

## Research Work Proposal

Supervisor: Dr. Francesc Serratos

Research team: SSAI – Sensorial Systems Applied to the Industry

Title of the Research Work: 3D face characterisation based on 3D Gabor filters

Student:

Study Programme: Master on Computer Security and Intelligent Systems (2010) Profile: Intelligent Systems

### Abstract

In the last two decades, a lot of research has been carried out related to face identification and localisation. This research has produced a huge amount of papers and several interesting methods. At the end, this effort has arrived to the society through very different fields, such as, face localisation in low-cost cameras, security systems, medical diagnosis, and so on. The first methods and systems were based on 2D static or dynamic images (video sequences). Nevertheless, at the beginning of the current century, the 3D cameras emerged and a new field of research appeared. The third dimension contributes to characterise faces in a better way and so, to increase the quality of the systems. As it is usual in all the technologic components, the first 3D cameras were very expensive, but nowadays, there are some low-cost 3D cameras. For instance, the *kinect* camera has a price around 150 Euros (<http://www.xbox.com/es-ES/Kinect>). This economic fact makes these cameras more popular and so, applications that use them are fast spread to the society.

The current master thesis is the first step of a larger project. The aim of it is to automatically recognise the probability of some illnesses in foetal that are 22 weeks aged. The features to be analysed from the foetal are extracted from 3D images captured inside the uterus. In this first step, we want to identify the main parts of a face and obtain some distances between them. Images are obtained from a public 3D face database and also from a low-cost 3D camera. We consider the master thesis is the first step to the larger project since we will reach experience on 3D data and face characterisation. Moreover, we will use a low-cost camera instead of the very expensive system needed to extract images from foetal.

### Specific objectives

- State of the art
  - o Analyse the methods applied to 3D face identification.
  - o Study the formats to represent 3D information
- Define a model to extract the features
- Implement a system to obtain features based on *Matlab*
- Write a document
- Publish the model and the application in a congress or workshop

### References

- Yingjie Wang, Chin-Seng Chua, "Face recognition from 2D and 3D images using 3D Gabor filters", Image and Vision Computing, 2005.
- Yingjie Wang, Chin-Seng Chua, "Robust face recognition from 2D and 3D images using structural Hausdorff distance", Image and Vision Computing, 2006.