Using Location-Based Social Networks for Crowd Sourced Transportation Systems and Apps

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Yuval Ne'eman Workshop for Science, Technology and Security

ICG International Committee on Global Navigation Satellite Systems

TEL AVIV UNIVERSITY

Outline

TERMINOLOGY

Flickr.com

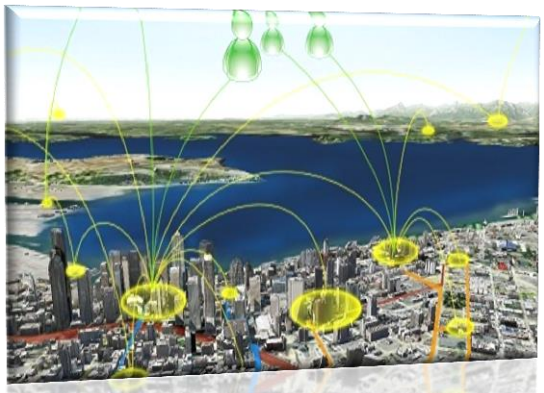
MOTIVATION

discovery.com

ENABLERS

iphonebuzz.com

CASE STUDIES



Microsoft

CHALLENGES

hackingtricks.blogspot.ccm

RECOMMENDATIONS

prosyn.net

Location based Social Network (LSBN)

… A social structure made up of individuals connected by the interdependency derived from their locations in the physical world … a given timestamp and the location history … [and their] common interests, behavior, and activities

http://research.microsoft.com/en-us/projects/lbsn/

Mobile Crowdsensing Apps

"Mobile crowdsensing applications leverage consumer mobile devices (e.g., smart phones, GPS gadgets, and cars) to collect and share information about the user or the environment, either interactively or autonomously, towards a common goal."

Source: IBM

Nasa.gov

talentgenius.co.uk

geek.com/

Motivation to develop LBSN

- Maximize existing infrastructure efficiency
- Maximize infrastructure utilization by relevant users
- Reduce congestion and pollution in crowded city centers
- Reduce loss of time and valuables (Money, fuel)
- Reduce uncertainty in decision making process (how to go , where to go, ETA , estimated cost)
- Mobile Crowd sensing as a disruptive innovation changing traditional concepts and market inefficiencies

Israel is Start-Up Nation

#1 in the world — R&D as % of GDP

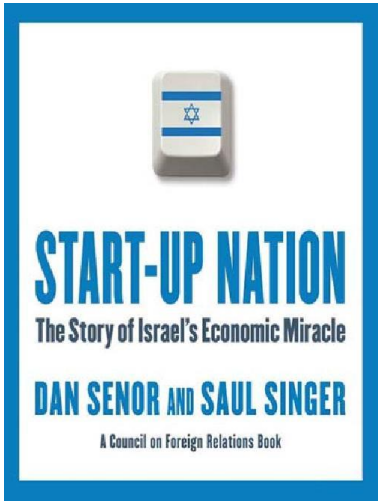
#1 in the world — Nasdaq-listed companies (outside of North America)

