

CS65/165 Smartphone Programming



Born on 23rd September 2008

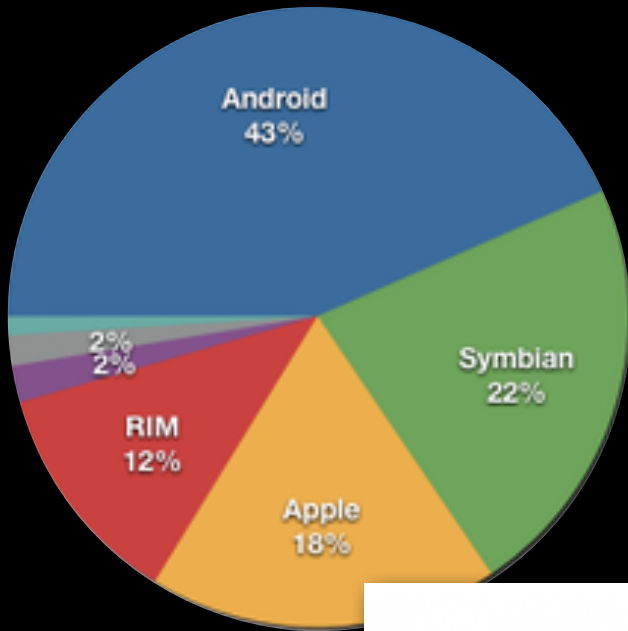


what beauty

Born on 9 January 2007



my first love



The App Store is about to hit 10 billion downloads.

9,952,049,154

some factoids

What's in a smartphone - the hardware inside?

And, why is it such a revolutionary device?

What software runs on phones?

How to I code apps and distribute them to the masses?

Oh, and I do I get rich... quickly.

Where is does the vision lead? End of smartphone era!!



what's under the hood?

SST
SST25VF080B
1 MB Serial Flash

SAMSUNG
Application
Processor and
DDR SDRAM

ST MICROELECTRONICS
LIS331 DL
Accelerometer

INFINEON
SMP3i
SMARTi Power
Management IC

SKYWORKS
SKY77340
Power Amp. Module

INFINEON
UMTS Transceiver

**NATIONAL
SEMICONDUCTOR**
LM2512AA
Display Interface

TRIQUINT
TQM666032
WCDMA/HSUPA
Power Amp.

BROADCOM
BCM5974
Touchscreen
Controller

TRIQUINT
TQM676031
WCDMA/HSUPA
Power Amp.

WOLFSON
WM6180C
Audio Codec

TRIQUINT
TQM616035
WCDMA/HSUPA
Power Amp.

