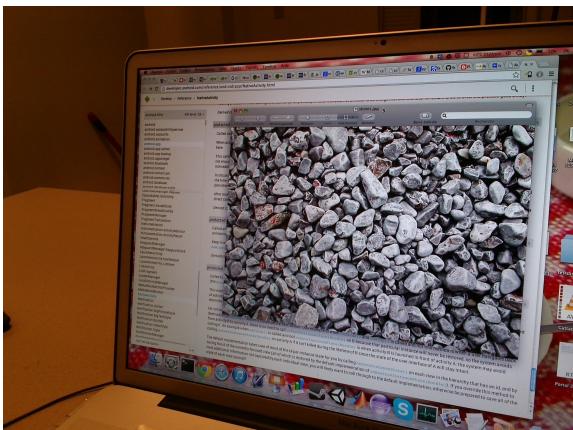


Improving feature tracking using motion sensors

Jean-Baptiste Boin

Motivation – Augmented reality



Motivation – Augmented reality



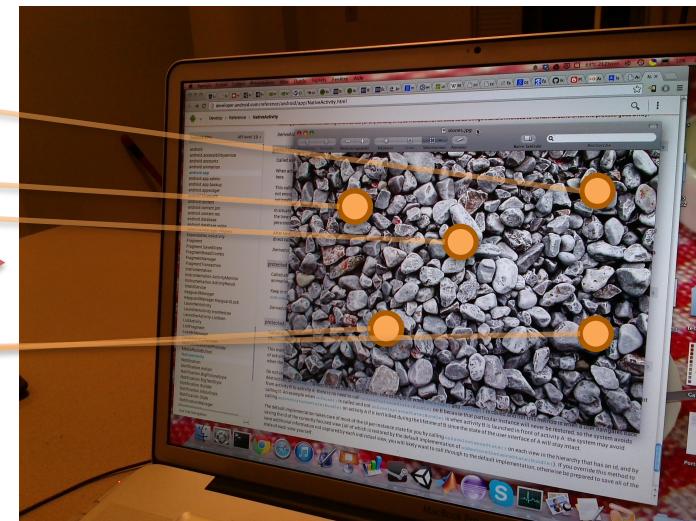
Motivation – Augmented reality



Baseline for tracking



2000 ORB features
pre-computed

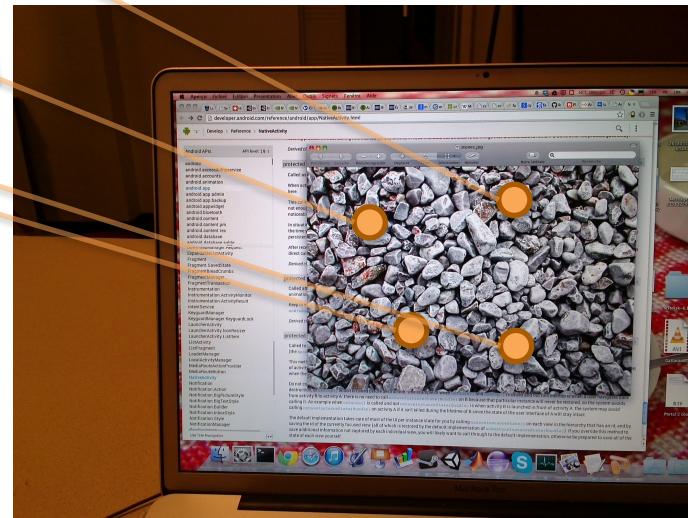
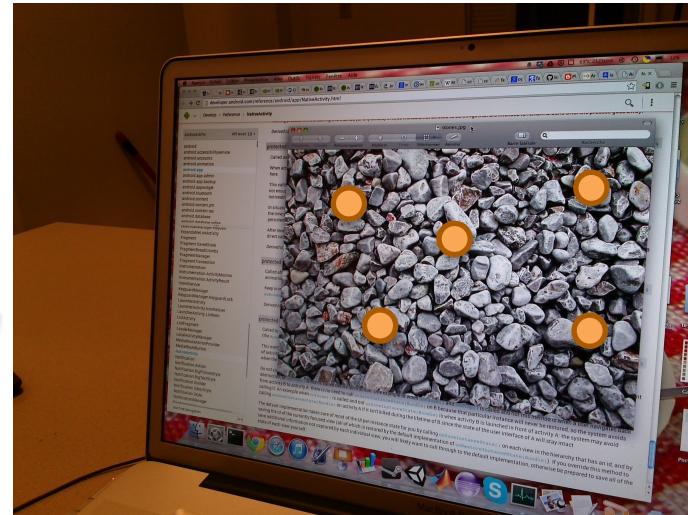


