TESI @UNIVERSITE' DE LORRAINE (FRANCE)

The **UFR Mathématiques et Informatique** group of the University of Lorraine is particularly active in the fields of Pattern recognition and image analysis, Document filtering and processing, Document analysis and indexing.

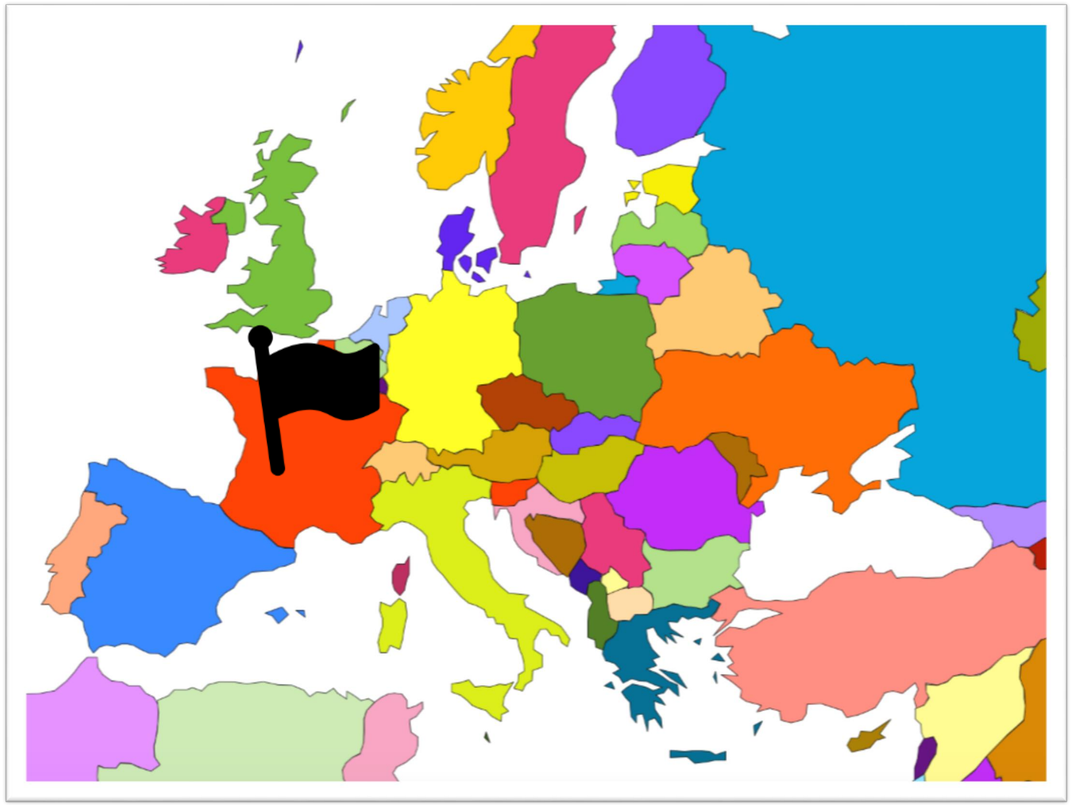
Salvatore-Antoine Tabbone, the contact professor for the ERASMUS@University of Lorraine, is the head of the UFR Mathématiques et Informatique group.

Prof. Tabbone in numbers: H-Index: 25; Citations: 3364

Required Skills for the thesis:

Machine Learning e Big Data Analytics, Artificial Vision

Give a look to the Lab Website



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UNIVERSITÀ DEGLI STUDI DI SALERNO

MIVIA

Giovanni De Angelis

Université de Lorraine

ANALYSIS AND EXPERIMENTAL EVALUATION OF REAL TIME GENDER RECOGNITION ALGORITHMS

Abstract

In recent years gender recognition from face images has become a very popular topic, especially in the fields of security and retail. Such interest is mainly due to the various real applications that can be profitably designed. The aim of this thesis is an experimental analysis of the gender recognition algorithms applied on images acquired in real-time environments.

The thesis investigates the performance drop observed when the images acquired in real scenarios are processed and identifies the causes of this collapse.

First the thesis provides an introduction about the gender recognition topic, describing the reasons of the growing interest. Then the document reports a review of the relevant methods proposed to solve the problem of gender recognition from face images. Starting from the state of the art analysis, a new method optimized to perform the gender recognition in real-time is designed and described. In order to perform a performance comparison with other methods, we chose the best commercial gender recognition solutions.

Then the thesis continues with a detailed list of all the datasets (public and private) used to test all the algorithms. The use of both public and private datasets has the aim to demonstrate that most of the available methods achieve an excellent accuracy on public datasets, but the performance dramatically decrease when the methods are evaluated on new images acquired in real-time.

The experimental results section contains all the detailed results of the performance evaluation. They demonstrate the superiority of the proposed method trained on real-time images. The thesis ends with a discussion of the experimental results and a critical explanation of the problems encountered processing real-time images.

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UNIVERSITÀ DEGLI STUDI DI SALERNO

MIVIA

Roberto Pisapia

Université de Lorraine

DISPARITY MAP EXTRACTION FOR A LOW COST 3D SENSOR

Abstract

The aim of this thesis is the development of a new low cost sensor for the 3D acquisition. The 3D sensor provides several features, like a tool for initial configuration of the sensor, the synchronized acquisition from both the cameras, the rectification of the captured images and the processing of the image to get a range map used in many different applications. Given the presence of high cost devices, which allow to obtain the three-dimensional representation of the environment taken into consideration, the purpose of this work is to realize a low cost sensor, that makes possible the stereo acquisition, and to produce a depth image from the disparity map.

This sensor can be used for counting and classification of people, or for a 3D reconstruction of the environment under consideration. The 3D sensor consists of two cameras in a PVC container, connected via USB to Raspberry Pi 2, which handles the video stream acquisition and the image processing. The first step is the assembly of the used components; particular attention was drawn to the layout of the cameras, to avoid misalignment that can negatively influence the result of the disparity map extraction.

Although the two aligned cameras, the initial calibration is always necessary, to eliminate the radial distortions related to inherent defects of the camera lenses. For this initial calibration, it is provided a simple tool, which allows, with the aid of a chessboard pattern, obtaining the calibration parameters, which are used to remove the distortion and possible misalignments between the cameras. For the acquisition and decoding of the video stream from the cameras, we use the library FFMPEG, which gives the opportunity to acquire individual video streams and then decode them in the desired format. One of the features provided by the sensor is the synchronous acquisition from the cameras, transforming two autonomous cameras in a real stereo camera.