NUMONYX
PF38F3050M0Y0CE
16 MB NOR + 8 MB
Pseudo - SRAM

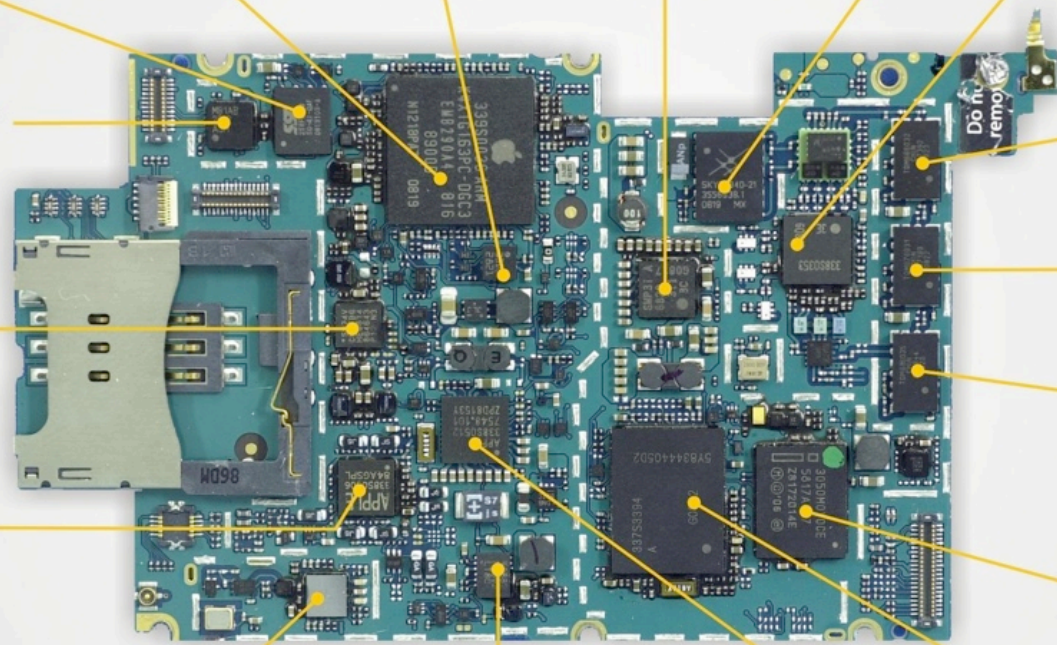


INFINEON
PMB2525
Hammerhead II GPS

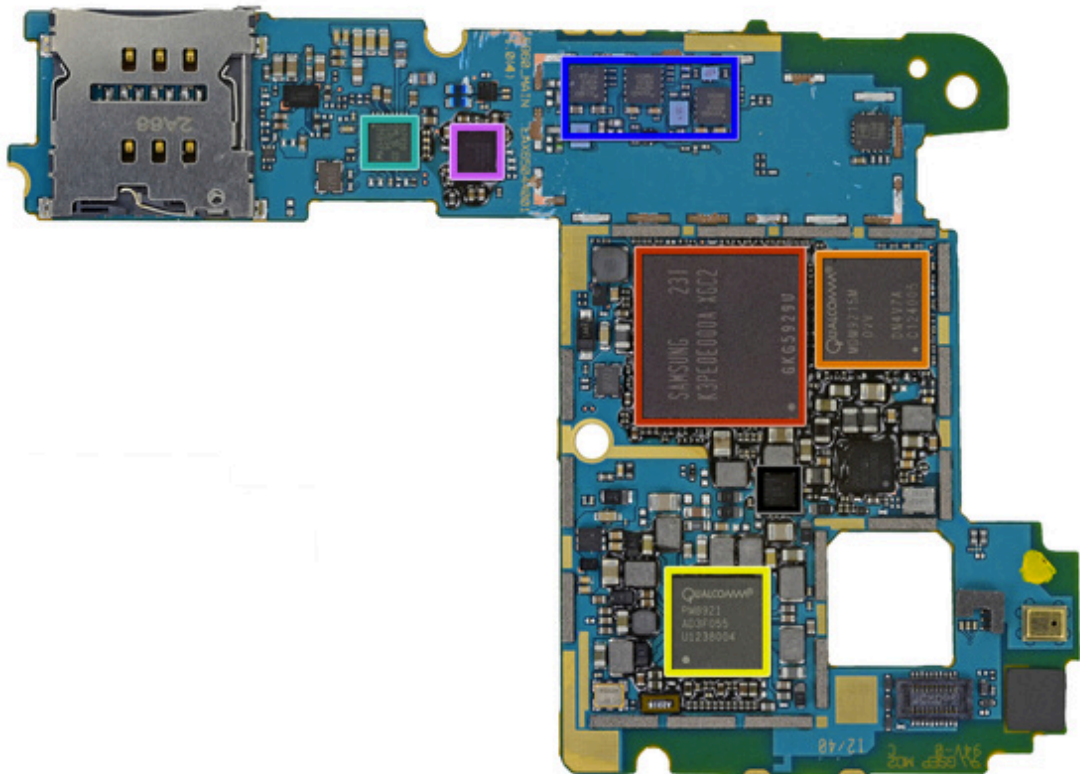
LINEAR TECHNOLOGY
LTC4088-2
Battery Charger/
USB Controller