500 ORB features
computed for each frame

Baseline for tracking



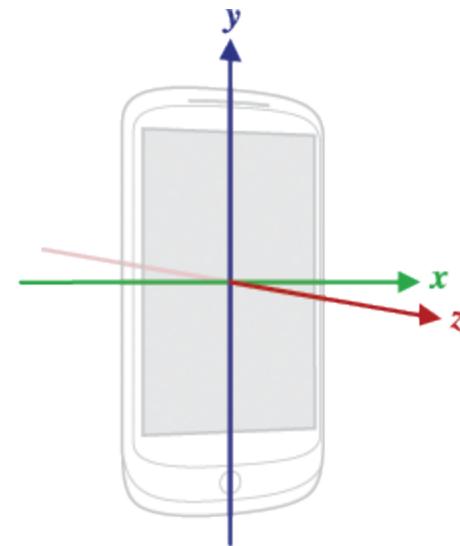
2000 ORB features
pre-computed



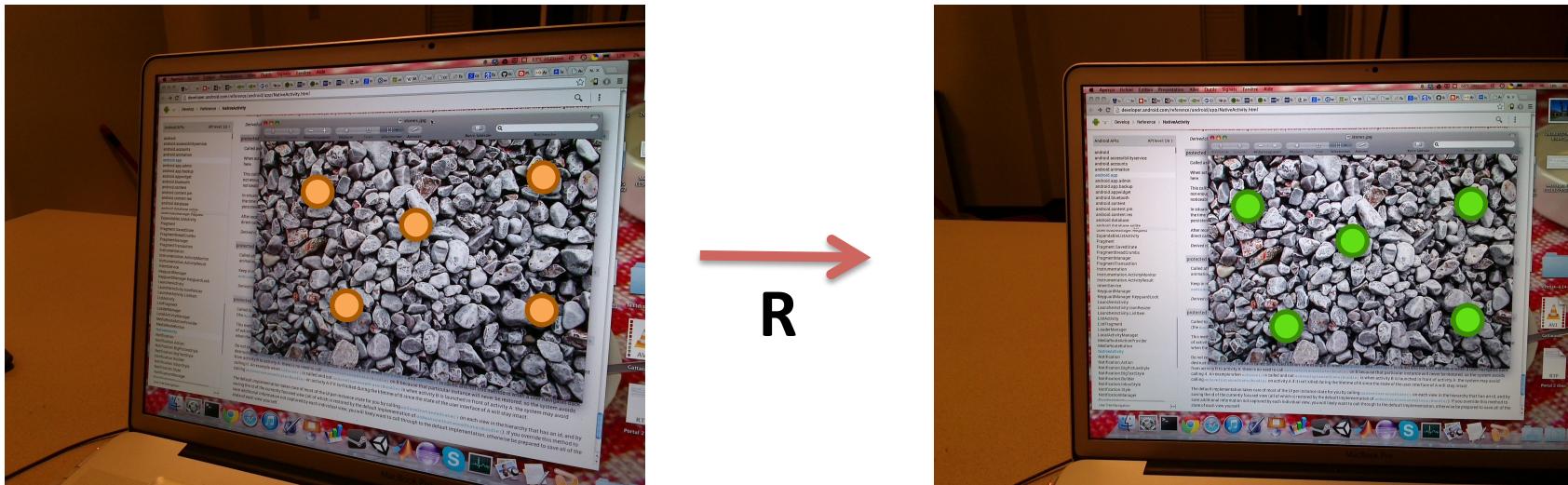
Introducing the sensors

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

