

Capture de mouvements & fusion de données au service de l'internet des objets

MotionCore
in your Mobile



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We bring the genie to your smartphone...



Welcome back home. Landing was 15 minutes delayed. Follow these instructions to you car located at P6, Floor 4, Slot 45. Heavy traffic on the highway. ETA home 8:45PM. Just sent a text message. Estimated cost for one week parking is \$85

Movea provides what's required



Cloud based Usage Model Library & development tool

- Links data to use cases
- Proven track record in Sport, Health, Entertainment
- Upgradeable and customizable

Pioneer in Motion Sensing *free*



Embedded Data Fusion Engine

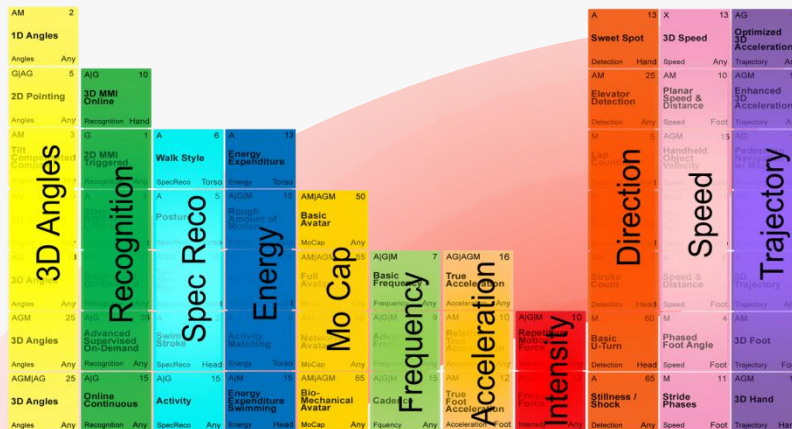
- Always on, Ultra low power
- Sensor / Architecture agnostic
- User activity & context monitoring



UNIVERSAL ELECTRONICS
Putting You in Control of Technology®

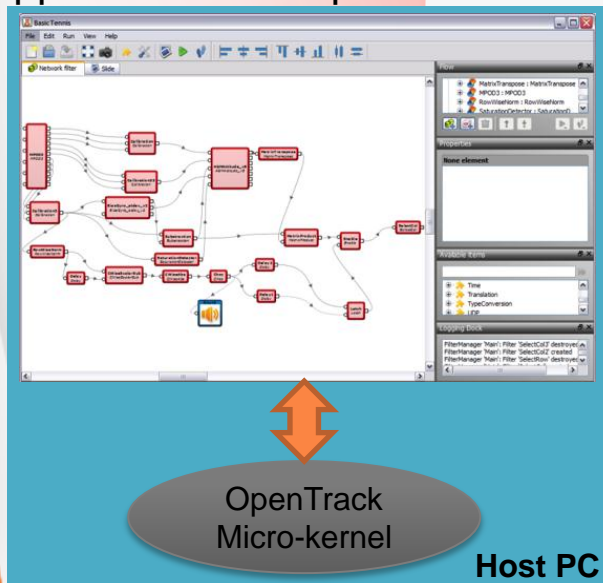
From IP to Application

Movea
portfolio
80 families
>435 patents

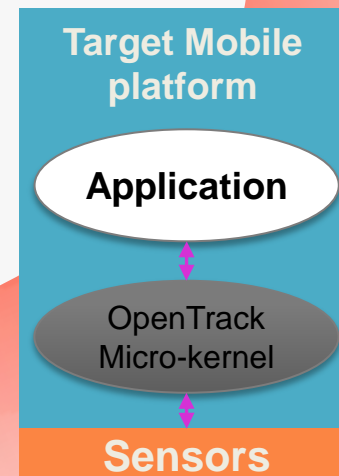


MoveaLab is used in
each market
segments

Movea Lab :
Intuitive drag and drop motion
development framework for
application developers



Generate



Plugin based architecture allowing
custom user extensions

Some of your big markets...