NXP
Power Management

INFINEON
Digital Baseband
Processor



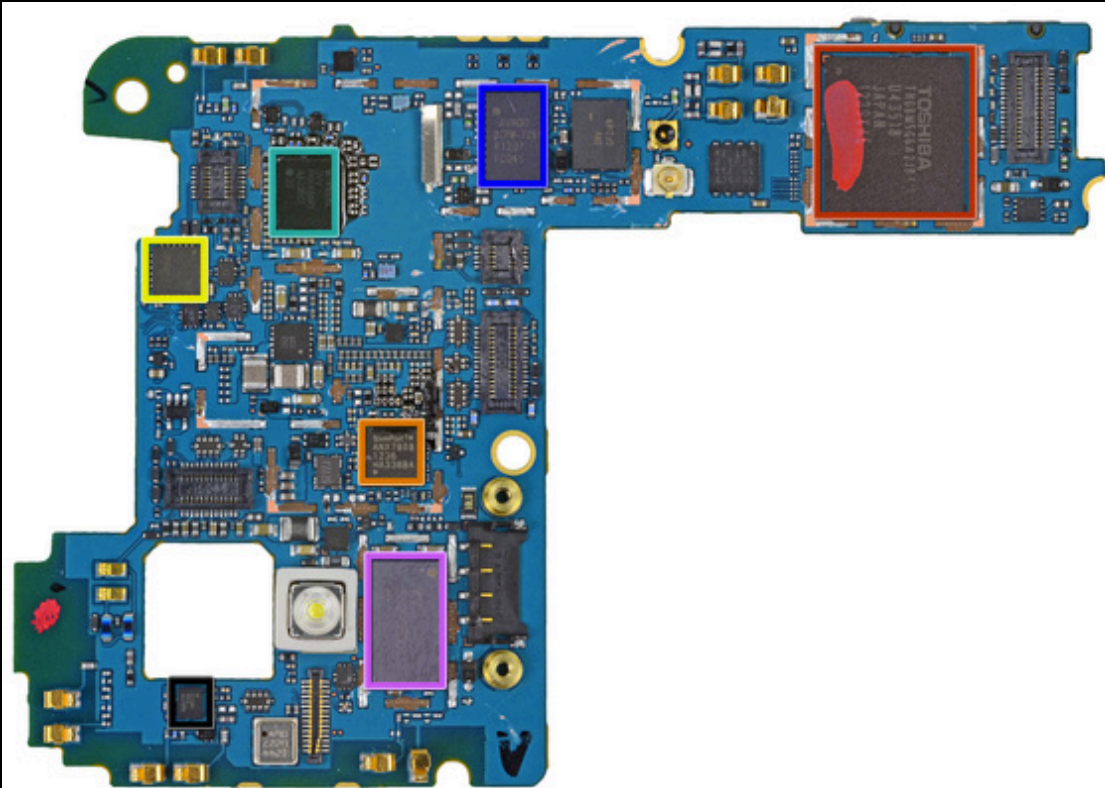
The naked iPhone 3GS



Step 18

- Back o' mobo:
 - Samsung K3PE0E00A 2GB RAM. We suspect the Snapdragon S4 Pro (APQ8064) 1.5 GHz CPU lies underneath.
 - Qualcomm MDM9215M 4G GSM/UMTS/LTE modem
 - Qualcomm PM8921 Power Management
 - Broadcom 20793S NFC Controller
 - Avago A5702, A5704, A5505
 - Qualcomm WCD9310 audio codec
 - Qualcomm PM8821 Power Management

The naked Android Nexus 4



- The front of the motherboard :
 - Toshiba THGBM5G6A2JBAIR 8GB Flash
 - SlimPort ANX7808 SlimPort Transmitter (HDMI output converter)
 - Invensense MPU-6050 Six-Axis (Gyro + Accelerometer)
 - Qualcomm WTR1605L Seven-Band 4G LTE chip
 - Avago ACPM-7251 Quad-Band GSM/EDGE and Dual-Band UMTS Power Amplifier
 - Murata SS2908001 802.11 a/b/g/n Wi-Fi and Bluetooth module
 - Avago 3012 Ultra Low-Noise GNSS Front-End Module

The naked Android Nexus 4

Samsung Galaxy Nexus

SAMSUNG



Samsung Galaxy Nexus review: Opening new doors

Samsung Galaxy Nexus hands-on: First look

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CHECK PRICE

- WElectronics
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- Plemix
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- Negri Electronics
- uSwitch (UK)
- SGBest (Singapore)

