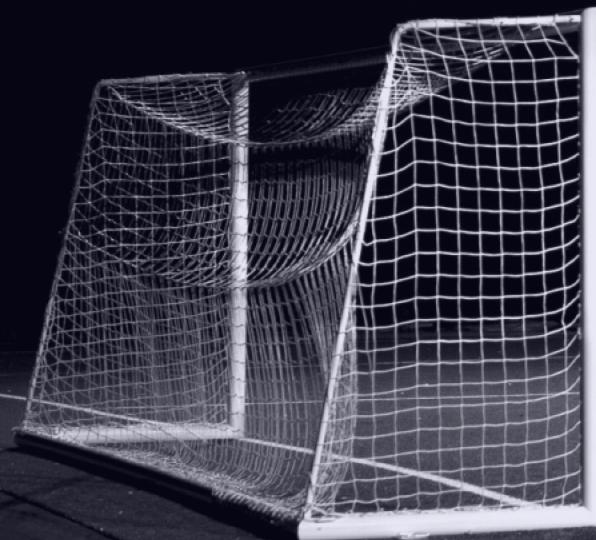


MarkUp

*Leveraging Bluetooth Smart for Accurate
Player Positioning and Fitness Tracking*



Context

- Fitness trackers are everywhere!
 - Optimized for ‘general’ use
- Professional soccer players have specialized equipment
 - \$\$\$
- Is there a middle ground for the amateur player?



Proposed Solution

- Make accurate tracker for less \$\$\$
- Use cheap RPi's and BLE + really good software
- Create LOCAL positioning system instead of GLOBAL positioning system (GPS)!

Context

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Product Leaders



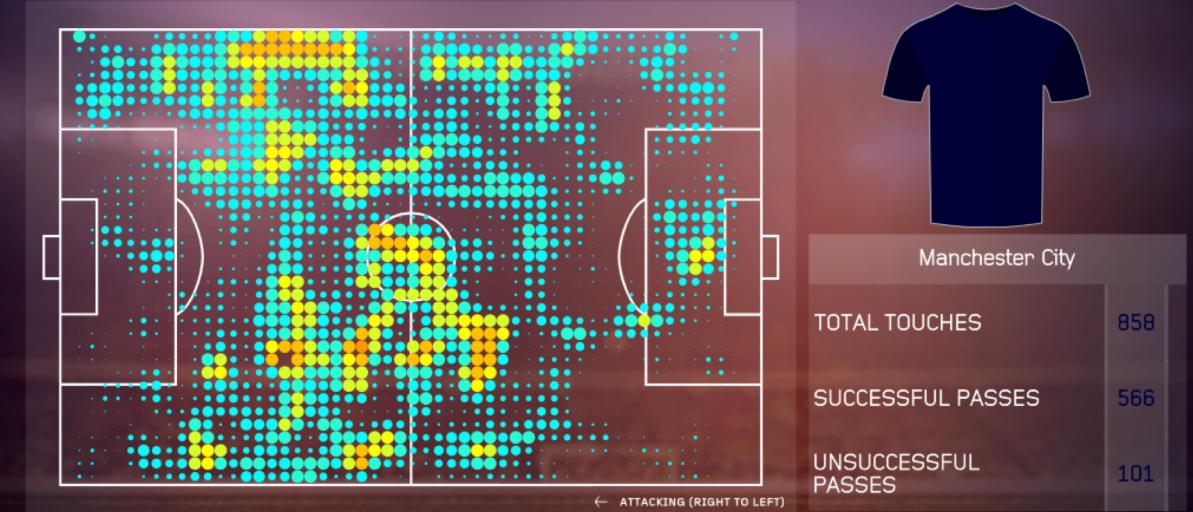
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Desired Metrics