Mobile & Tablets

MotionCore™



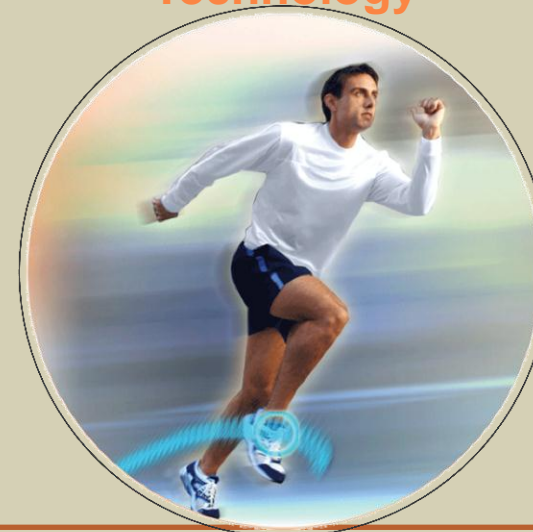
Interactive TV

MoveTV™



Sports & eHealth

SmartMotion® Technology



Common IP and Development tools

- | | | |
|-----------------------------|---------------------|---------------------|
| • Calibration & Orientation | • Pointer control | • Swimming |
| • Indoor Ped Nav | • Gestures | • Tennis |
| • Context Awareness | • Air signature | • Running |
| • Power Mgmt saving | • Hosted & Embedded | • Body Area Network |

Mobile & Tablets Markets with MotionCore

Mobile & Tablets

MotionCore™



Sensors A,G,M,...P,ALS

MotionCore™ Functions



Context Engine

Device's posture, user's posture, how the user is travelling...

Pedestrian Navigation

Step Cadency / Step Length, Ded-recko, Map Matching

Gestures

Air Pointing (Mouse), Advanced gestures

Foundation

Continuous cal, Orientation, Compass

**Movea
extended
API**

**Standard
API**

**Applications
developers**

Motion Foundation

- Includes all the features for
 - Continuous Calibration
 - Simple Gesture (Flick, Tap, Shake...)
 - Orientation (rotation matrix, Quaternion, inclinometer)
 - Compass
- Android & Win 8 (/9) compliant

You want your **Mobile Device**

to always provide **services requested** with

gesture



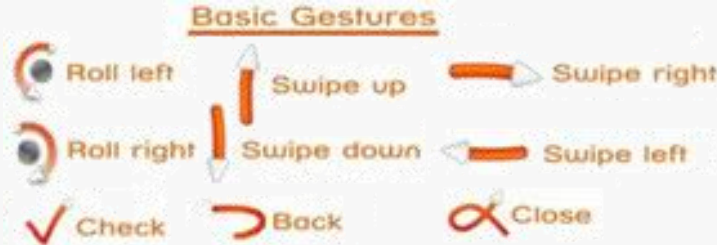


Gestures



Motion processing IP cores for mobile applications

- Mobile centric gestures
- Customer programed focused gestures
- User programed signatures