POPULARITY

Daily interest
 35%

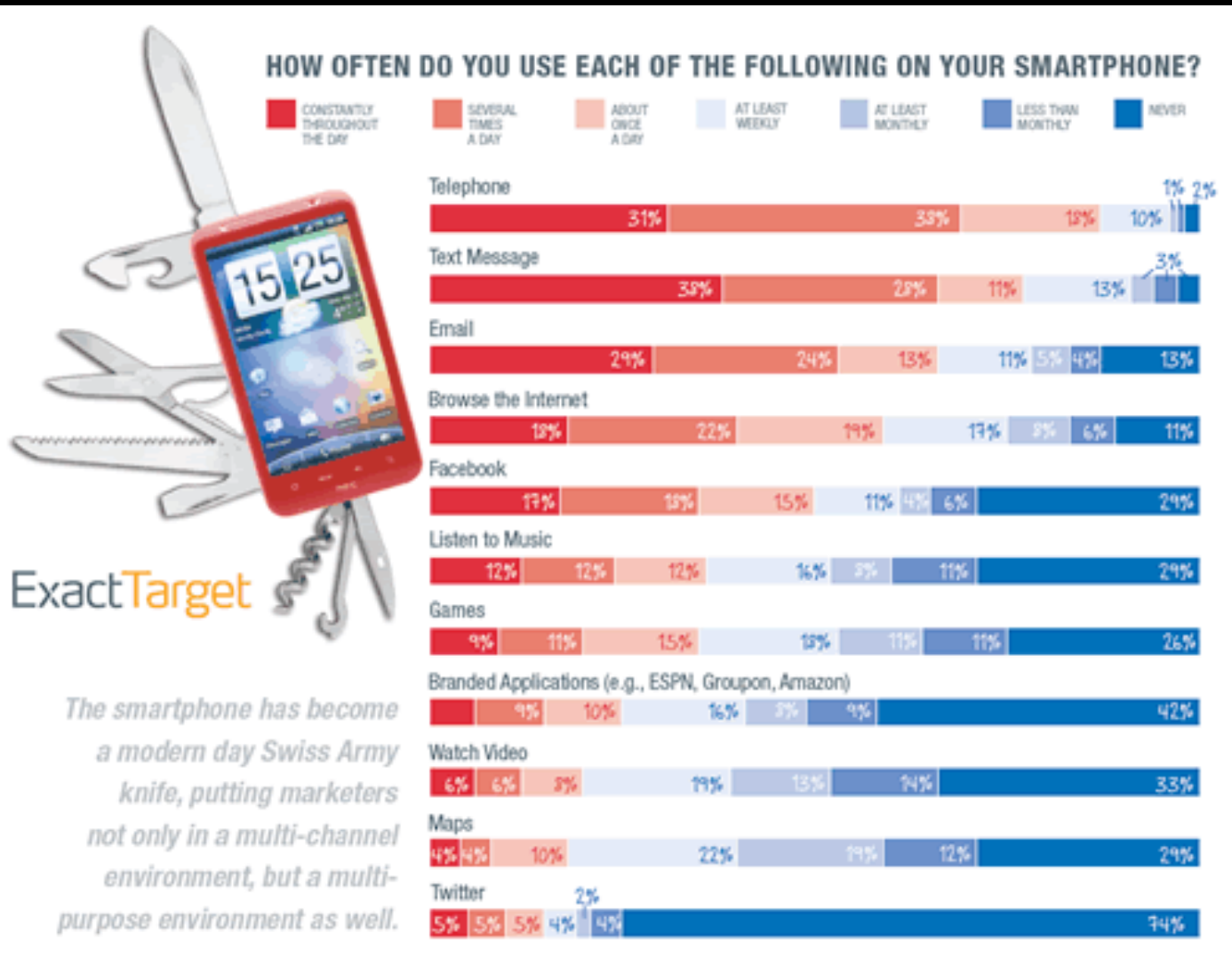
Total hits: 1895697

VOTING RESULTS

Design

Also known as Samsung Google Galaxy Nexus I9250, Samsung Google Nexus 3

| | | |
|------------------|--------------------|---|
| GENERAL | 2G Network | GSM 850 / 900 / 1800 / 1900 |
| | 3G Network | HSDPA 850 / 900 / 1700 / 1900 / 2100 |
| | Announced | 2011, October |
| | Status | Available. Released 2011, November |
| BODY | Dimensions | 135.5 x 67.9 x 8.9 mm |
| | Weight | 135 g |
| DISPLAY | Type | Super AMOLED capacitive touchscreen, 16M colors |
| | Size | 720 x 1280 pixels, 4.65 inches (~316 ppi pixel density) |
| | Multitouch | Yes |
| | Protection | Oleophobic coating |
| SOUND | Alert types | Vibration; MP3, WAV ringtones |
| | Loudspeaker | Yes |
| | 3.5mm Jack | Yes |
| MEMORY | Card slot | No |
| | Internal | 16/32GB storage, 1 GB RAM |
| DATA | GPRS | Yes |
| | EDGE | Yes |
| | Speed | HSDPA, 21 Mbps; HSUPA, 5.76 Mbps |
| | WLAN | Wi-Fi 802.11 a/b/g/n, dual-band, DLNA, Wi-Fi hotspot |
| | Bluetooth | Yes, v3.0 with A2DP |
| | NFC | Yes |
| | USB | Yes, v2.0 microUSB (MHL) |