MANCHESTER CITY - HEAT MAP

City Mainly Limited To Touches In Wide Areas In The Final Third

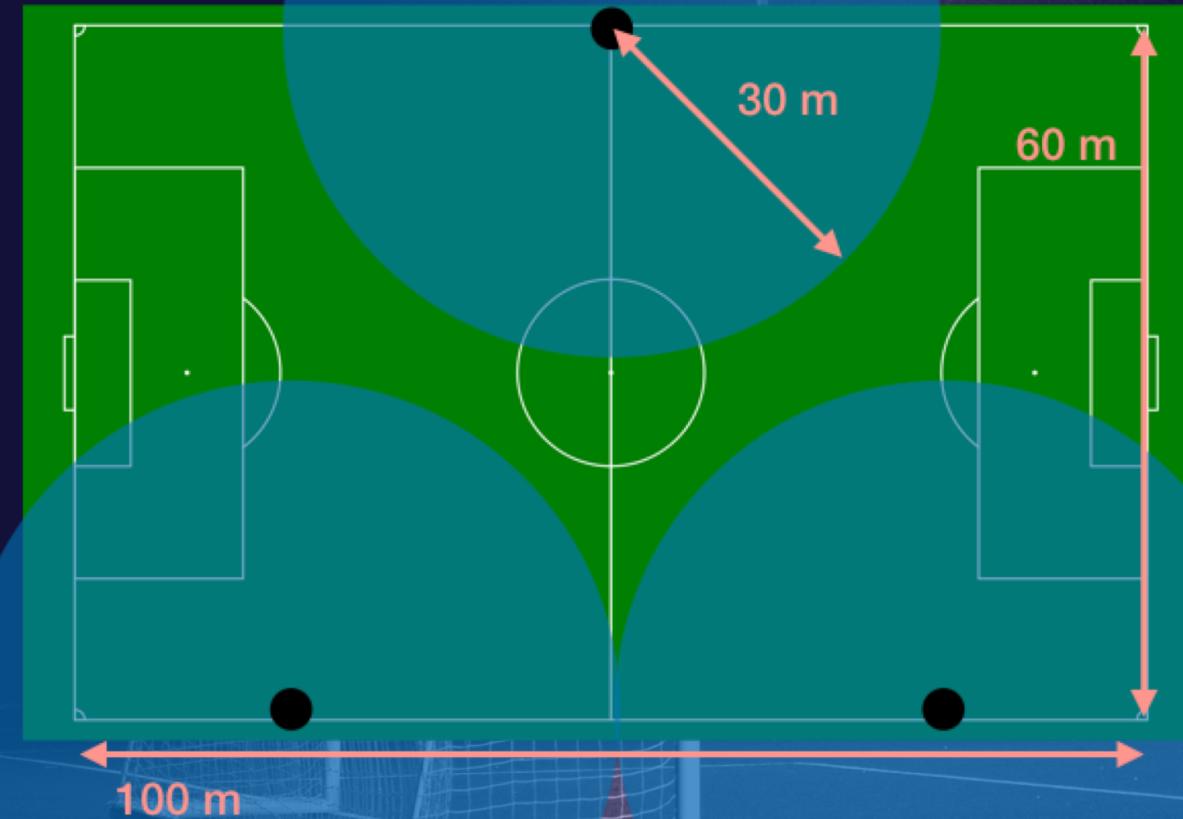


Arsenal vs Manchester City, 0' - 90'
English Premier League, 21 December 2015

Data Provided By
STATS

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Approach

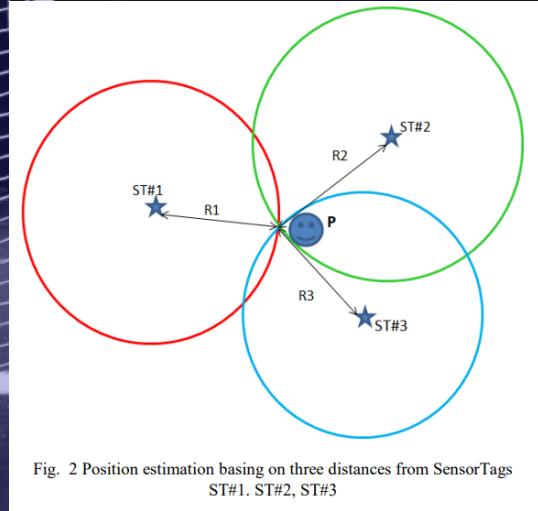
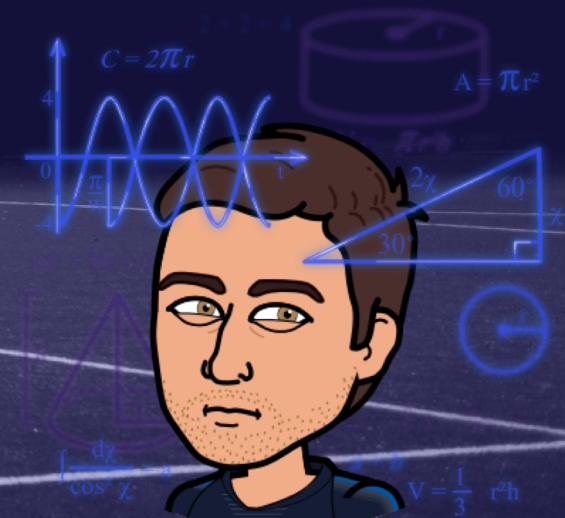