- Air signature
 - Authentication



MotionCore : motion processing running on Android based Smart Phone

You want your **Mobile Device**



to always help you to find you Car within a Parking Mall thanks to

Pedestrian Navigation

Pedestrian Navigation

Main role of inertial sensors



podometer



Absolute
azimuth



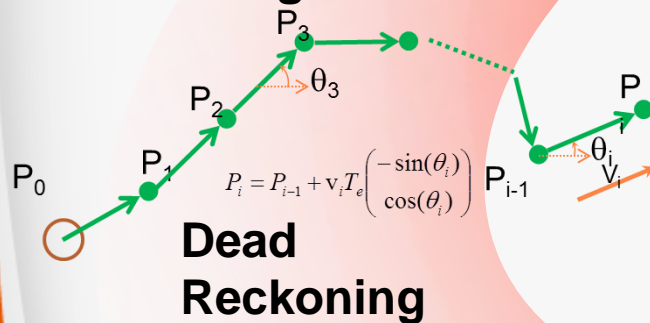
Relative
altitude



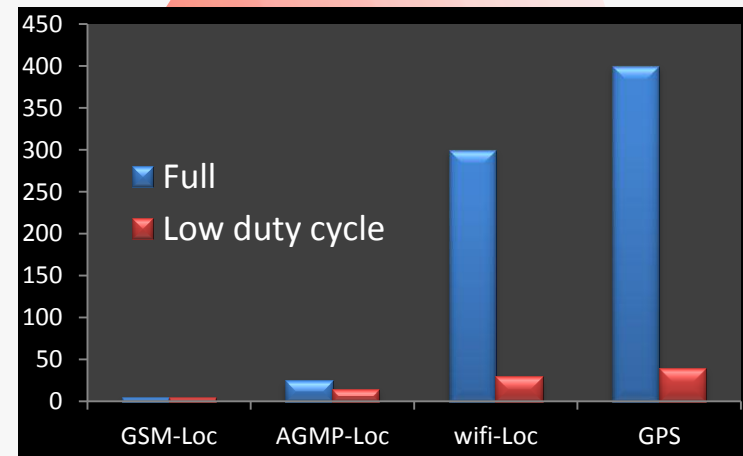
Relative
heading

Accuracy combined
with
saving energy

- Step Cadency
- Speed
- Heading

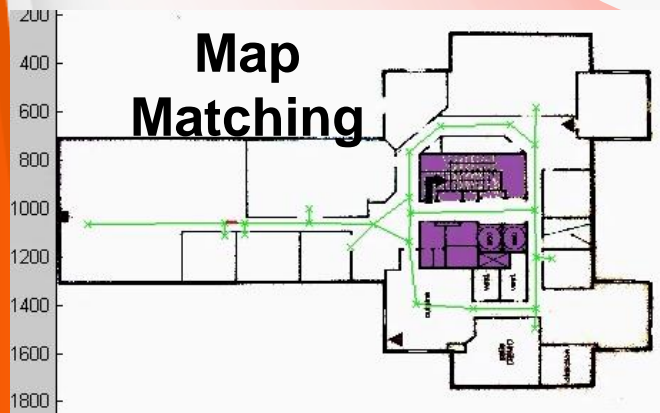


Power consumption of loc modalities



+ fusionning with RF solution

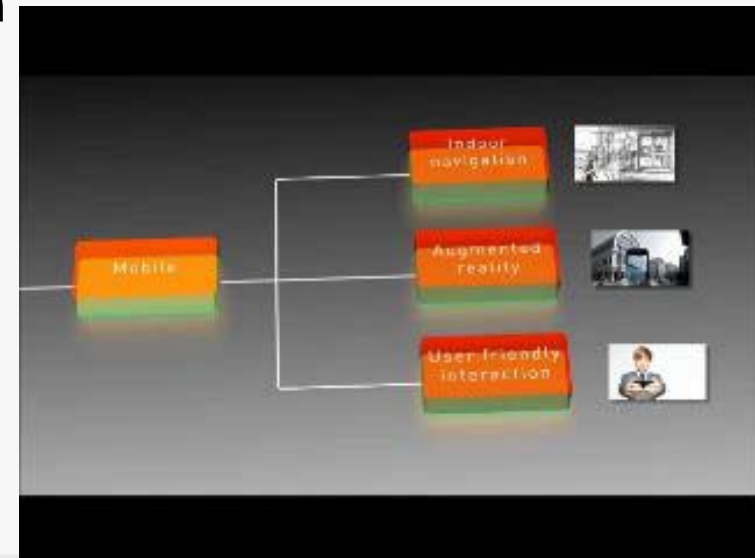
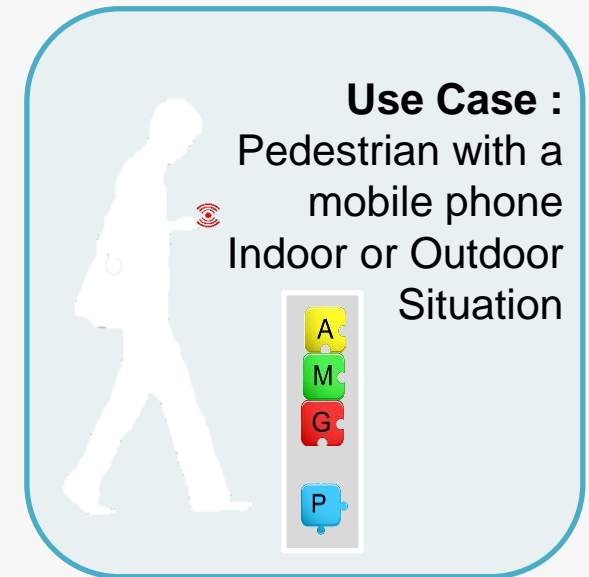
+ Adding Pressure for new feature...



