Towards novel HBB application platform: experimental testbed

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Outline

• Introduction
• Current state of hybrid television
• Broadcasting testbed
• Education using hybrid technologies
• Personalized hybrid television
• Conclusion
Introduction

- Analog television broadcasting
  - 5 - 8 MHz bandwidth – 1 SD channel

- Digital television broadcasting
  - DVB-T (terrestrial), DVB-C (cable), DVB-S (satellite)
  - EPG, subtitles, teletext
  - 8MHz bandwidth – 4 SD channels

- User interactivity – MHP, HbbTV
Current state of hybrid television

- MHP
  - DVB-J
  - Java based Xlets
  - Return channel

- HbbTV
  - HTML-CE, JavaScript
  - Translated with built-in browser
  - IP (broadband) channel
DV Broadcasting testbed
Testbed model
Hardware

- DekTec DTA-111
  - QAM, OFDM modulator
  - 48 – 862 MHz (complete VHF + UHF)
  - DVB-T / DVB-H, DVB-C
  - PCI slot
  - Windows and Linux driver
  - API
Software

- Video conversion
  - ffmpeg
  - mencoder

- Avalpa OpenCaster solution
  - esvideo2pes
  - pes2ts
  - tscbrmuxer
  - oc-update.sh
Reception

DVB-T
Hardware

- USB DVB-T receiver
- Set-top-box
- Samsung Smart TV
Software

• Dvb-apps
  • lock card, select channel, setup demux interface

• TV players
  • VLC, Kaffeine, MPlayer

• HbbTV
  • Opera TV Emulator
  • FireTV (Firefox HbbTV add-on)
Education using hybrid technologies
Transmitting presentations

- Improve education
- Transmitting presentations \((ppt, pdf, odp)\) during lessons or workshops
- Making surveys
- Taking exam tests
Forms of presentation content delivery

1. Timed video track
   - Presentation slides are converted into one video track
   - Long conversion time
   - Compatible with all DVB devices

2. Multiple video tracks and their exchange
   - One presentation slide is converted into one short (1 frame) video track
   - Short conversion time
   - Compatible with all DVB devices
   - Presenter controls broadcasted slides (next, previous)

Conversion to video track is done by *unoconv* (images) and *ffmpeg* (video track).
Forms of presentation content delivery

3. Presentation transported in DSM-CC object
   • Presentation packed in its format into DSM-CC object
   • End device unpacks DSM-CC object
   • Presentation viewer needed

4. Presentation transported as HbbTV application
   • Presentation and questions for survey are converted into HbbTV application
   • HbbTV application is packed into DSM-CC object and broadcasted over DVB-T
   • HbbTV enabled device translates DSM-CC and shows content
   • Voting is done by IP channel.
HbbTV application

- Converted presentation with voting option
  - CE-HTML, JavaScript, CSS
  - PHP, MySQL, GNUPlot
- Voting
  - jQuery's POST method (GET method as fallback)
- Data stored in MySQL database
- Results in form of graph
Slovakia

- Slovak republic
- Capital: Bratislava
- Currency: Euro (€)
- Population: 5,445,324


Question:
Where is Slovakia?
1 - Africa  2 - Asia  3 - Europe
Presentation broadcasting application

- Video conversion to MPEG-2
- Presentation conversion
  - Multiple video tracks and their exchange
  - Packaging into DSM-CC objects
  - Packaging into HbbTV application
- Transmitting
- Linux, Qt
Presentation receiving application

- Different types of input
  - Input file
  - DVB-T tuner
- DSM-CC object translation
  - Open folder with received files
  - Run Opera TV Emulator
Testing

Set-top-box interface

HbbTV application on TV screen

Results
Testing

- PC
  - VLC, Mplayer, kaffeine
  - Opera TV emulator
  - Fire TV plugin pre prehliadač Firefox
- Analyser
  - DVB Inspector
Personalized hybrid television
Identification and personalization

- Server application
  - XML interface
  - Managing users and channels
  - Custom screen
  - Player control
Player control

- Gestures recognition system (FEI STU BA)
- Server application
  - Receive XML (*Linux network sockets*)
  - XML parsing (*libxml*)
  - Managing users and channels with MySQL database (*libmysql*)
Welcome roman!

PRESENT KNOWN USERS:
1. roman
2. martín

CHANNELS:
1. Doma
2. Markiza
3. STV1
4. STV2
5. TV JOJ
Summary

- Digital Video Broadcasting testbed
  - Transmission (HW+SW), receipt (HW+SW)

- Education using hybrid technologies
  - 4 ways of presentation broadcasting
  - Presentation processing and broadcasting application
  - Voting system

- Personalized hybrid television
  - XML interface
  - Personalized graphical interface
  - Channel control
Future work

- Broadcasting Testbed
  - Conversion performance
  - Adaptible SI/PSI tables

- HbbTV application
  - Advanced authentication

- Personalized hybrid television
  - Face and voice recognition modules integration
Thank you for your attention!