#1 in the world — VC investment per capita

#1 in the world — Engineers per capita

~ 4% yearly economic growth

A+ credit rating



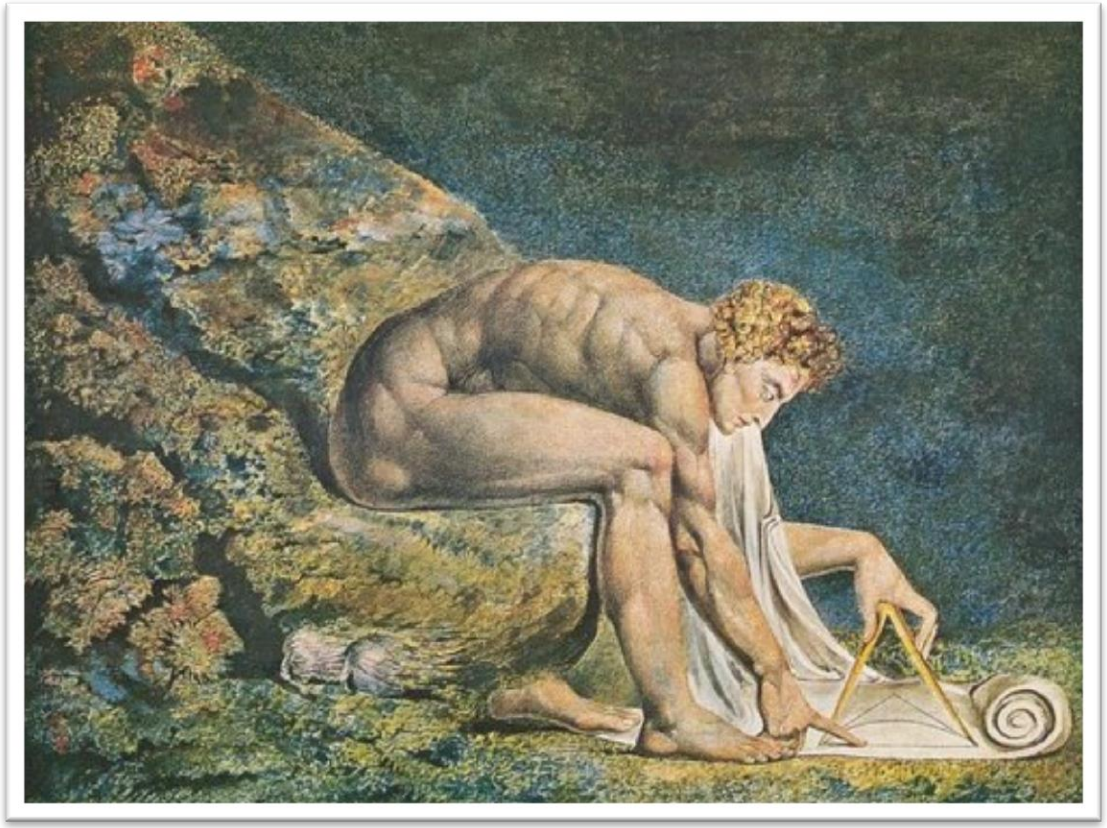
Source: www.TerraVP.com

Current Work

- Social Networks Applications (SNA) are a new phenomenon that changes the way people take daily decision.
- LBSN are used for various applications: social navigation, parking discovery, geo-social consuming, etc.
- We witness a global success of Israeli sourced GNSS based SNA with increased traction
- What is the LBS vision according to Israeli start-ups?

"If I have seen further
it is by standing on the shoulders of giants"

-Sir Isaac Newton



William Blake, Newton, 1795

Source: http://blog.julianlass.com

Augmented Reality in NYC, 2011

Source: http://www.gizchina.com

Enabler 1 - GNSS

- GPS IOC in 1993, Removal of Selective Availability in 2000
- GLONASS announced IOC on GNSS meeting December 2011
- Areas covered with up to 4 systems
- Price, size and **power consumption** decreasing dramatically

"Global shipments of GNSS-enabled mobile phones are expected to reach 1 billion in 2020. This is driven by increasing attractiveness and affordability of devices …"

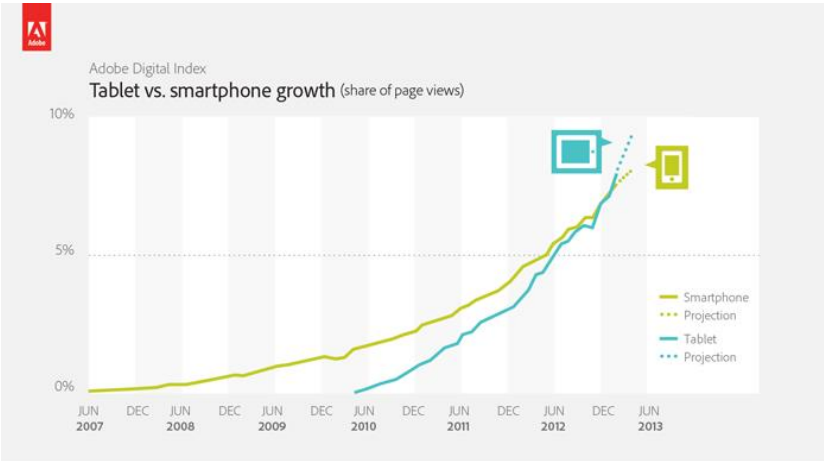
(The Space Report 2011)

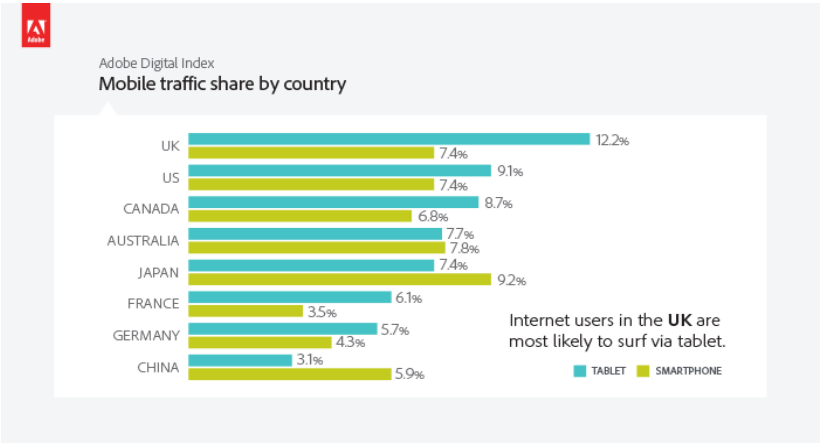
Enabler 2 – Internet

- Began in 1960s with rapid acceleration in 1990s
- Services less than “15 years old”: Email, search, Wikipedia, social networks, e-payments, blogging and more
- Major growth in accessibility due to the mobility and network availability

“global websites are now getting more traffic from tablets than smartphones, 8% and 7% of monthly page views respec-tively.”

(Adobe digital index 2011)