« Raw » dead-reckoning trajectory
Map matching correction

Pedestrian Navigation

- The User is walking in an indoor environment
- There is no **access to continuous absolute positioning**, but scarce absolute positioning information (from time to time) as this has a power cost,
- Sensors (**low cost sensors**) are included in his Tablet or Mobile Phone,
- **Tablet/Mobile to Body position can change during use case**
- Global Location target performance is 0,3 to 3 meters for any duration ...



Pedestrian Navigation

- MOVEA owns a strong patent portfolio on Ped Nav

38 families / 187 patents



Activity

- Detection
- Classification

10 Families /
41 patents



Local Motion

- Estimation
- Sensor Calib
- 3D orientation

21 Families /
117 patents



Global Navigation

- Estimation
- Navigation Tracking
- Position refining

7 Families /
29 patents



moved

You want your **Mobile Device**

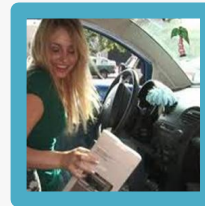
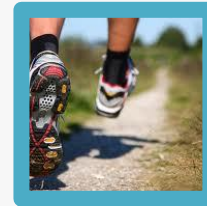
to always aware of your environment thanks to our

Context Engine



Context Engine

- Provide information about the situation - **Sensor Fusion**
 - How the device is carried (device's posture)
 - The user's activity
 - How the user is traveling (environment)
- add external data coming from – **Data Fusion**
 - The smart phone
 - The cloud



From sensor fusion to...

Data fusion

Context Engine

A
G
M
P
ALS
Prox
Audio
Micro
Wifi
GSM
H
T
Gas
Home



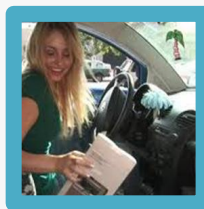
Device's posture

- Off Body
- At table
- In a not worn bag
- Docking station
- In hand
- In Pocket
- In a worn bag
 - Backpack
 - Purse & briefcase
 - Shoulder bag
- By Ear



User's activity Monitoring

- Standing
- Walking
- Running
- Biking
- Lying (on back & face down)
- Sitting : in a chair, couch, stair, ground...
- Walking downstairs / upstairs...
- Dancing
- Strolling
- Skating



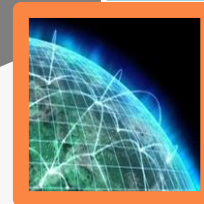
User's environment

- In an elevator
- In a Car
 - Driving
 - Passenger
- In a Bus, a Train, subway...
- Pedestrian out/in door
- In a Plane
- On a motorcycle



Smart Phone

- Agenda
- Calendar
- Contacts
- Emails
- Pictures
- OS activity



Cloud

- Weather forecast
- Database : sport, health, traffic
- GPS
- Maps

Users services

From sensor fusion to...

Data fusion



Context Engine / User's activity

DataBase
from UseCase

Observation
(data)