Fig. 2 Position estimation basing on three distances from SensorTags ST#1, ST#2, ST#3

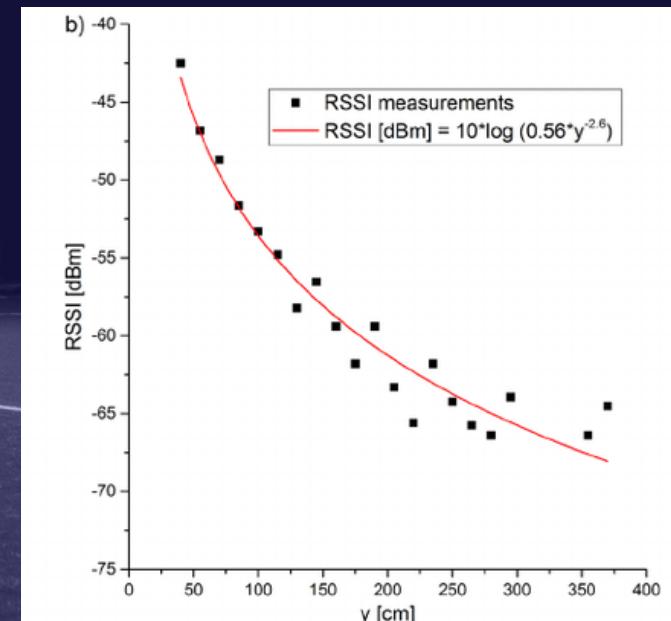
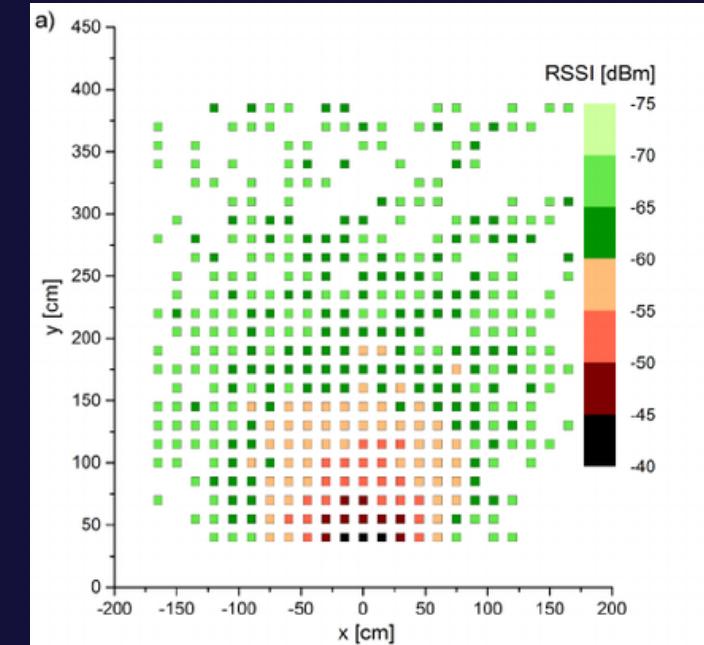
1. Collect inertial data using Hexiwear
2. Approximate true position using BLE range/RSSI
3. Sensor fusion/Kalman Filtering to combine the two
4. Profit