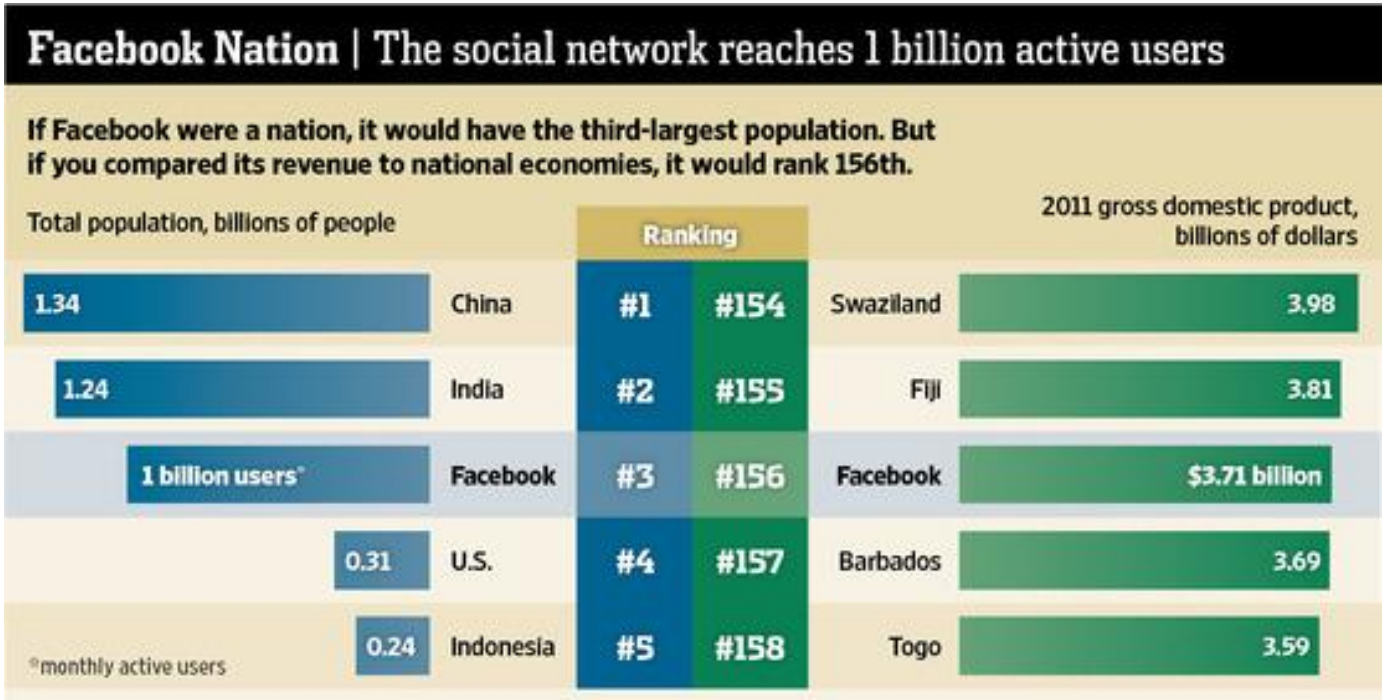


Source:adobe.com

Enabler 3 – Social Networks

Enabler 3 – Social Networks

Increase the speed and reach at which a community can communicate, coordinate, mobilize and use resources



Source: wall street Journal

Benefits of Social Networks

- Interactivity – Users can interact and disseminate information in one-to-many and many-to-many forms
- Selective distribution – information is spread using relevant criteria
- Measurability – online actions of users can be measured
- Documented history – actions online can be stored for past analysis.
- Relevancy – request analysis improves the understanding of user needs and personalizes the service and offered.

Enabler 4 – Smartphones and applications

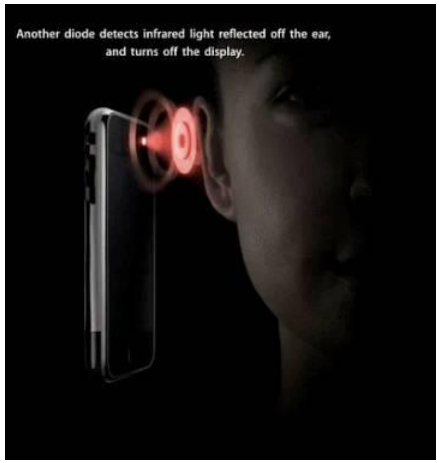
- Global shipment of Smartphones reached 1 billion devices representing 25% of total devices
- Devices become faster and stronger in respect of computing power, batteries and display
- High relevance to mobility and GNSS based apps (mapping and navigation requirements

Apps dominating the mobile communications sphere while usage of standard phone calls and text messages gradually diminish
(source: arabiangazette)