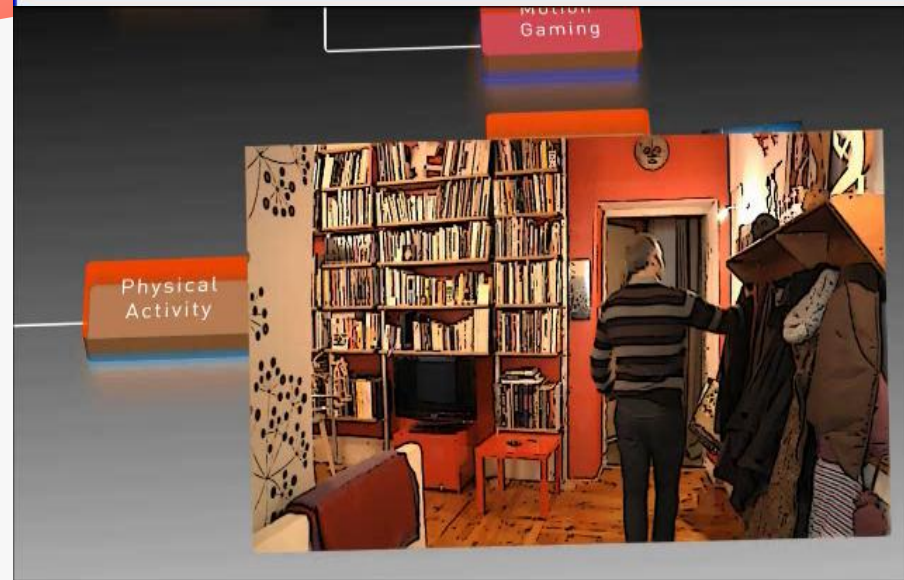
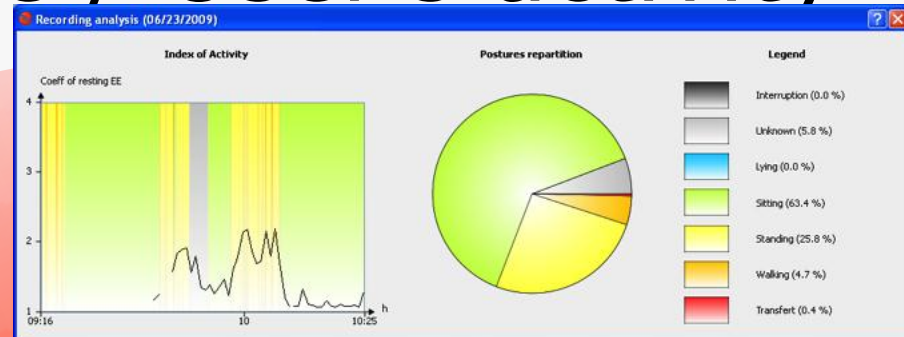
Feature
extraction