| | CAMERA | Primary |
| Features | | Touch focus, geo-tagging, face detection |
| Video | | Yes, 1080p@30fps, check quality |
| Secondary | | Yes, 1.3 MP; 720p@30fps video |
| FEATURES | OS | Android OS, v4.0 (Ice Cream Sandwich) |
| | Chipset | TI OMAP 4460 |
| | CPU | Dual-core 1.2 GHz Cortex-A9 |
| | GPU | PowerVR SGX540 |
| | Sensors | Accelerometer, gyro, proximity, compass, barometer |
| | Messaging | SMS(threaded view), MMS, Email, Push Mail, IM, RSS |
| | Browser | HTML, Adobe Flash |
| | Radio | No |
| | GPS | Yes, with A-GPS support |
| | Java | Yes, via Java MIDP emulator |
| | Colors | Black |



Things you can do

what's your
favorite app?



Learning to program phones
Six thematic labs (MyRuns)
Group continuous Sensing app

MyRuns app

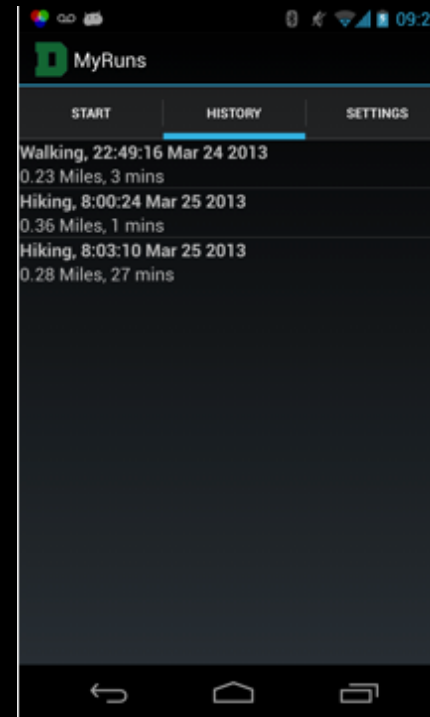
Built the UI

Database (SQLite) and adapters

Maps, location (GPS) and services

Motion sensors and exercising stats

Cloud side using AppEngine



accelerometer

emotion

gyroscope

air quality

compass

near-field

barometer

proximity

light

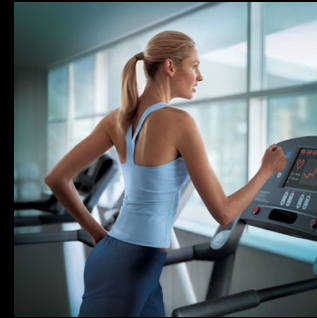
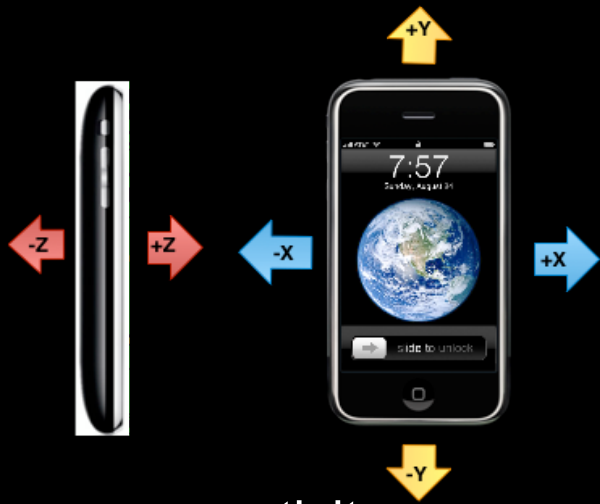
radios

