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Mobility As the State of Being!

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Statements on

Mobility as the State of Being

- Jaime Lloret Mauri, Polytechnic University of Valencia, Spain

- Joel J. P. C. Rodrigues, University of Beira Interior - Covilhã / Instituto de Telecomunicações, Portugal

- Subhas Chandra Mukhopadhyay, Massey University (Turitea)- Palmerston North, New Zealand

- Josef Noll, University of Oslo / Center for Wireless Innovation, Norway

Mobility as the state of being

- Do we have to be mobile?
- Who suffers first when not being mobile?
- Impact on
  - Social life
  - Business
  - Personality
  - Quality of ...
- Impact of increased mobility?

a real crisis in life
female, age 15

20% of workers are seldom in the office
Movation white paper, 2007

10% increase in mobile gives GDP growth of 0.6 ...1.2%
Telecom Circle, 2009

only way of talking to my kids is to send them an SMS
female, age 33

holidays for me means to switch off my mobile
male, age 43

mobility means for me being able to have a family life
male, age 35

Business is mobile
Telenor, 2003

Quadruple-play

Discussions
Mobility provides

mobile intelligent phone

Joel

10% increase in mobile gives GDP growth of 0.6 ... 1.2%

Telecom Circle, 2009

Mobility provides behaviour of devices

Jaime

increased productivity

Joel

truly pervasive and ubiquitous

Joel

Enabling optimized services and infrastructures

Jaime

enhance life quality

Joel

Discussions
Impact on society, business and people

Your location is known, even if it comes from just a sensor

business will create services

"The **society** is not IT"

privacy only for a minority for people

Community members will support you

increase productivity - gain free time

Discussions
The ultimate challenges

costs

values

privacy

switching off the mobile phone increases life quality

young people don't even know where the "off button" is

the mobile becoming my friend

educate your boss not to disturb you

service development for companies, not for people

humans need to develop - more functionality puts more requirements for human beings

The Sixth International Conference on
Wireless and Mobile Communications ~ICWMC 2010~
September 20-25, 2010 - Valencia, Spain

More than mobility

By Jaime Lloret

UNIVERSIDAD POLITECNICA DE VALENCIA

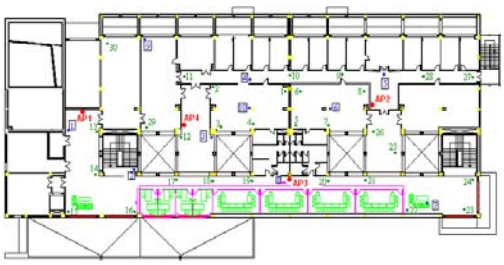
IGIC Instituto de investigación para la gestión integrada de zonas costeras

Departamento de Comunicaciones

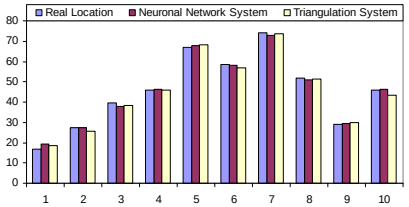
1

More than mobility

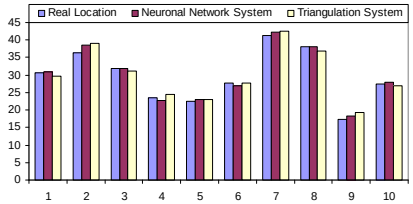
IGIC DCOM



Floor and locations of the APs and sensors



Systems comparison for X axis.



Systems comparison for Y axis.

Miguel Garcia, Carlos Martinez, Jesus Tomas, Jaime Lloret, *Wireless Sensors self-location in an Indoor WLAN environment.* International Conference on Sensor Technologies and Applications (SENSORCOMM 2007), Valencia (España), 14-20 de Octubre de 2007

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2

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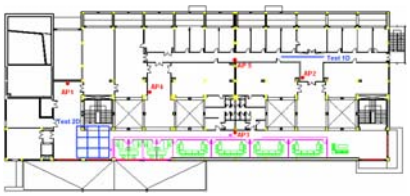
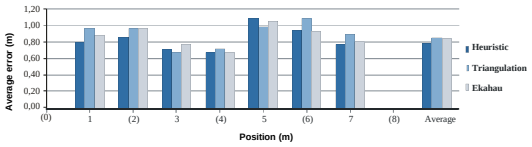
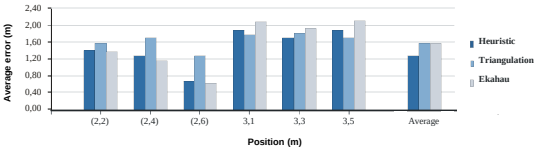




Systems comparison for 1D experiment.