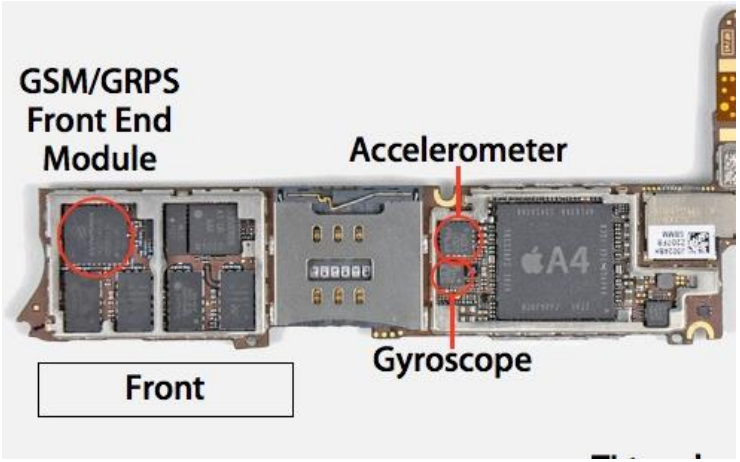
Source: ITU

Active sensors in smartphones

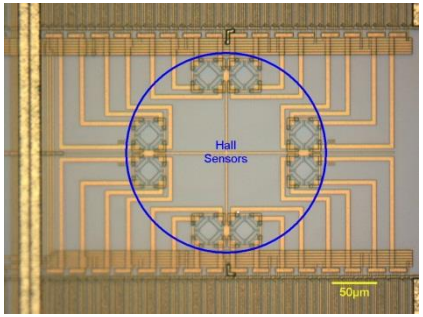
Proximity Sensor



Accelerometer and Gyroscope

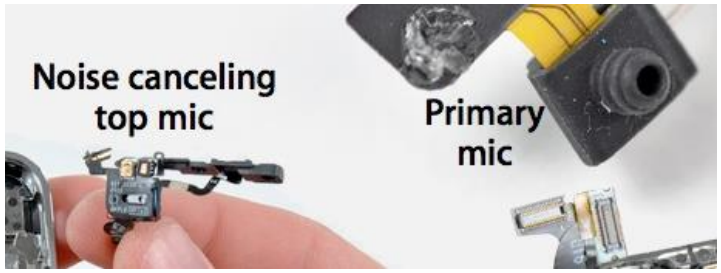


Hall effect sensor



Camera and flash

Microphone for noise

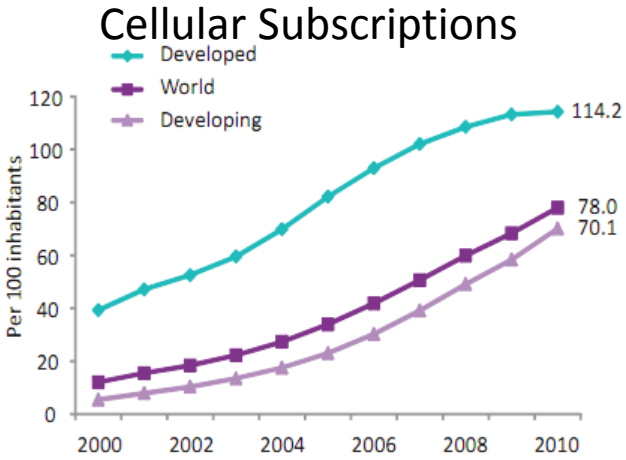


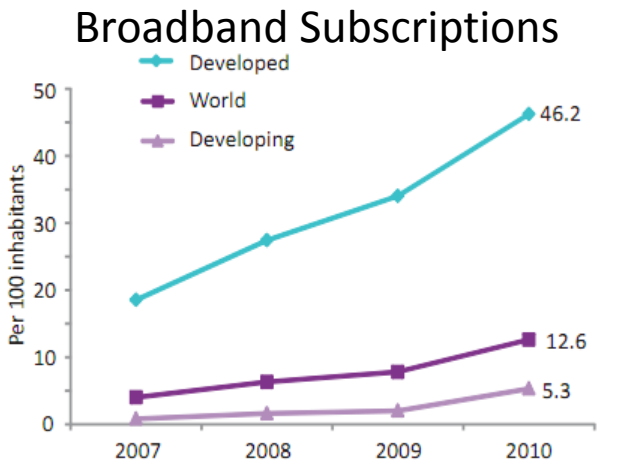
Ambient light detector

Apps for iPhone 5

Enabler 5 - Wide BW Mobile Networks

- Latest developments had made various mobile networks with higher BW available
- Growth in global subscription rate for cellular (114 sub. Per 100 inhabitants)
- Growth in wide BW subscription
- First experiment in social Wi-Fi





Source: ITU

Timeline of Major Technology

Social Networks

Hotmail 1996

PayPal 1998

Facebook 2003

Twitter 2006

Wikipedia 2001

YouTube 2005

Internet

Email 1966

Arpanet 1967

Internet 1995

Google 1997

1960 1990 2000 2011

GNSS

Satellite Triangulation 1970

GPS / GLONASS IOC 1993

GPS s/a 2000

GLONASS renewal 2001

Mobile & Cellular

GSM 2G 1991

1st SMS 1992

Palm Pilot 1996

Wi-Fi 1997

3G / WiMAX 2001

iPhone 2007

iOS4 April 2009

Quad Core Galaxy SIII 2012

Timeline of Major Technology – focus on the last 2 years

Social Networks

facebook
600M -> 1B Users
Jan 2012-> Oct 2012)

