Industry requirements for multimedia and the Semantic Web

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Overview

- Industry requirements for the Multimedia enhanced Semantic Web
- Benefits and opportunities
- Realising the benefits
- Conclusions

Multimedia enhanced Semantic Web vision

- **Huge expansion of multimedia content available via the internet**
  - should lead to new revenue opportunities for home, mobile, enterprise, consumer
- **Examples**
  - Vodafone Live - multimedia clips available for purchase (download onto mobile handset)
  - NASCAR to go – text and images from latest races available on mobile handsets
  - DVB-H – services to broadcast TV to mobile handsets have been announced
  - O2 Mobile Video – news, entertainment, music downloads available for mobile phones
  - downloadable content in fixed environment e.g. iTunes

Multimedia enhanced Semantic Web vision

- **Huge expansion of multimedia content available via the internet**
  - should lead to new revenue opportunities for home, mobile, enterprise, consumer
- **So why is the content market developing so slowly?**
  - users need to be able to find the content, but current tools do not support semantic query
  - content providers lack automated tools for content annotation
  - tools to automate home and professional content management are rare
- **The impact on industry is important**
  - difficult for value of multimedia assets to be fully realised
  - legacy content value is lost
  - revenue opportunity from multimedia equipment is reduced
  - fixed and mobile service providers miss new service opportunities

Multimedia enhanced Semantic Web vision

- Multimedia annotation
  - MPEG-7 for high level and low-level annotation
  - processes often manual
  - free text annotation leads to inconsistencies
  - TVAnytime and other standards available for broadcast content
- Semantic Web tools are advanced for text based services but developing more slowly for multimedia
  - services, agents, and applications on the Web face difficulties in discovering and exploiting the information and knowledge in multimedia
  - aceMedia is one of a few projects tackling the issue
  - also significant work by IBM, especially *MARVEL*: MPEG-7 Multimedia Search Engine and modeling of semantic concepts for automated annotation
  - Google video – text based searching

Benefits of the Semantic Web – enabling services

- Fundamental enablers from projects such as OntoWeb, KnowledgeWeb, DIP, SEKT
  - focus on information exchange B2B and B2C
- applications
  - search : if the customer can more easily find what they are looking for, then they are more likely to purchase it
  - support of e-commerce : enabling automation of transactions on behalf of a user
  - automated services : negotiation of transactions on behalf of a user for commercial applications (e.g. purchasing goods or services) and leisure applications (e.g. organising a social event for a group of friends)
- Examples
  - Sekt Integrated Project : judicial, IT consultants, digital libraries
  - DIP Integrated Project : eBanking, eGovernment

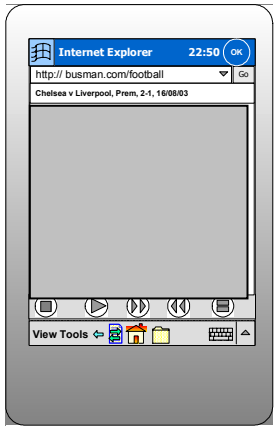
Benefits of the SW applied to MM

- Multimedia content is a valuable asset as an item to be sold and supporting sales of other goods and services
- Knowledge engineering applied to multimedia
  - **knowledge extracted and exploited throughout the content value chain**
  - **automated knowledge-assisted multimedia analysis unlocks legacy assets which become open to intelligent search and retrieval.**
  - **enables multimedia to be securely communicated through different network environments, consumed by different users and in different terminals, stored, and re-used**
- Enables new content experiences such as :
  - **personalised self-announcement of content**
  - **automatic content collections**
  - **trusted content consumption and sharing**

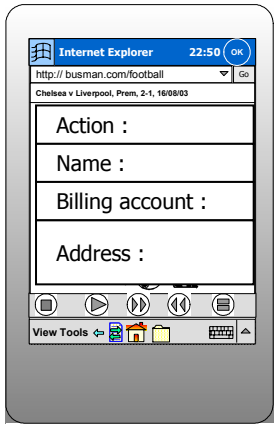
Example of SW enhanced service

- "What Happened Next?" is a game created by MegaMediaCo
  - collaboration with ISPs, cable and mobile network operators, interactive TV companies

Viewers watch some content



Action stops – what happened next?

