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Fraunhofer IGD Position Paper for Future Internet PPP Usage Areas (Second Usage Area Workshop, Brussels June 2010)

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This position paper is dedicated to the specific usage area *content*, as it was identified within the FI-PPP constitution process.

Today a tremendous amount of media is available through the networks, whereas content is evolving from purely textual information and low fidelity media to high fidelity immersive content, covering aspects like audio-visual 3D, immersion and interaction.
From our perspective, to enable high fidelity networked content services, the Future Internet Platform should consider not only increase of bandwidth and convergence of networks, but also foster evolution of content, application platforms and networked terminal devices.

We can identify the following most relevant usage areas and applications, which are appropriate for large scale experimentation with the Future Internet platform:

- Personalised services allowing ubiquitous and pervasive access to information on-the-move being capable to provide the right content at the right time.
- Integrated public situated and mobile content access services.
- Adaptive, interactive and autonomous content presentation systems, taking into account contextual information as well as explicit and implicit user input.
- Advanced tele-communication services allowing people to remotely collaborate in shared virtual environments, which will help to reduce cost and environmental impact.
- User-centric search and retrieval services for (3D) audio-visual and related media in order to improve content access and delivery.

- Media monitoring and audience measurement services that allow businesses to better and faster understand their external environment and media impact.

To achieve these goals research and development at a significant level is required within the following areas of internet functionality and technologies:

- Effective recommendation systems, helping user to cope with the tremendous amount of available data as well as automatic content summarization technologies providing condensed versions for given audio-visual and 3D documents.
- Advanced multimodal user interfaces, enabling natural human machine interaction, providing different channels as gestures, voice or touch.
- Advancements in cognitive systems and context awareness will enable smarter user interfaces, recognizing implicit user feedback such as emotions, attention, behaviour and intention.
- Advancement in the area of audio-visual sensor integration will help to make sensors smarter in terms of energy efficiency, embedded processing capabilities, size and cost.
- Simulated and Mixed Reality technologies for immersive reproduction of reality and life-like communication.
- Robust automatic semantic analysis of media, capable to generate semantic metadata in a fast and reliable way and improving related search and retrieval services.

The Future Internet Core Technology platform should already provide immediate support for the following technological areas:

- Open (cross) media formats, aggregating legacy content formats, including suitable means for dynamic content adaptation over different distribution platform as well as interplay of associated metadata models.
- Open networked application platforms, exploiting cloud and grid computing infrastructure services.
- Comprehensive exploitation of social network technologies in the process chain from media creation to delivery.
- Technologies for efficient coding and transmission of dynamic and interactive 3D content at different levels of resolution and quality.

In order to evaluate our targeted applications in the Future Internet Technology platform, we would need the following experimentation environments:

- Large networks of public situated displays with seamless network integration of nomadic devices and advance audio-visual sensors.

- Large-scale content repositories and distributed computing environments for grid-based automatic content analysis.
- Large scale test beds of networked home environments, providing cloud/grid resources and cross device content sharing.

The major role of the Fraunhofer-Institute for Computer Graphics Research IGD in the FI-PPP usage area developments can be mainly provision of near-to-market research and technology transfer in the area of networked media.
Fraunhofer IGD is the world's leading institute for applied research in the field of visual computing, which includes computer graphics, computer vision, as well as virtual and augmented reality. Fraunhofer IGD is closely connected with other Fraunhofer partner institutes in Rostock, Singapore and Portugal, and in Germany. By being integrated in the local University of Technology Darmstadt, a high level of research quality is maintained. Research at Fraunhofer IGD mainly concentrates on three strategic areas: semantic modeling, interaction of computer graphics and visual computing, as well as generalized digital documents. The main activities of the Fraunhofer IGD are the development of innovative product prototypes (hard- and software) and the realization of concepts, models, and solutions for computer graphics and its adaptation to specific application requirements. The work is rounded off by basic research projects and the realization of single devices and computer graphics systems with pilot character. The R&D projects are directly related to current problems in industry, trade, traffic, and service. For the implementation of these projects IGD have developed excellent competencies in software development, computer graphics and application deployment.
The Media Group is part of Fraunhofer IGD's "Cognitive Computing and Medical Imaging Department". With our technologies we target various application domains within different industries (Broadcast and Media, Retailing, Telecommunication).