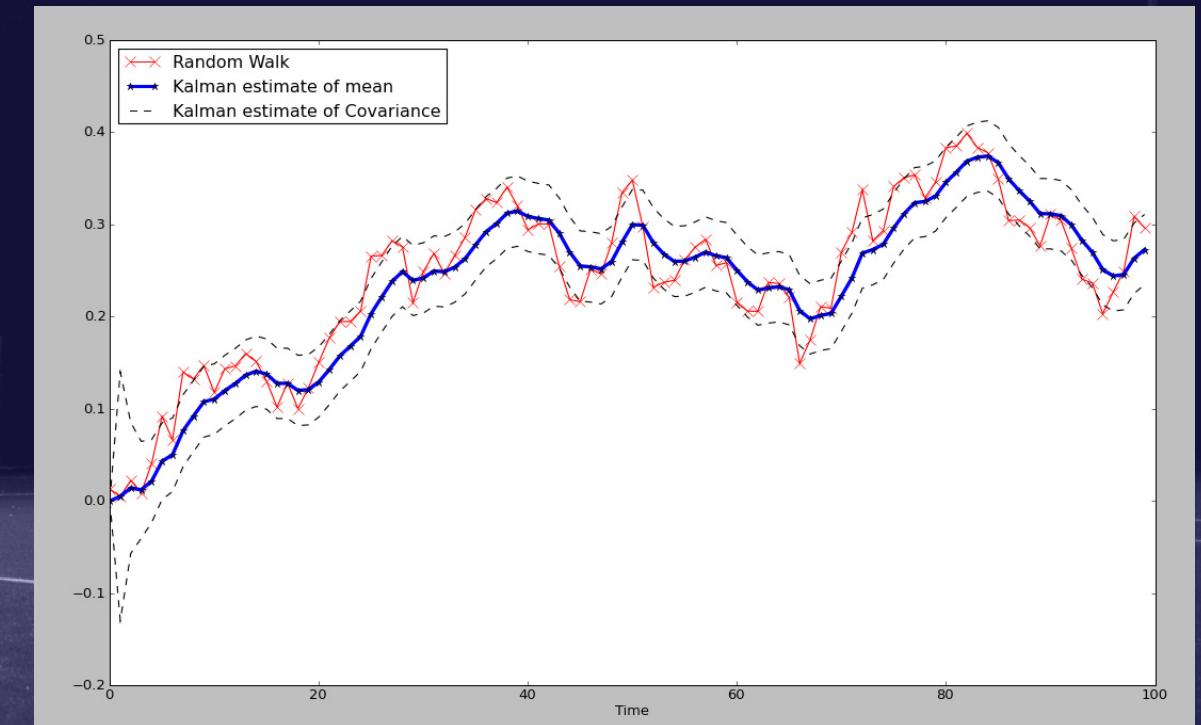
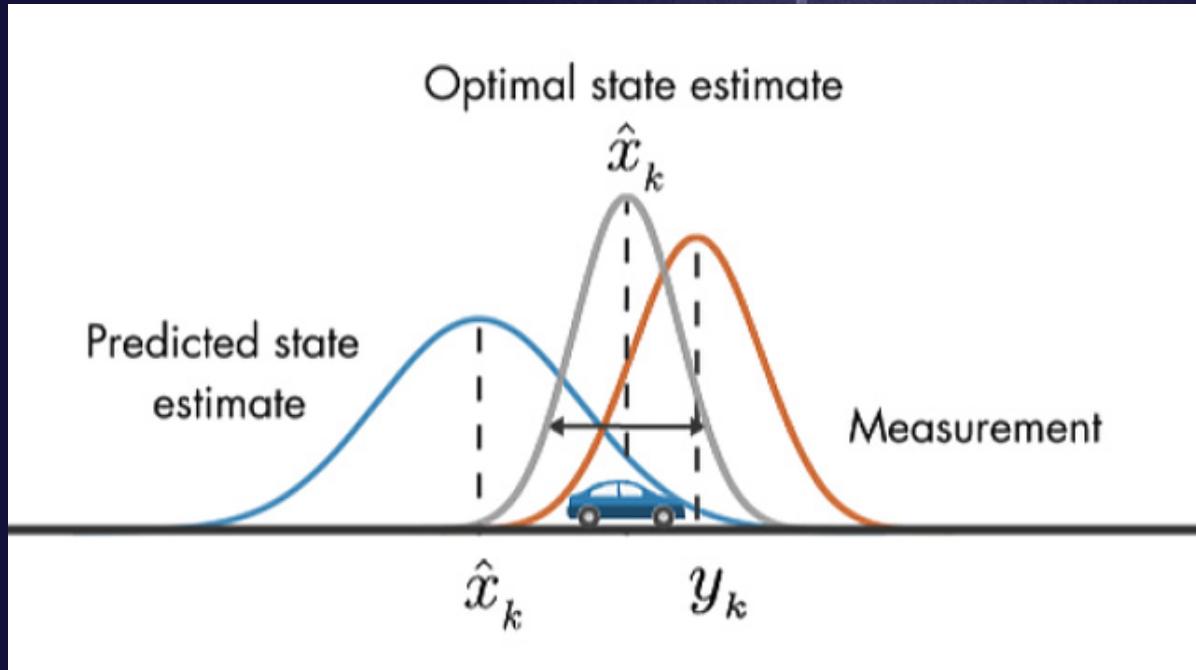
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So...what's the catch?