Train
Classification
engine

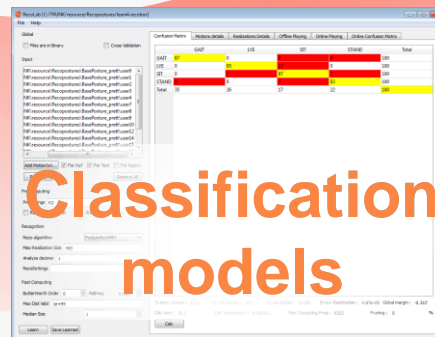


Classification
models

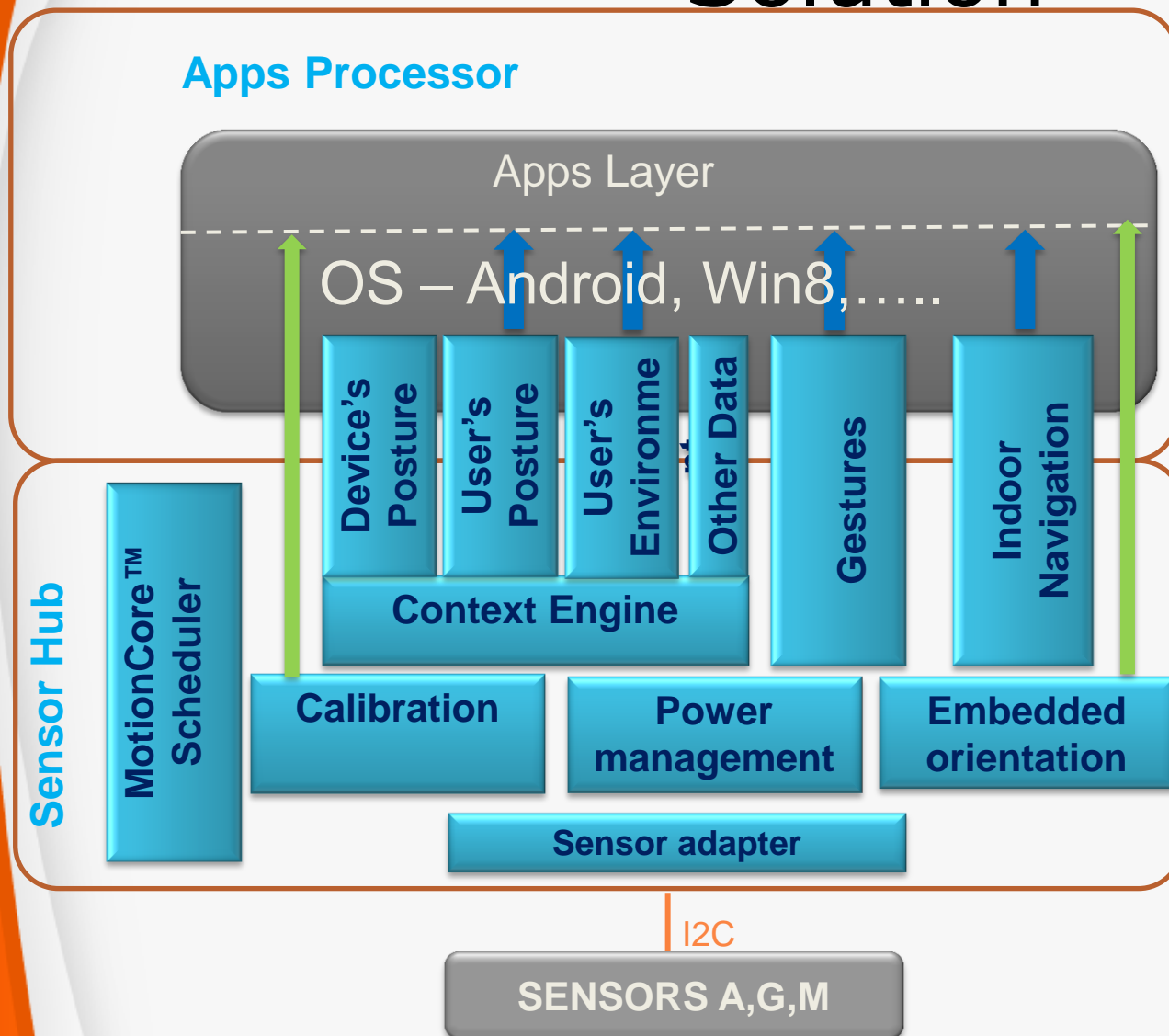


Classify

Training process
Classification result



Data Fusion : Sensor Hub Solution



- Wake up mode / sleep function
- Reducing Power Consumption (due to small CPU)
 - Cortex A9 : 8MIPS/mW
 - STM32 : 12,5MIPS/mW
- Real Time Processing



movea

Who are we?

MOVEA AT A GLANCE

Company Profile

- Created in 2007 in Grenoble, France
 - Spin-off of CEA-Léti
- 20 years of motion sensing & consumer electronics industry experience
- Motion Sensing pioneer and market leader with over 5 million units shipped
- Focus on IP & technology
 - Over 350 man-years invested in R&D
 - **435 patents / 80 families**
 - Joint MotionLab with CEA-Léti
- 60+ employees today and growing
- Global leader in motion-sensing technology IP, technology and solutions:
 - Mobile/Tablet
 - Interactive TV
 - Sports & eHealth



Customer Success Highlights

- Over 5M units shipped to date
- 20+ products released
- 6 new products releasing Q2/Q3 2012
- 4 Tablet design wins
- Customer wins in all target markets

Customer Successes

Sports

- **Babolat**: Top 2 tennis racquet provider
- **Decathlon**: Worlds Top 3 largest sporting goods retailers
 - Swimmer V1 & V2
 - Tennis
 - Urban Walking



DECATHLON

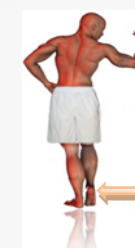
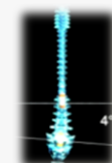
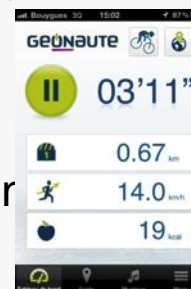
eHealth

- **Hocoma**: Game driven rehabilitation solutions
- **RMI**: Body movement analysis and physical therapy solutions