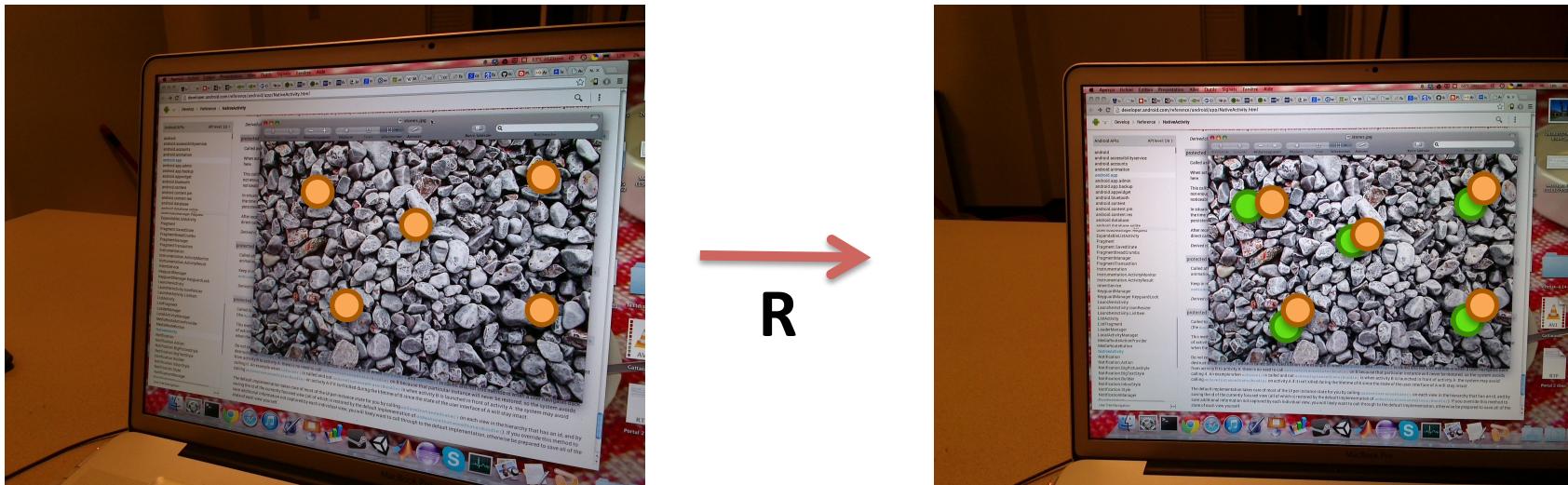
Sensor.*TYPE_ROTATION_VECTOR*



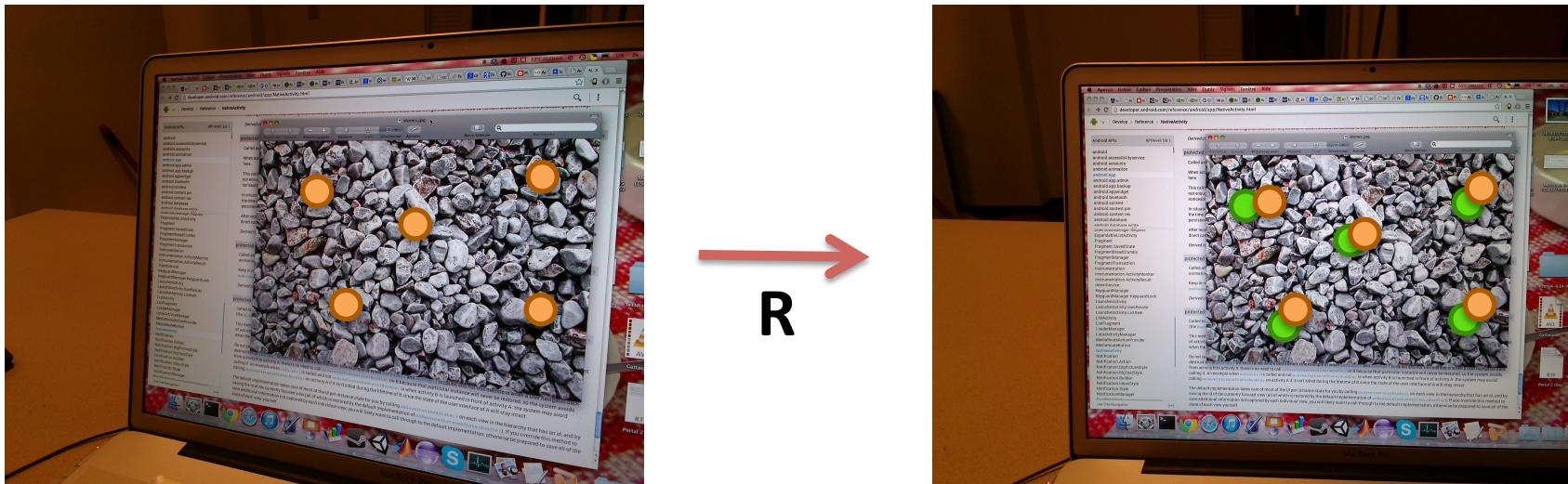
Improved tracking



Improved tracking



Improved tracking



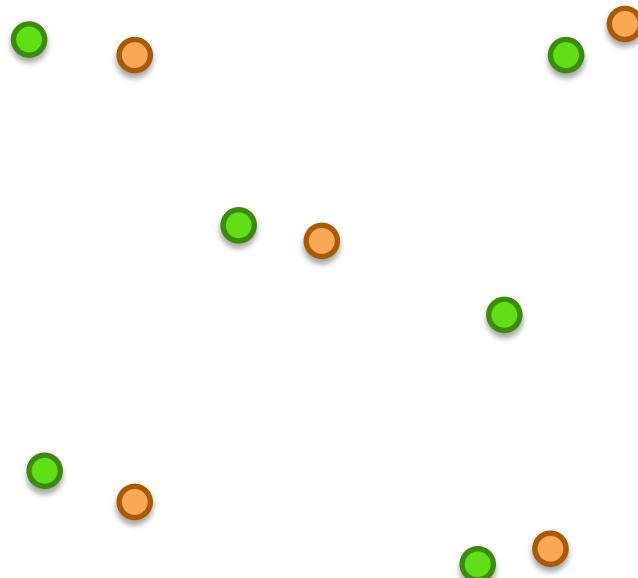