foursquare
20M users
2B check ins
Q1 2012
30M users
Q4 2012

OpenStreetMap
25K+ active contributors/month
Q1 2012

waze way to go
36M users
65K active contributors
Q4 2012

Internet

Google
Google purchase MMI

20% of internet surfing Sourced from Smartphones and tablets

2011 2012 2013

GNSS

GLONASS
IOC
2011

GLONASS
accuracy<2.8m
2012

Baidu IOC over AP
Dec 2012

MEDIATEK
5 in 1 GNSS chip
2013

GALILEO
GIOVE-A
High altitude fix

Mobile & Cellular


Dual GNSS
iPhone 4S

Quad Core
Galaxy S3

Octa Core
Galaxy S4


ZTE U956
Quad Core
For 240$


ZTE Blade 3.5
w/ A-GPS for
$140

Case study A – Waze

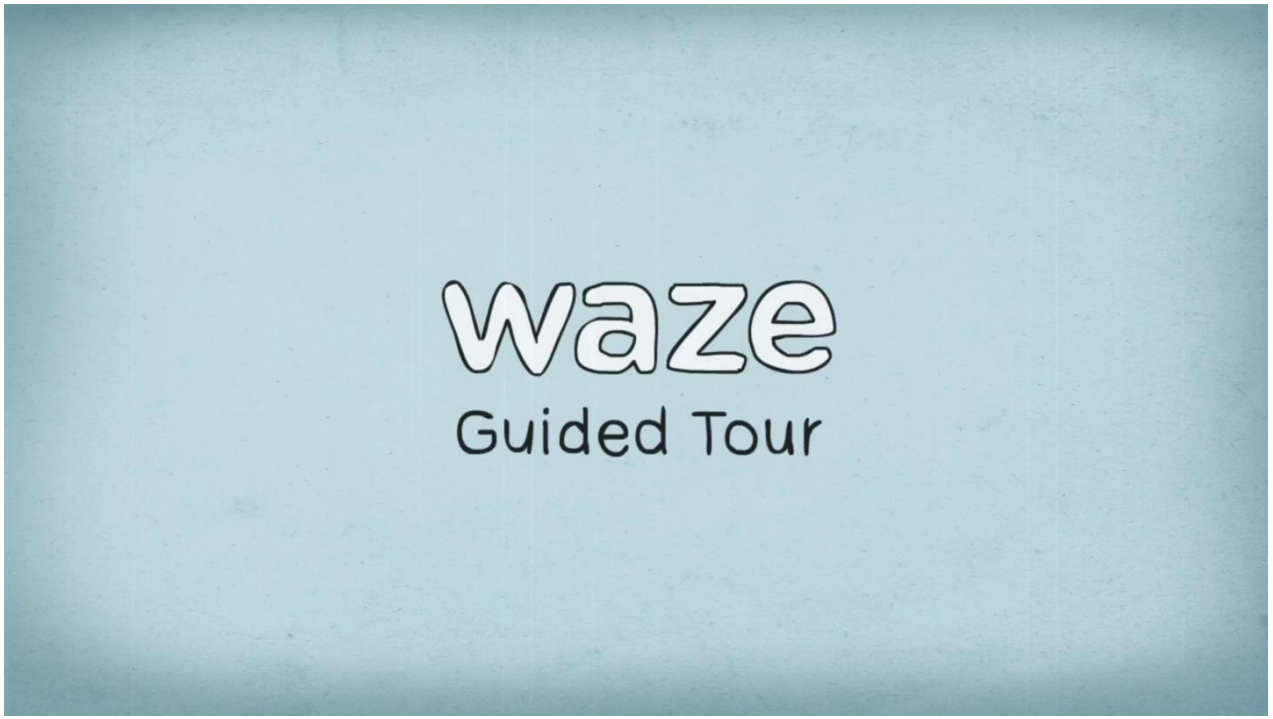
crowd-sourced traffic and navigation app.

The Need: Get fastest navigation rout to destination based on real time information

Social features: passive speed& location contribution, alerts, ride update, pick me up and more is coming

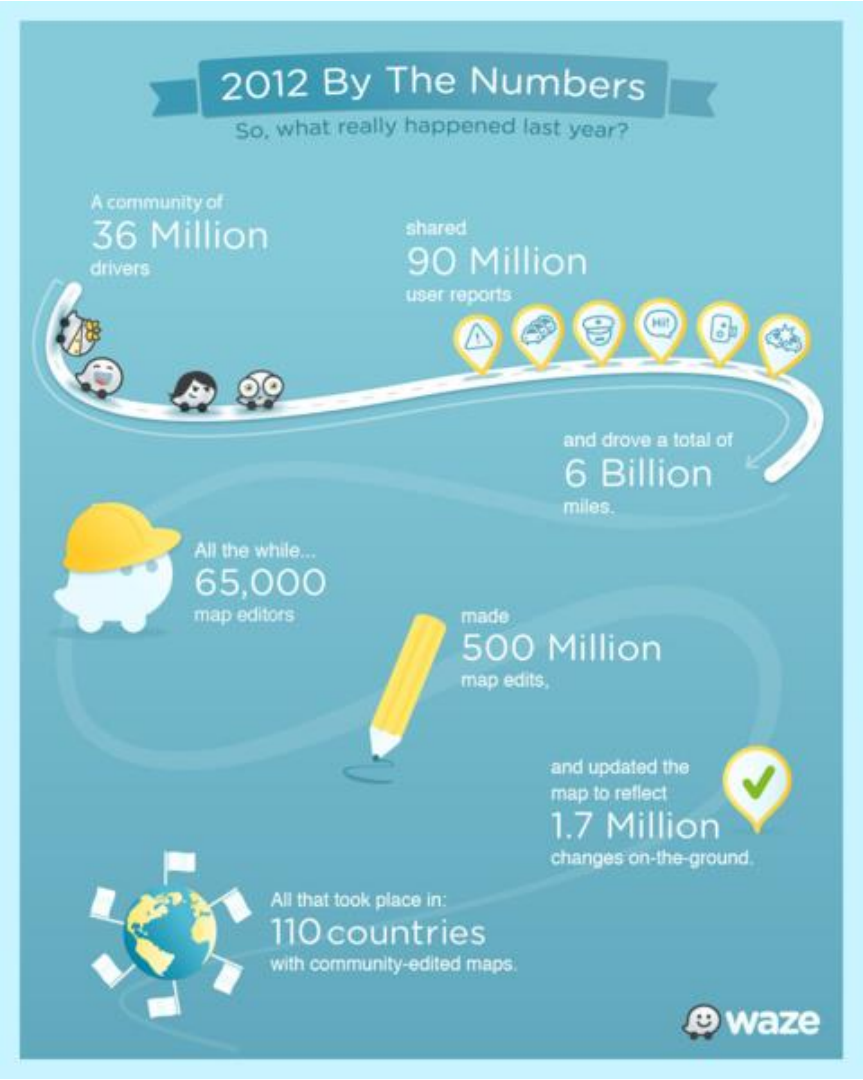
When drivers work together the road ahead gets a little brighter

(source: Waze)



Source: waze

Waze -traction



GSMA GLOBAL MOBILE AWARDS 2013 WINNER

Waze won the Best overall mobile app.

Preferred over Dropbox file hosting service, Flipboard news application, Sky Sports F1 and the Square electronic payment service.