- Hexiwear...isn't the best hardware
 - Only sampled @ 30 Hz
 - BLE is spotty
- Bluetooth range is small + RSSI isn't a good indicator for distance



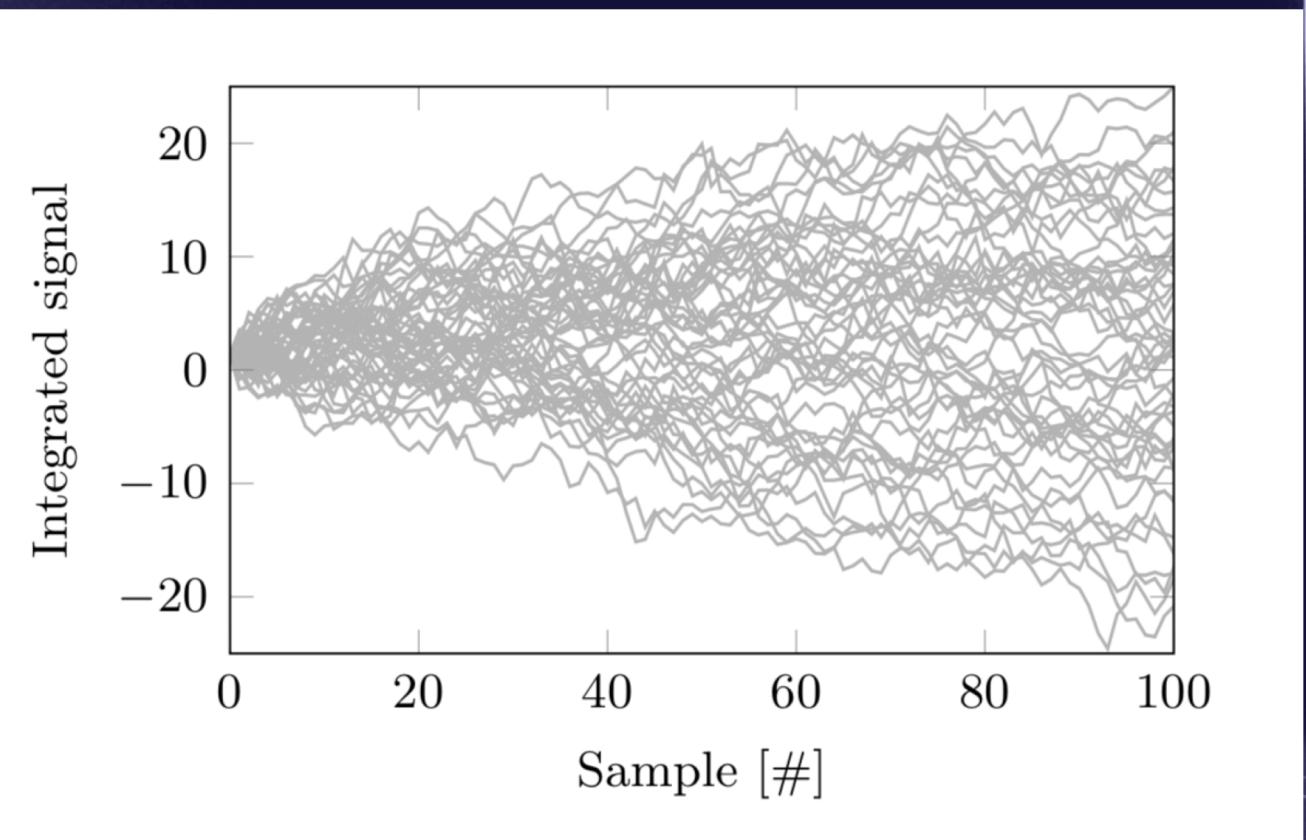