microphone

location

front/back cameras





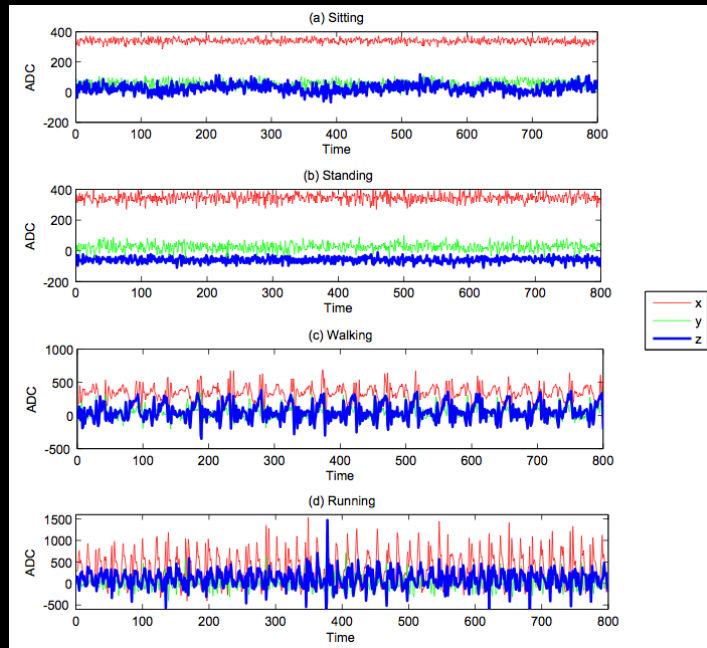
activity

sitting

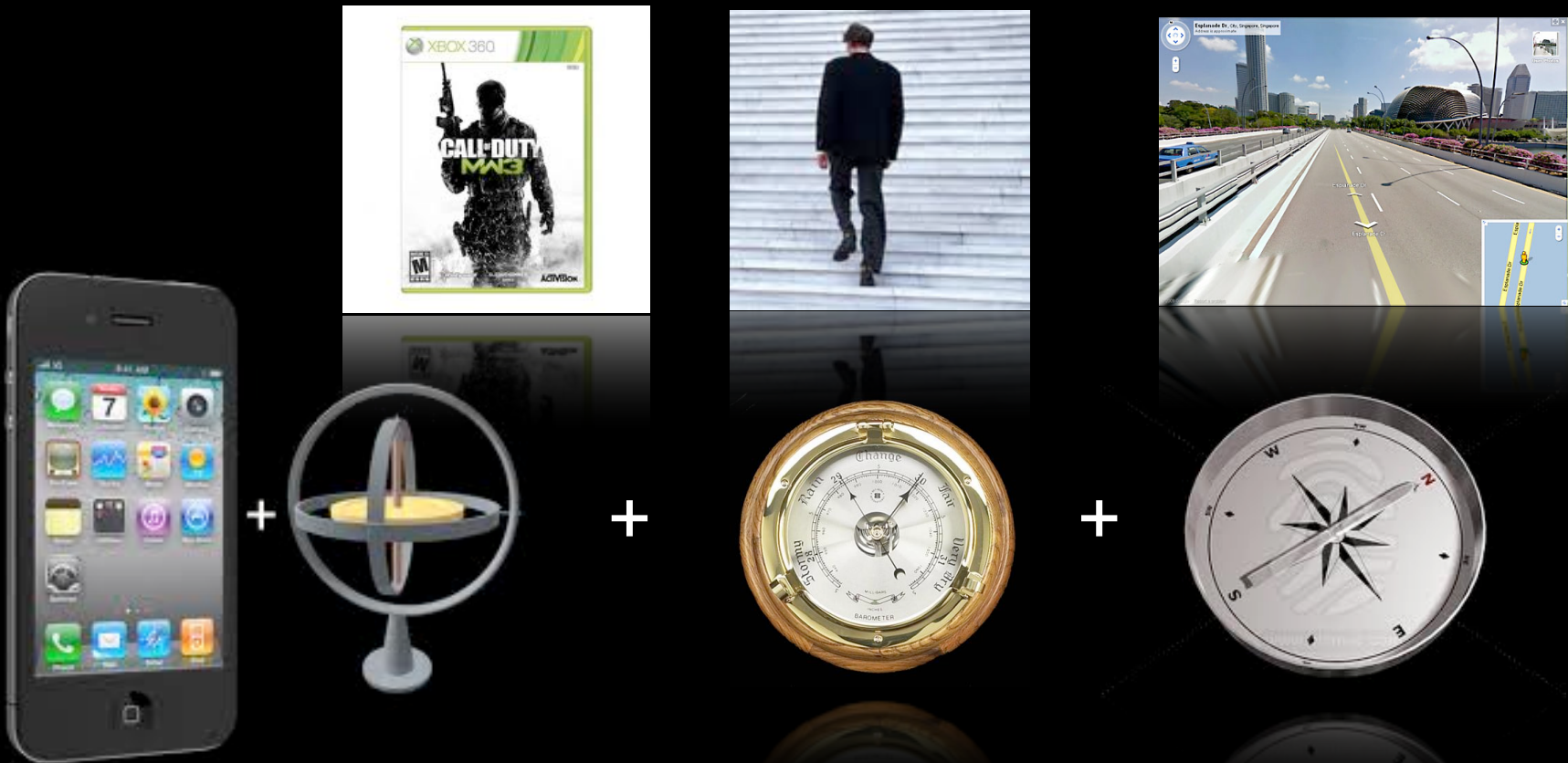
standing

walking

running



accelerometer



gyroscope, barometer, compass



collocation nets (BlueTooth)