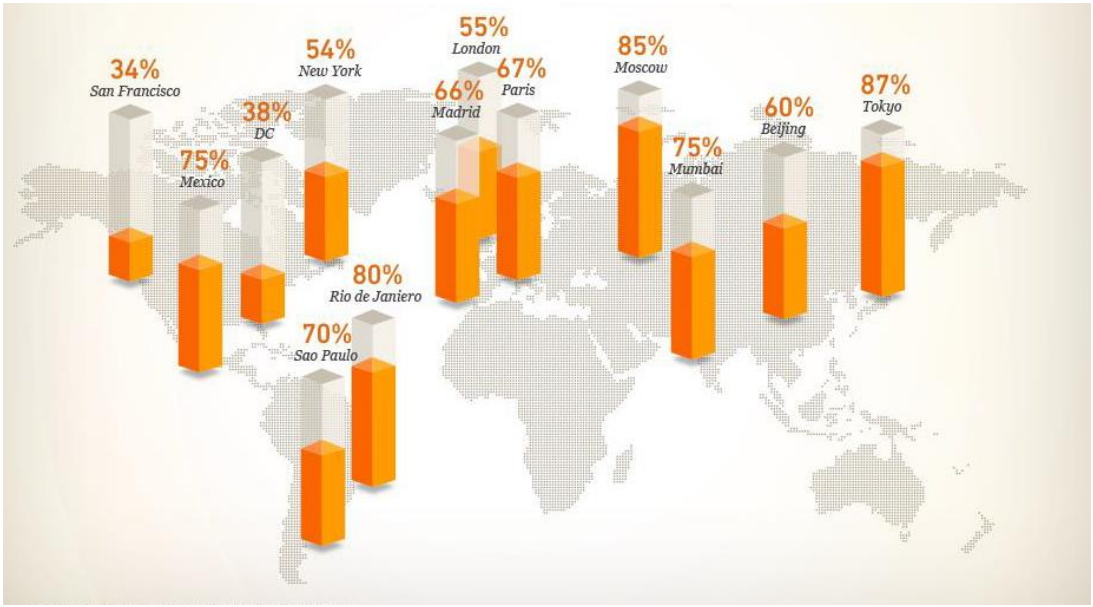
Case study B – Moovit

crowd-sourced public-transportation information system

The need: get fastest **relevant** public transportation rout

The environment:

7B people in the world only 900M cars; in NY people commute 12.5 days and 1.5 days delayed per year



Public transportation as percent of motorized trips

Source: Publictransportation.org

Case study B – Moovit

The solution : Multilayered real-time information system based on PT agencies data and crowd sourced information based on passive contribution of users

Benefit: accurate ETA

Social features: passive location contribution, bus occupancy

Case study B – Moovit

crowd-sourced public transportation information system

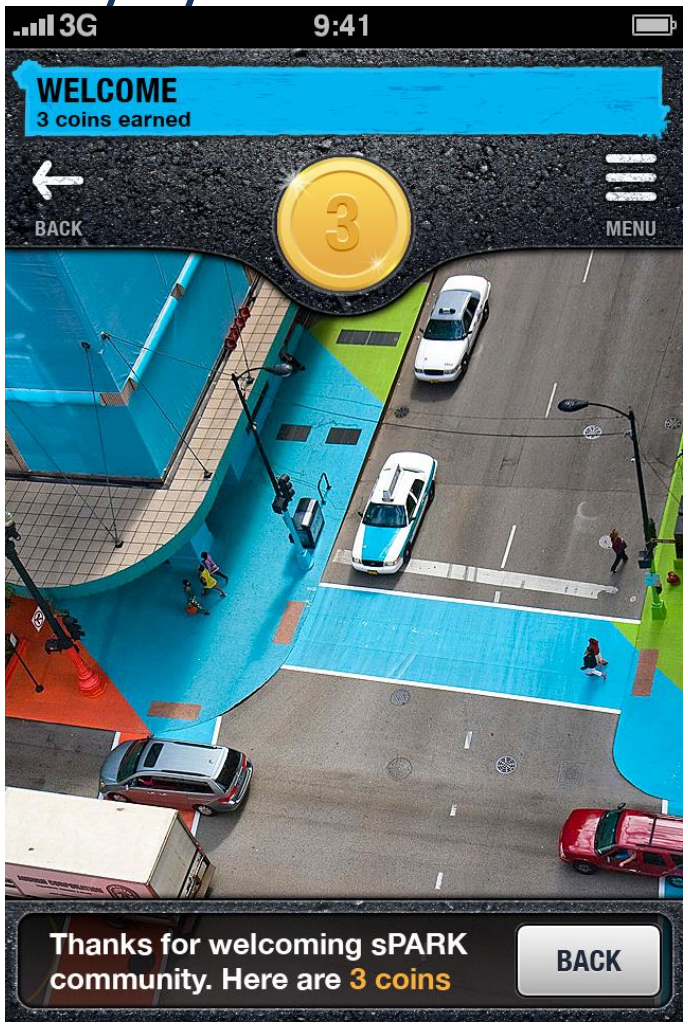
Traction: 31 countries

1M downloads (Q1 2013)

Case study C – sPARK

Crowd sourced parking discovery system

- The need: drivers lack the ability to navigate toward an urban destination while taking optimal parking decision
- Market: Drivers in crowded cities
- Solution: Platform and app. That enables best route to closest cheapest parking
- Benefit: reduced congestion , pollution; reduce time loss and frustration, maximizes use of resource in shortage
- Social features: passive contribution, share a spot , double hitch hike
- Traction: N/A



Source: sPARK

Case study D – Get Taxi

Virtual taxi station

- Need: inefficient service of offline taxi stations
- Market: $31B global spending
- LBS features: closest taxi, fastest route, immediate feedback, lost baggage, mPayment