Background: Kalman Filters



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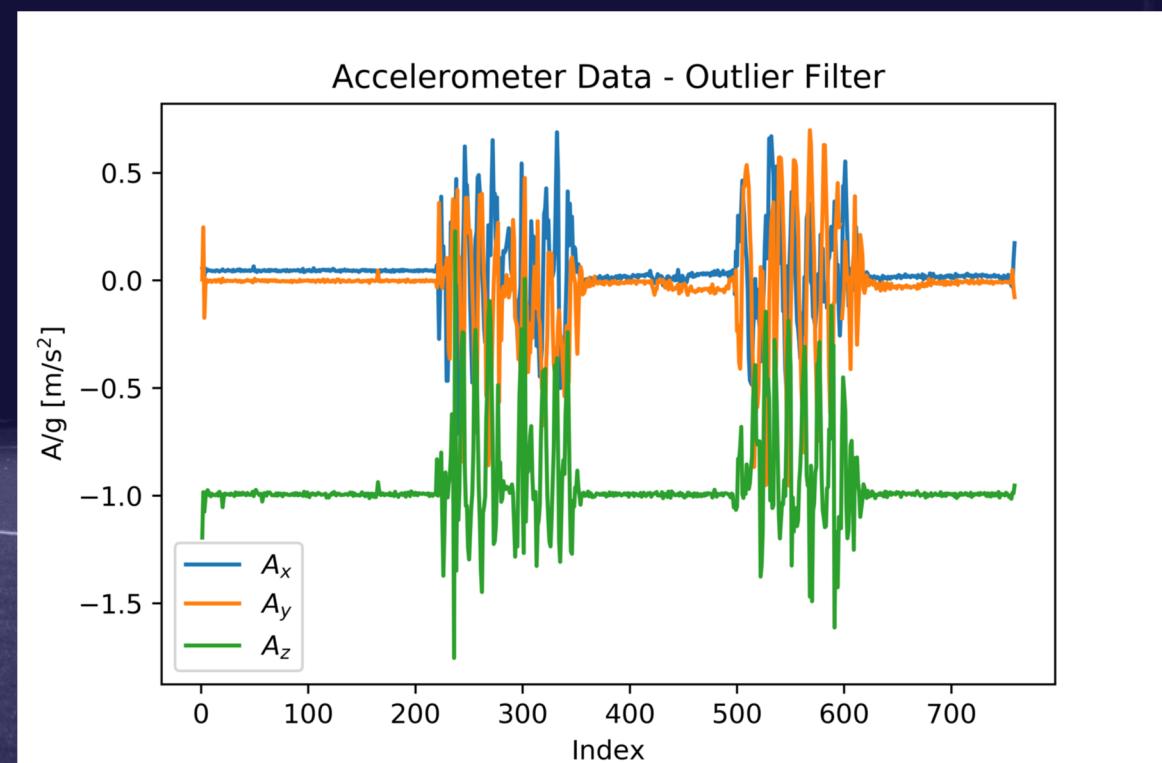
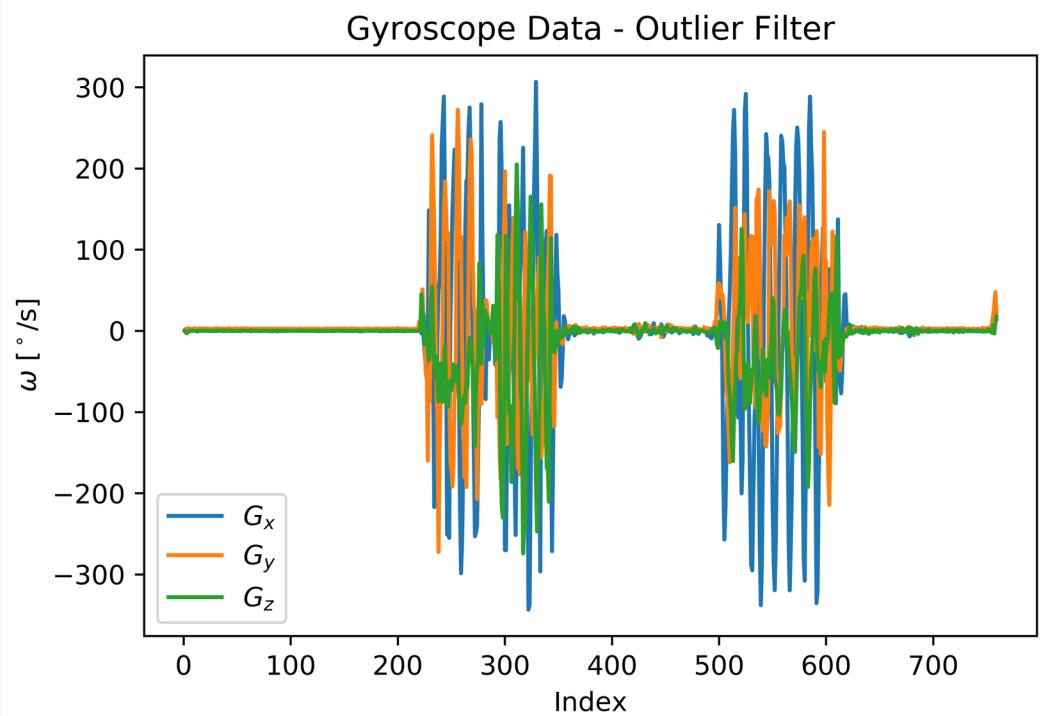


