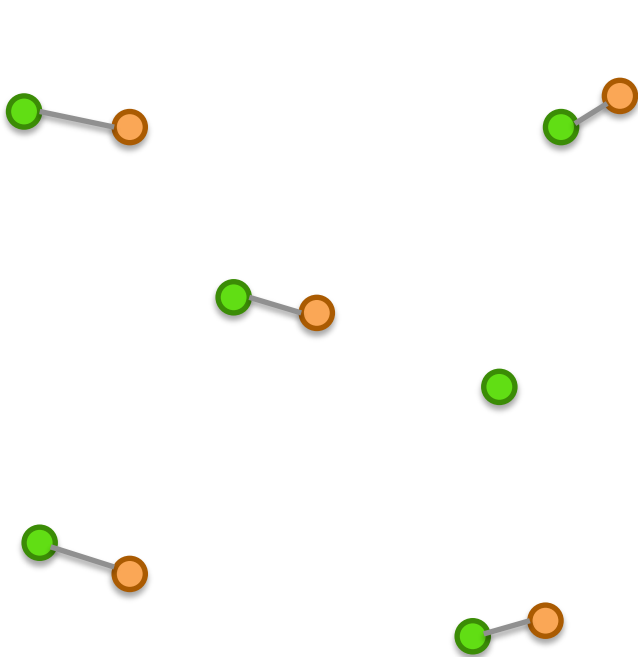


- Correct matches  
→ Good tracking

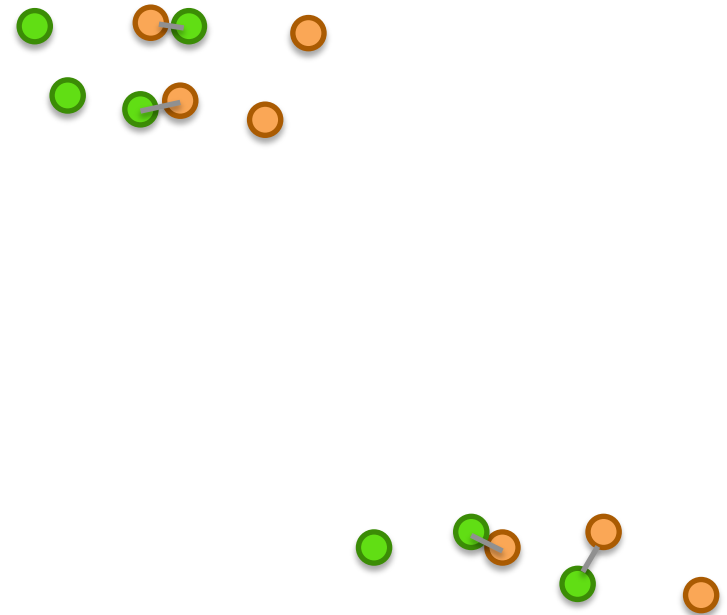
# Current scheme



# Current scheme



- Correct matches  
→ Good tracking



- Incorrect matches  
→ Tracking failed

# Refinements under development

- Improve matching of keypoints using:
  - the scale of the keypoints
  - the response of the keypoint detector
- Handle delay between sensor input and reception of the image