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Localization Of Health Agents And Resources By Mobile Devices

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Abstract and objective

This poster reports the research being carried on the following: Initially, some health care situations where low resolution positioning is effectively usable are identified. Despite their limited processing capacity, due to its popularity, mobile devices are a natural choice to implement location awareness. Software can be used to turn regular cell phones and connected PDA's into low resolution positioning devices, without the subscription of expensive Telco's services. Remote computing is used to overcome the processing capacity restraint and improve the performance of the solution. Then, remote Artificial Intelligence techniques are used to improve the geographical resolution and to perform user problem's solution search. Finally, the need of articulated integration with other emerging technologies like Evidence Based Medicine (EBS), Body Area Network (BAN), Portable Patient Record (PPR) is pointed.

Keywords:

telemedicine, health services accessibility, mobile localization, location aware, ubiquitous computing

Introduction

In large cities like Sao Paulo, Brazil, there are several situations when geographical information can affect the health care result. Due to cellular phones and other mobile devices popularity and increasing processing capacity, they are a natural choice to location aware computing implementation. Though their majority don't currently offer built in geo positioning technologies, software solutions can be implemented to supply these capabilities.

Methods

Geographic low resolution health related problems

The importance of geography is intuitive whenever a triggering event, in an unfamiliar place, requires a quick decision of where to go as soon as possible in order to get proper health care. Every connected mobile device knows the fixed antennas they are talking to. Once their coverage area is around 3 km, the worst case resolution is known. Including the low resolution restraint, one possible statement to this rule can be: mobile connected devices software supplied positioning is useful whenever someone has to decide something related to the health care, satisfying geographical restraints with accuracy of at least 3 km. This definition excludes time restraints in order to consider situations as when a patient has to select a specialized doctor which fee can be refunded by his medical insurance system, who has free agenda matching to his schedule and who can be reached inside his 1 hour drive distance geographical area. This is a typical Artificial Intelligence (AI) problem.

Mobile device technologies independence

There are basically 4 technologies to connect mobile devices: Satelite, GSM, CDMA and WIFI and the subgroups and evolutions of these 4. The mathematical solution for positioning in each one of them is different, and the same happens with the resolution. This plurality produces additional complication once the devices often switch from one network to another.

Results

Limited processing capacity

Mobile devices cannot handle AI yet. It demands the transference of the processing is to a remote server. Java technology is used to handle the diversity of mobile device's models. Once it doesn't load the device, additional data processing is used to increase the geographical resolution, offer clues and to build graphical maps to be downloaded into the device.

Conclusion

Integration with other emerging mobile technologies

The presented technology can be easily integrated with EBS, PPR, and BAN mobile solutions through a future platform standard. This can help to supply the location aware part of the ubiquitous computing paradigm in medical informatics.

Low cost solution

Once this approach doesn't use the Telco's positioning expensive services, it can be usable to solve localization problems that require geographical information for a huge number of people that could not afford it otherwise, several years prior to mobile equipment evolution and substitution.