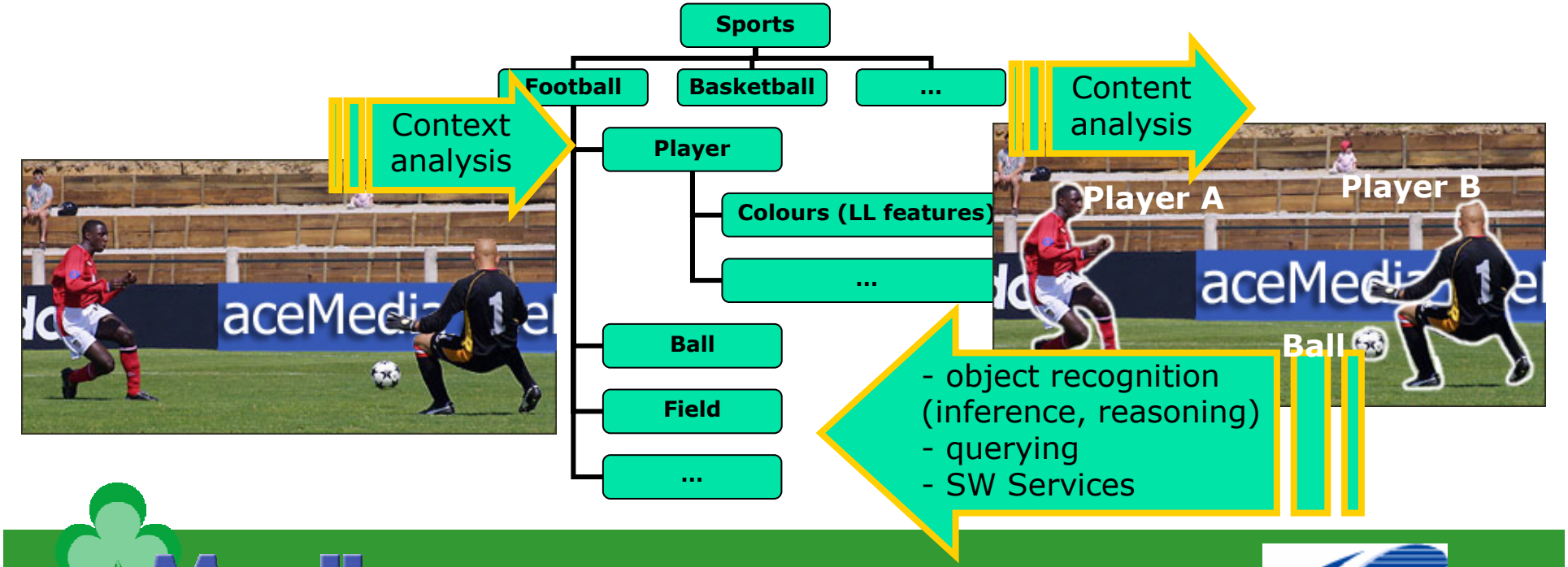


Viewers upload their answers

- "What Happened Next?" costs €0.50 per day to play
- Prizes once per week for highest score

Example – "What happened next?"

- ... but detection of interesting events is time consuming, and archive material is not suitably annotated
  - requires tools for automatic and semi-automatic semantic understanding of sports video for event detection and clip selection
  - archive content automatically analysed and formatted with meaningful metadata; content sorted into semantic themes



Business opportunities

Services enabler

- Multimedia services in fixed and mobile communication systems e.g. search portals, mobile information services
- Content creation, collaborative editing, authoring, content hosting
  - *Facilitate accessibility anywhere at the most suitable quality*
  - *Drastically enhance the way to find, retrieve, and filter content.*
  - *Enhance productivity through objective intelligent metadata generation*
  - *Workplace efficiency via intranet enhancements*

Products added value

- Connected CE products/terminal giving seamless access to personal or professional multimedia content
  - *TV, digital media players, PCs, PDAs, mobile and fixed phones, DVD players, PVR, terminal to access Internet/Intranet*

Realising the benefits of the SW in MM applications

- Technical and market advances
- Extension of SW business models to support multimedia content industry
- Support for riskier projects
- More focus on the user

Technical and market advances

- Extending SW tools for use with multimedia content
  - **accommodation of low-level features descriptors such as colour, texture, motion, shape e.g. via a multimedia ontology**
  - **tools to link low-level multimedia descriptors with higher-level descriptors ("multimedia semantic gap")**
  - **formalisation of multimedia relations among concepts such as spatial, temporal and semantic relations**
  - **specification of domain specific concepts and relations supporting multimedia content as an asset with intrinsic value**
  - **re-usability of concepts and relations to enable interoperability between multimedia and other content domains**

Extension of SW business models

- Systems approach to development of the multimedia enhanced Semantic Web
  - **closer integration of knowledge and multimedia domain researchers to enable joint advances**
  - **standards supporting multimedia enhancements to SW**
  - **harmonisation of standards relating to multimedia content protection**
  - **study of business models for progressing from current multimedia markets to semantically enhanced multimedia content products and services**

Support for riskier projects

- Local, national, international funding for more speculative applications development
  - **enabling collaborative projects and individual projects to explore applications beyond the currently well-exercised domains of sport, news and entertainment**
  - **speculating on markets which may not emerge for 4+ years**
  - **encouraging academic research groups to tackle commercially exciting domains in addition to education, social, and heritage**

More focus on the user

- Emphasis on the user as end-consumer and application/service provider
  - **easy to use tools which provide automation and intelligence, but where complexity is hidden from the user**
  - **user choice in what is automated and what is manual (or semi-automatic)**
  - **access to more complex features and functions provided for sophisticated users**
  - **provision of tools for trust management**
  - **formalism of user interface for seamless access across multiple devices and applications**

Potential market challenges

- Broad industry acceptance
  - Compliance to major interoperability standards and industry groups - Java based, MHP, Windows, Linux, DVB, 3GPP, 3GPP2
  - standards related to knowledge e.g. W3C
  - standards relating to multimedia content – SVC, MPEG-7, MPEG-21, TV Anytime
- Sustainable business models for content
  - backwards compatibility with legacy content
  - security and trust for the entire content delivery chain (users, content providers, creators, brokers)
  - charging models reflecting the investment needed by content providers

Conclusions

- Multimedia enhanced Semantic Web expands existing and creates new business opportunities
  - important for European companies' global business competitiveness
  - opens new business opportunities to realise the value of multimedia content assets
- Realising the value requires multiple approaches
  - Technical and market advances
  - Extension of SW business models to support multimedia content industry
  - Support for riskier projects
  - More focus on the user

Contact

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