Wireless Public Announcement System for Hearing Devices

Javier Sainz, Moviquity, ES
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Scenario

PUBLIC PANELS

WIRELESS NETWORKS:
MOBILE WLAN

PCS

Profile
Filter
Position

Mobile/WIFI
BlueTooth
WBAN

USER

PUBLIC ANNOUNCEMENT SYSTEM

SERVICES

TRANSPORT

CONGRESS HALL

CONFERENCE ROOM

FIXED IP NET LAN/Internet
Scenario

The Personal Communications System
As Communications hub:

• Connects to Hearing Aid via WBAN
• Connect to Personal Networks:
  • Bluetooth
• Connects to remote Networks
  • Mobile
  • WLAN (WiFi), WMAN
Scenario

• A person with hearing impaired profile and equipped with the latest PA technology terminal is going to the Museum using the Train. On the way he interrupts the excursion and visits a shop.
Scenario

Activities:

Programming the day:
Excursion info: destination timetable is used to prepare the Public Announcement filters.
- This activity is performed at home with a PC Screen and with high speed internet access to Access Public Announcement Providers Web Pages (ie. Train or Museum information Web Pages)
Scenario

On the move;

• Using the mobile device (PCS) connected via wireless to internet (Mobile or Wifi) and to a Hearing Aid (WBAN).
• The user receives text, images, audio and vibration warnings of PA messages that are received.
• Location is defined on the fly by a location platform that combines the information from different technologies (Wireless Beacons like Wifi and Mobile, RFID, GPS)
• **At the Train Station.**
  Change of Train Platform Announcements. Received for informing of a Platform Change.
Scenario

On the move; Using the mobile device.

At the Museum:
The museum is offering a tour for hear impaired visitors. This announcement will be received by the user when he is inside the museum.

• Announcement received in the vicinity of a shop (announcing discounts) prompts the user to change his plans for a visit to the shopping Mall.

→ This PA message will be received by the user if allowed by the programmed filter.

→ All messages are stored and can be heard and read again.
Scenario

- Emergency Announcement
  A Fire Alarm Announcement at the Mall. This type of announcement will be propagated to all users in the vicinity of the danger.
System Architecture

Public Announcement Architecture

- GPS Satellite
- Mobile UMTS Access
- Mobile network
- Localisation Service Server
- POI Server
- Public Announcement Service Server
- BT beacon
- WLAN access
- HearCom User

User Localization Information is used to filter PA Content
System Architecture: Elements

Public Announcement Publication

Announcements can be placed by the Different Public Organizations in different Formats/Languages to cater for the different Profiles and Localization

Announcement Parameters:
- Localization scope
- Urgency
- Language
- Voice File / Text File / Image
- Target Profile

Public Announcement Organization

Emergency Room
Train Station
Mall Announcement Room
Police Department

Public Announcement Service Servers

PA Message
Message Content
Format Audio or Video Destination Profiles Locations
PA Message
Message Content
PA Message
Message Content

Different Network Technologies are available to propagate the information optimally:

- Unicast/ Broadcast/ Multicast.
- The Mobile Wireless Networks
System Architecture: Protocols

Organization for the Advancement of Structured Information Standards (OASIS) has proposed a protocol to propagate alert messages. This protocol can be extended to informational messages.

**CAP**: Common Alerting Protocol:
- Supporting digital images, text, audio and video.
  - Multilingual and multi-audience messaging
  - Flexible geographic targeting (localization).
- Compatible with digital encryption and signature capability.
- Message update and cancellation features
- Interoperability standard for use among warning systems and other emergency information systems.
- Usable over multiple transmission systems.
- End to end authentication and validation of all messages.
Human Machine Interfaces

– Adapted to user profile.
  • Hearing impaired, Elderly ..
– Connected to Hearing devices
– Critical for deployment success.
  • User friendly: overcome user limitations (wear it and use it at home: domestic applications).
  • Messages filtered and with different alert levels
    – Location dependent.
    – Alert messages prioritized
Conclusions

• A system for the propagation of Public Announcements to mobile users
• Proposal is based on Hearing devices connected to PCS, IP technology and CAP like messages.
• Specially conceived to empower accessibility of Users on the move of different profiles (Hearing, Vision Impaired).
• Based on off the shelf technology (WBAN to come):
  • Messages:
    • Presentation adapted to user preferences and profiles.
    • Filtered based on user localization, profile and preferences.
    • Stored to be retrieved for later revision by the user.
• Further development needed in Assistive HMI technology.