Source: Get Taxi

Effective use of infrastructure

Run-in time between passengers

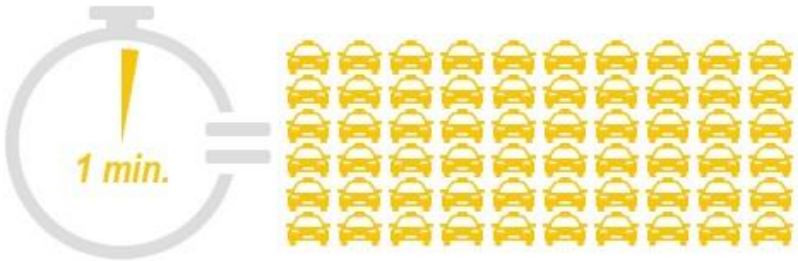
4 KM ORDINARY TAXIS

1 KM GETTAXI DRIVERS

Case study D- Get Taxi

AT PEAK TIMES

1 GETTAXI RIDE EVERY SECOND



$30
MILLION
in funding

170
EMPLOYEES
full-time equivalents

1,500+
ENTERPRISE CLIENTS
around the globe

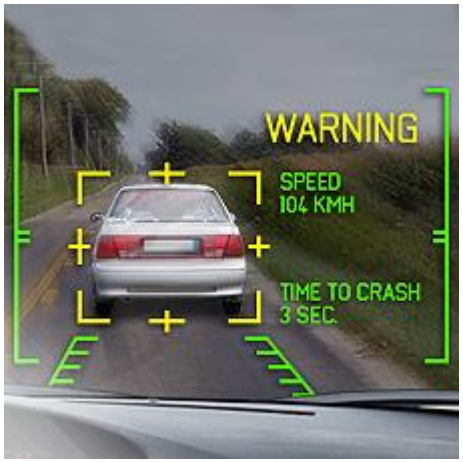
6,000+
TAXIS RUNNING
on GetTaxi technology

1,000,000
DOWNLOADS
for mobile devices

20
CITIES
in four different countries

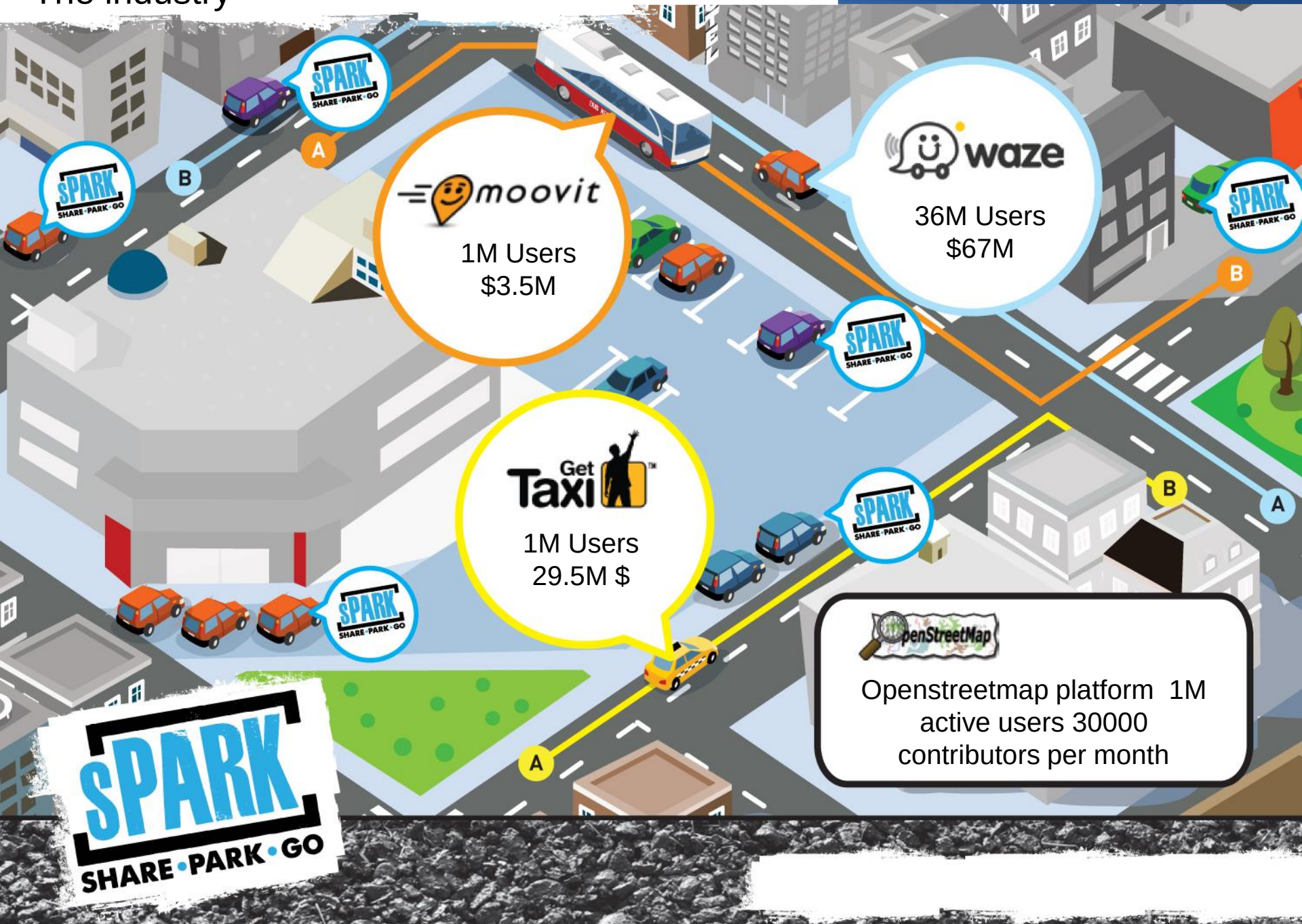
Case study E – iOnRoad

- The need: real time alerts on driving
- Market: 900M cars and drivers
- Solution: User app. Based on GPS combined with advanced Image processing features of built-in camera, accelerometer and gyroscope
- Benefit: real-time feedback on driver behavior enables pre accident reaction
- Social features: share your driving behavior (Car owner, insurance)
- Traction: 1M downloads
- Company was sold to Harman for amount estimated at $10M