Systems comparison for 2D experiment

Miguel Garcia, Fernando Boronat, Jesus Tomás, Jaime Lloret,
The Development of Two Systems for Indoor Wireless Sensors Self-location.
Ad Hoc & Sensor Wireless Networks: An International Journal. VOL. 8, Issue. 3-4, Pp. 235-258, June 2009.

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3

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Algorithm:

$$p(o^j \mid l, B^j, T_i^j) = p(o^j - 10n \log(\frac{d^j}{d_i^j}) + \frac{L_w^j}{L_{wi}^j} \mid l, B^j)$$

```
1 get the vector of signal strength, o
2 for each possible location l using 0.5 meter greed
3 search the k nearest neighbor samples from l using Euclidian distance
4 estimate Pr(o|l) using equation (5), (6) and (9)
5 output the most probable location
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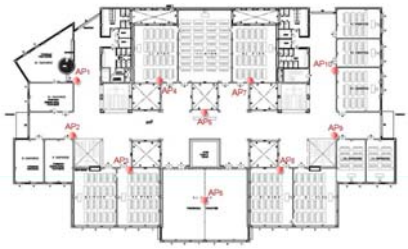
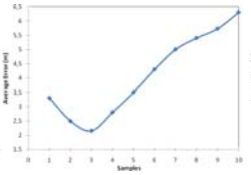
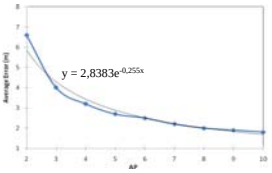
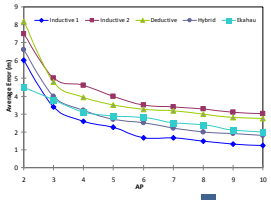




Average location estimation error as a function of the number of samples.



Average location estimation error as a function of the number of APs



Jaime Lloret, Jesus Tomás, Miguel Garcia, Alejandro Cánovas,
Hybrid Stochastic Approach for Wireless Sensors Self-Location in Indoor Environments. **Sensors. Vol. 9, Issue 5, Pp. 3695-3712, Mayo 2009.**

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4

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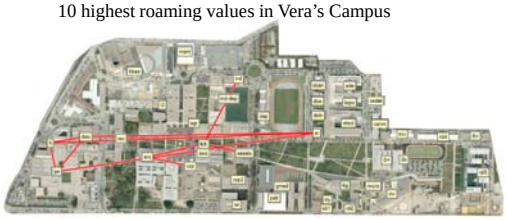
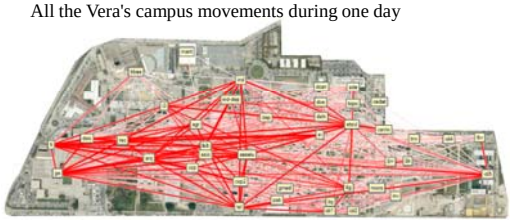
10 highest roaming values in Vera's Campus



All the Vera's campus movements during one day



Miguel Garcia, Sandra Sendra, Carlos Turro, Jaime Lloret,
***People Mobility Study in a University Campus using WLANs*, The third International Conference on Mobile Ubiquitous Computing, Systems, Services and technologies (UBICOMM 2009), Sliema (Malta), 11-16 de Octubre de 2009.**

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5

More than mobility

- WLAN position systems in existence provide devices placement with high precision.
- Mobility provide the behavior of the devices (users, sensors, etc.)
- We can study the behavior of the devices in order to improve the network/system…
- Some prediction can be applied in order to avoid failures, overloads, etc.
- We can know what is happening in the environment just studying the behavior of the network and its impact in the packets transmitted through it.

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6