Draft - Project Ideas

Possible student project ideas as collaboration between the IMT research group (DMU) and the IMAT5314 MSc projects module

# Video Player for Minimizing Motion Sickness

Motion sickness can be caused by disjointed information received by the human brain from the visual and from the vestibular systems. For example, when sitting inside a car movement is registered by the vestibular system but not by vision, unless the individual is looking outside the car (which is one of the "techniques" used in order to reduce motion sickness).

A prototype can be created of a video player synchronized with the accelerometers of mobile device (e.g. iPhone, iPad and/or Android devices) or of a remote sensor unit (e.g. Nintendo WII, or 6DOF Arduino sensor packs). Positioning the device on the seat of a car, movements will result in the move of the video in an opposite direction, simulating a fixed point as when watching something outside the car.

A project in this area could involve the creation of a prototype, and/or the evaluation and usability study on it.

# Indoor Positioning System

A prototype for an indoor positioning system could be realize, and in a later stage used for facilitate indoor navigation by blind people.

The prototype could make use of technologies such as:

* WiFi networks
* Bluetooth beacons
* RFID
* ...

One project could involve the creation of a prototype, and another project (which will need to carried out either at the same time of the first, or after) could involve the blind navigation parts, working with data sonification for transferring information to the user.

# 3D binaural sound library

Binaural audio allows the simulation of 3D soundscapes using a simple pair of headphones instead of a complex array of loudspeakers (e.g. Dolby 5.1, etc). A C-C++ library can be created which allow the integration of high-quality binaural audio processing in video-games and other interactive applications.

# 3D binaural teleconferencing system

Teleconferencing systems often rely on a simple mono audio stream. A prototype of a teleconferencing system (initially just for a limited and pre-determined number of computers connected to the same network) exploiting the 3D audio binaural technique can be created. This would allow the increase the effect of immersion and realism within the call, with a consequent increase in the speech intelligibility.