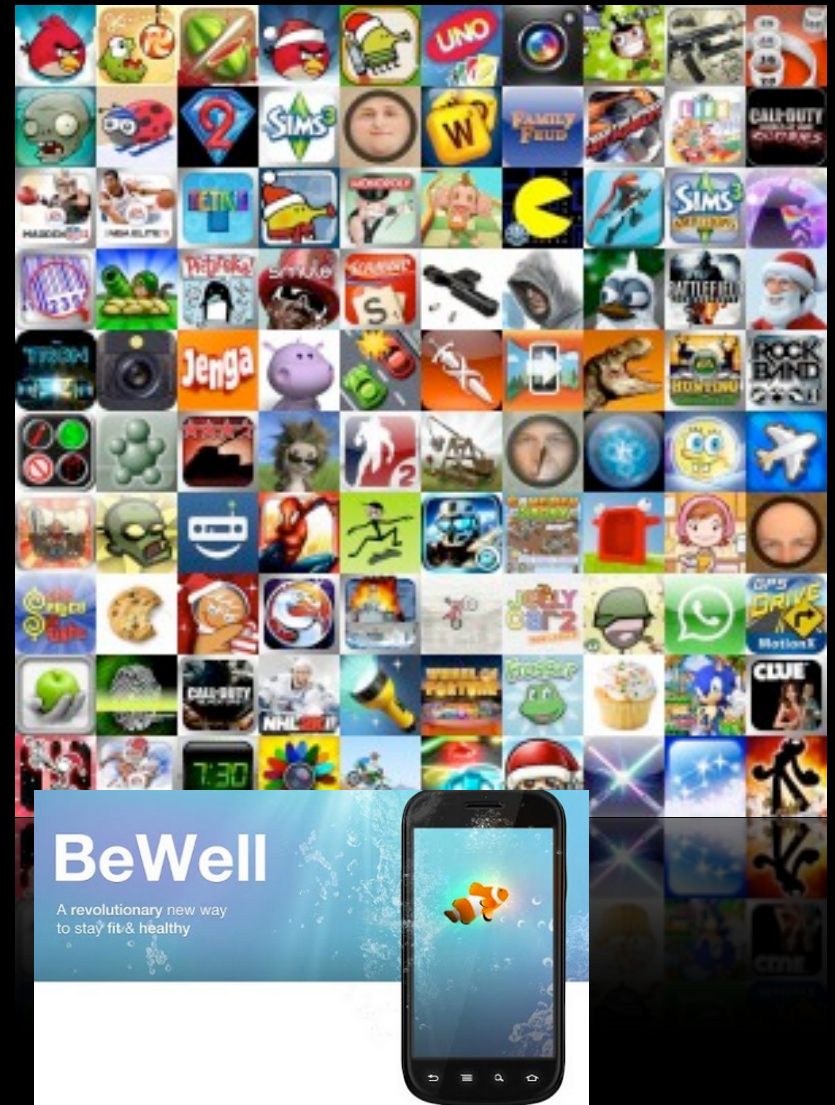
raw sensor
data

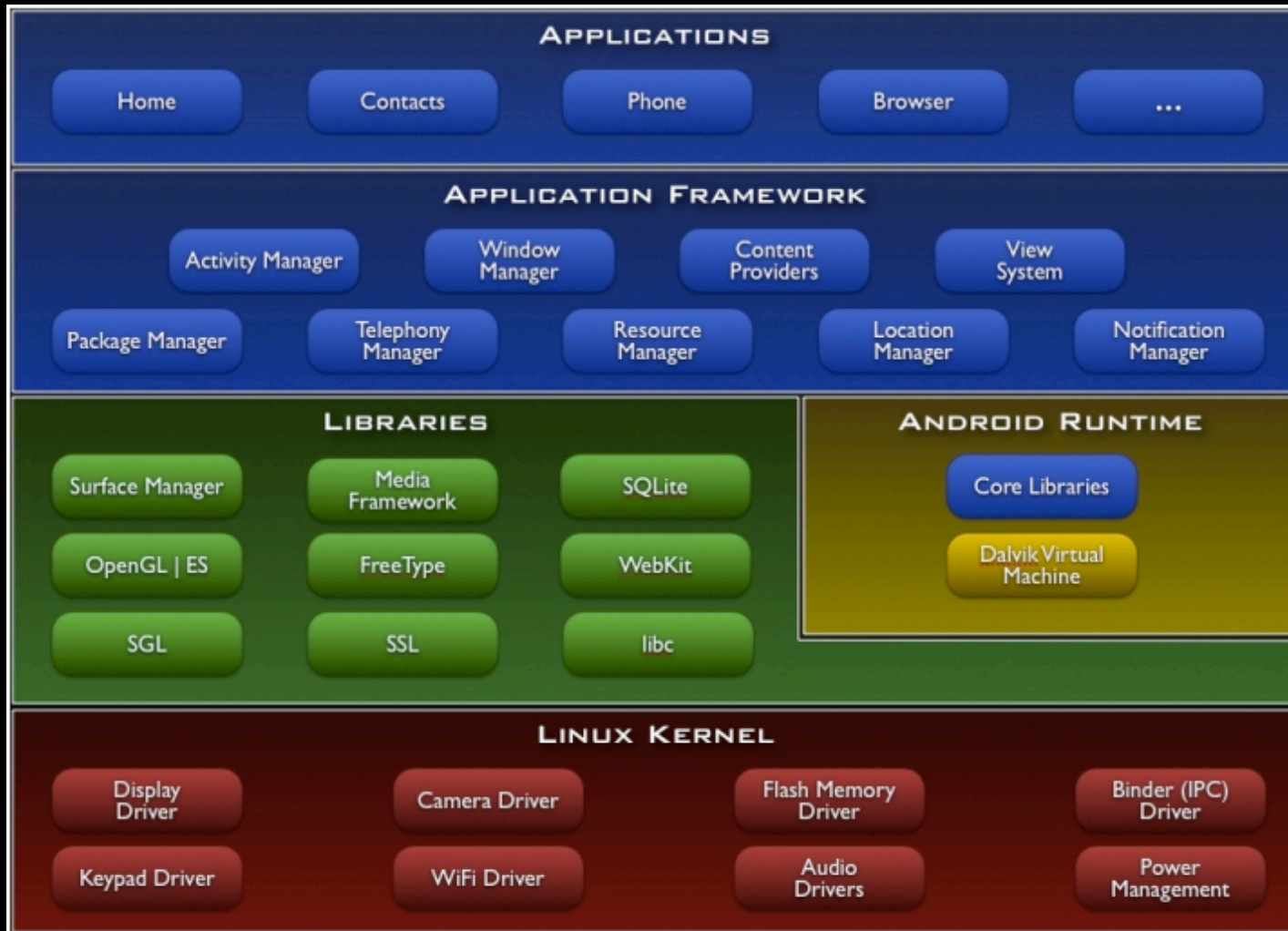
extracted
features

classification
inference

making sense of data

Teams of two group projects





android architecture