Source: Ion road

The industry



Case study F – fuel Monitor

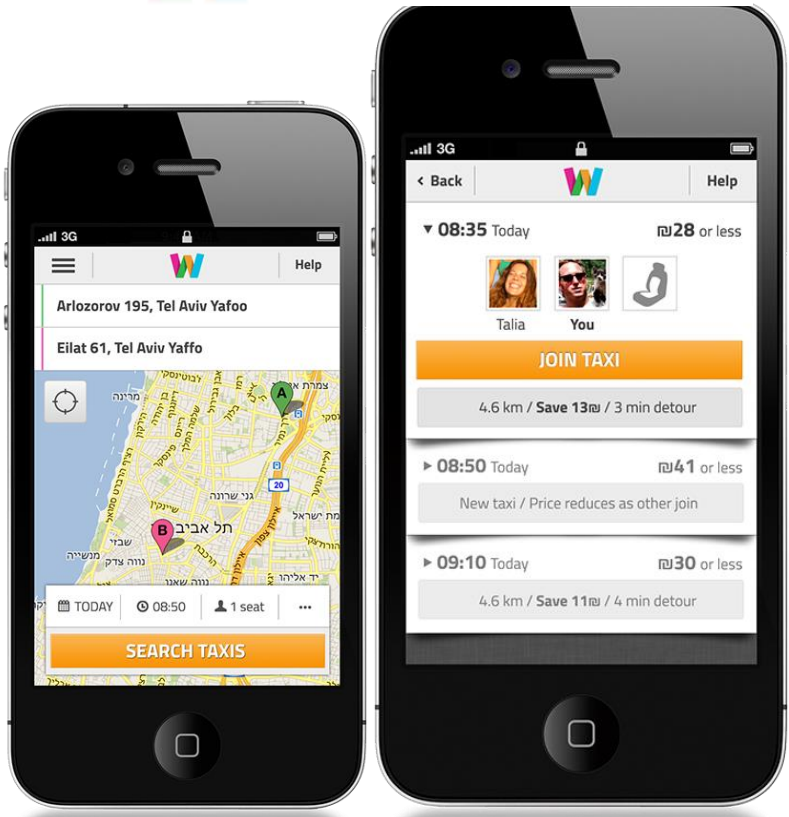
- The need: real time evaluation tool for driving efficiency
- Market: 900M cars and drivers
- Solution: User app. Based on GPS tracker with real-time car specific lookup table
- Benefit: real-time feedback on driver behavior enables fuel consumption reduction
- Social features: share your journey data
- Traction: 100K users globally

Source: fuel monitor

Case study G – Waybetter

Share Taxi ride platform

- The need: Private taxi drive is relatively expensive while most drives takes only a single passenger
- Market: 22K licensed taxis (LNDN)
- Solution: shared rides platform and app.
- Benefit: Cost Reduction of 30-60%
- Social features: share your journey
- Traction: N/A



Source: WAYbetter

Case study H – Buzzjurney

Share Taxi ride platform

- The opportunity:1.3 people in every commuters car. Meaning, there are 3 empty seats in every car.
- Market: 154M Daily commuters. who travel 1.5B Km annually
- Solution: Platform and app. That enables location based drive sharing
- Benefit: reduced congestion & pollution; reduce commute cost
- Social features: share your journey with the community

Source: Buzzjurney

Important notes

- All apps presented are free for users thus enable anyone with smartphone to become a user.
- "*when the product is free, you are the product*"

so users must contribute something usually privacy, passive or active feedback or "face time" for targeted commercial content.

Challenges

- Receive initial traction in order to establish minimal valuable service (chicken-egg problem)
- Monetization of the social networks
- Privacy issues are concern by regulators users and commercial entities (Apple, Google, Microsoft etc.)
- Gapping the digital divide

Recommendations

- Application development level
  - Support entrepreneurs by providing initial data
  - Prizes and contests
  - Approach app developers with global traction
- Increase Awareness Programs
  - Provide citizen with info. on social apps trough conventions , media, blogs and portals
  - Train government authorities and decision makers to learn public behavior through social apps

Recommendations

- R&D for knowledge gaps
  - Deepen crowd sensing R&D
  - Promote local research on Information flow and user behavior
- Government Initiatives and International Agreements
  - Constructive and proactive dialog with major social network companies
  - Improve network availability and promote use of smartphones
  - Encourage innovation by seed funding

Summary

- LBSN are changing the way we consume transportation related services
- LBSN receive growing traction by users but we are still at the beginning phase.
- Technology development lowers the barriers for user adoption.
- Israel became an industry leader in LBSN and location based apps.
- User adoption will result in reduced resource consumption and greater infrastructure efficiency

Using Location-based Social Media for Crowd Sourced Transportation Systems and apps.

Thank You!

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