Position Tracking



"Results"

- Couldn't get RSSI to work
- BUT Hexiwear logs data!



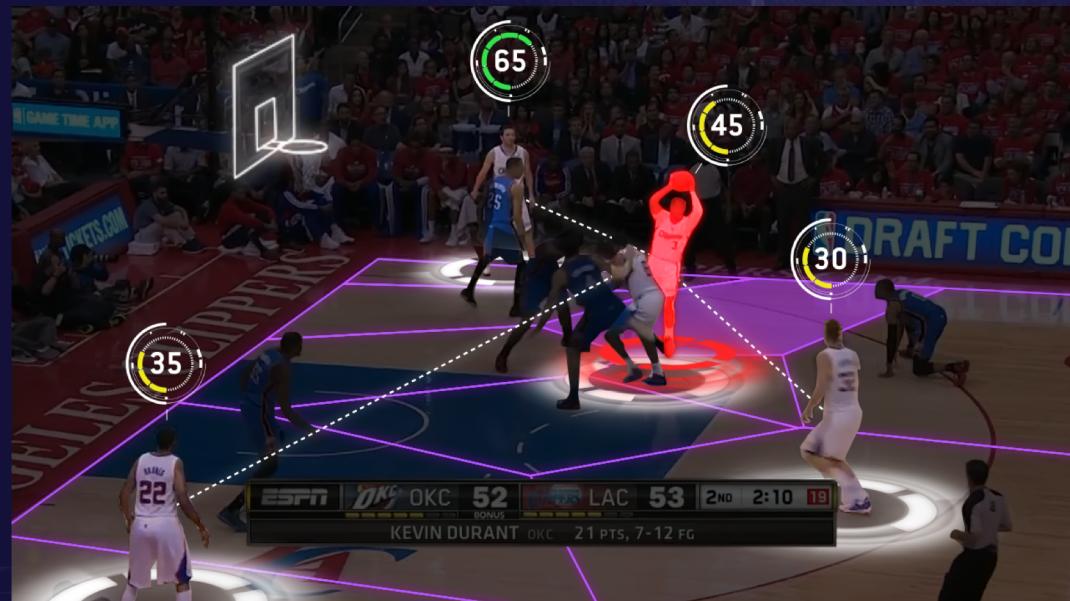
Next Steps

1. Get RSSI to work! Test BLE Range
2. Kalman Filter!
 - Test, Test, Test (shifty soccer)
3. If RSSI doesn't work, why not try image recognition?

Benefits of current approach

- Local position estimation
 - Can create infrastructure of RPis
- Cost
 - 1 GPS Transceiver = \$40
 - 2 RPis = \$20

Position Tracking with Images



The Math Behind
Basketball's Wildest
Moves | Rajiv Maheswaran

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