- 1st attempt: reduce matching time by matching descriptors in a neighborhood

Improved tracking

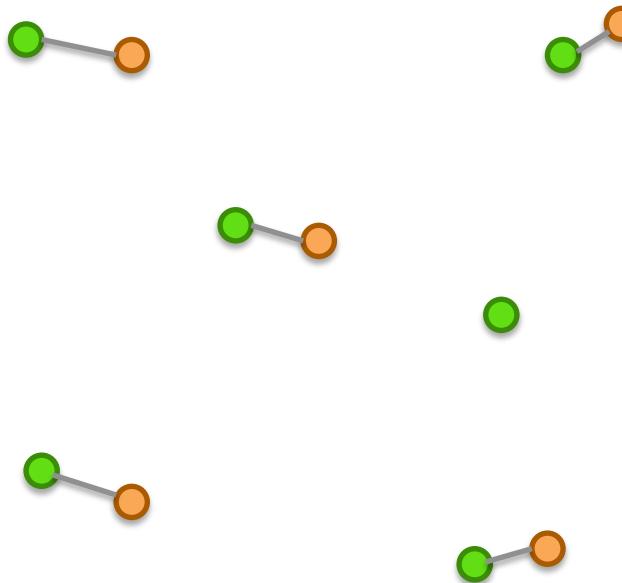


- 1st attempt: reduce matching time by matching descriptors in a neighborhood
- 2nd attempt: remove descriptor extraction step