Several Customer projects under development

- Golf
- Fitness/wellness: daily life monitoring
- Running



Agnostic All the Way

CM/ODM

Re@ mote Solution
the Valuable Convenience

UNIVERSAL ELECTRONICS
Putting You in Control of Technology®

ruwido

SUREX

FORWARD
FORWARD ELECTRONICS

SMIK

4mod
IMAGINE & DESIGN

Sensors

ANALOG DEVICES



BOSCH

EPSON TOYOCOM

AKM

InvenSense

Kionix VTI TECHNOLOGIES

Honeywell

freescale semiconductor



Microprocessors

NVIDIA TEGRA 3

GreenPeak ARM

NORDIC SEMICONDUCTOR

ST ERICSSON

intel Atom inside™

radio pulse

TEXAS INSTRUMENTS

OS

ubuntu



Windows 7™



ANDROID



Mac OS X

iOS

Microsoft Windows xp



Linux

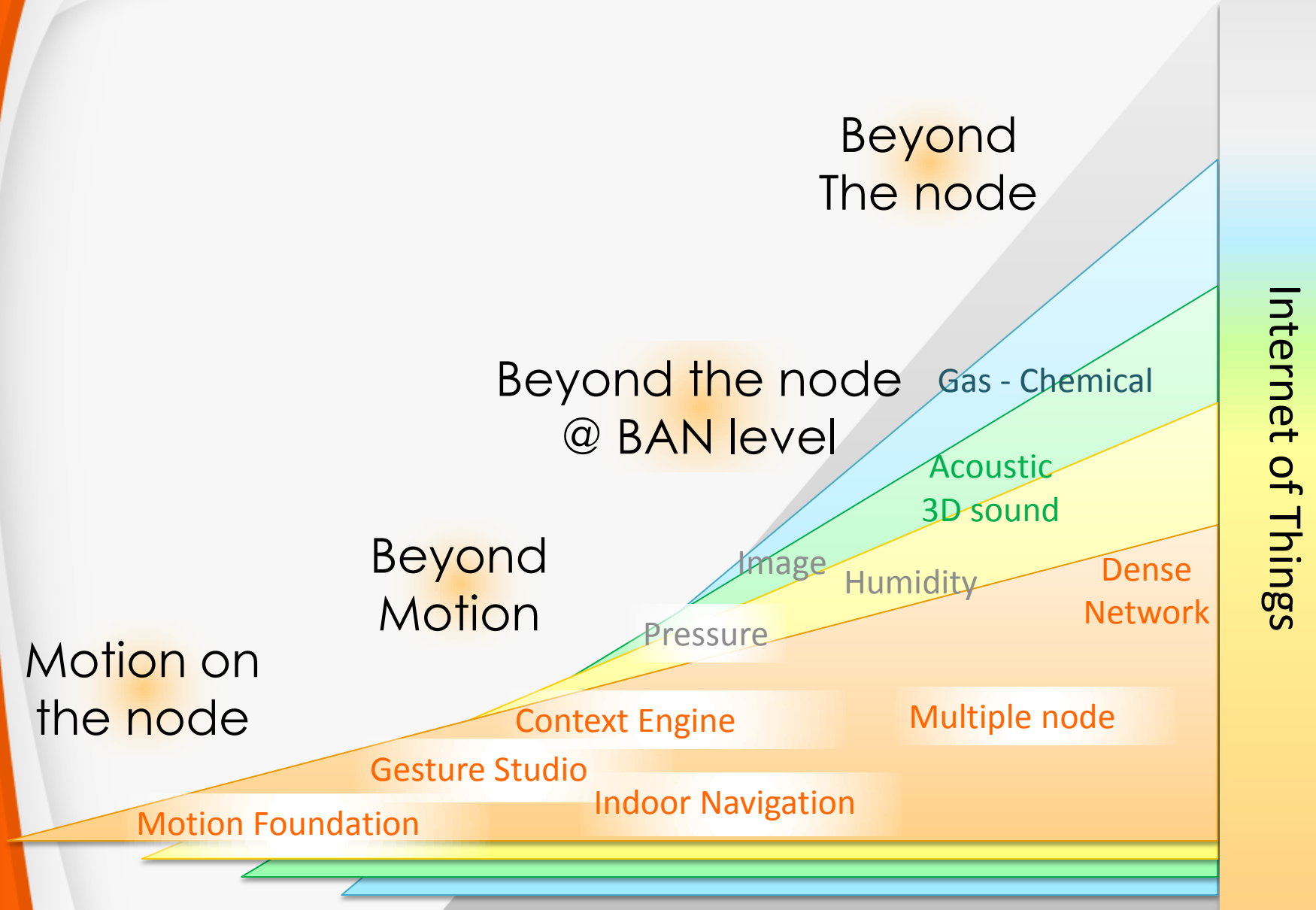
Wireless



Motion application processing and beyond...

VISION & CONCLUSION

From Motion to Data Fusion



Thank you and...
Let's talk about
motion & fusion!

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