Current scheme

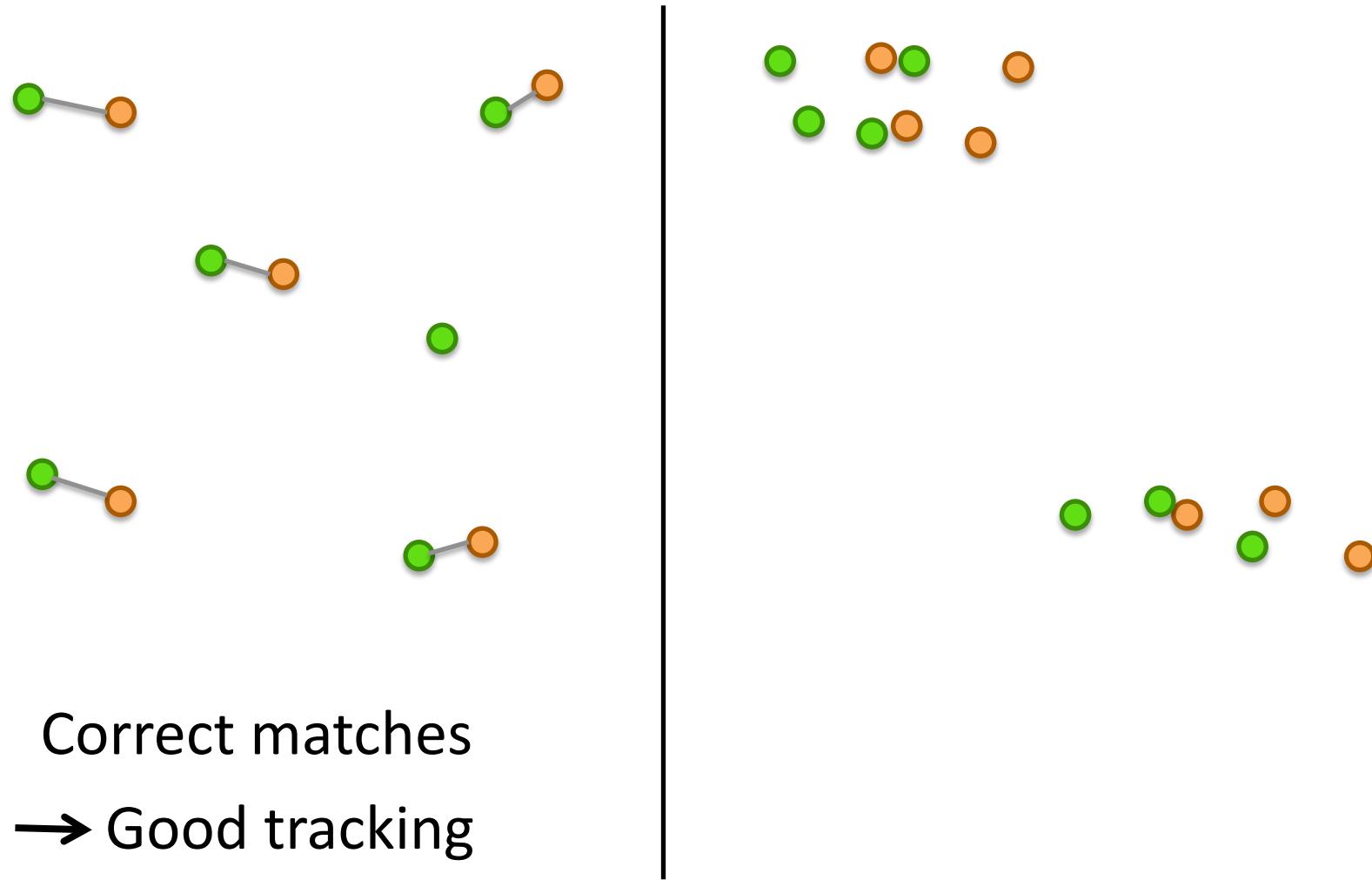


Current scheme



- Correct matches
→ Good tracking

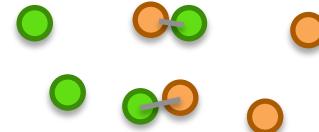
Current scheme



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