Homework Image Analysis and Computer Vision

Sofisti Giorgio (10500171)

giorgio.sofisti@mail.polimi.it

Politecnico di Milano

1 Introduction

The first question of the homework requires to develop a MATLAB script capable of identifying automatically relevant features like edges and angles in the provided image in order to use them later for image rectification and normalization.

1.1 Pre Analysis

The image represent one of the façade of the internal gallery of the Sciarra palace in Rome. The palace has been built at the end of the 19th century in liberty style and present a lot of decorations on the façade that makes the feature extraction a bit harder than normal since it requires more attentions in filtering phase to distinguish what is relevant from what is not. The image is taken from the ground pointing the camera up during a sunny day and for this reason present a high contrast between the areas illuminated by sunlight, that penetrates through the glass roof, and the areas that are in the dark and this is another point to keep in consideration in the following steps. Last but not least we have partial information about the camera itself and only few assumption about the geometry of the palace.

Image Pre-Porcessing

The first step for image features extraction is the elimination of the colors that do not carry any information about edges and corners but triplicate only the load on the algorithm and make the process longer.

IMAGE BEFORE AND AFTER

In order to get better results, as pointed out earlier, we need to normalize the image making dark areas brighter and bright areas darker and get an almost shadow-free image. After some tuning I’ve found the best compromise, in terms of output goodness, applying the normalization twice.

IMAGE BEFORE AND AFTER

EDGE EXTRACTION

After the pre-processsing the image is ready to be used as input for edge extraction algorithm. After some testing of different algorithm canny gives the best output in terms of accuracy. I finally applied a filter to remove small lines (decorations and some image noise) not needed for detecting edges.

EDGE DETECTION

Starting from the black and white image I extracted segments applying Hough method. To obtain a better result I applied Hough twice with different parameters and sum both result to obtain the final set.

gagygdgayud

2 Caratteristiche generali del testo e sua predisposizione

Bibliografia

1. Cartelli, A., Giovannella, C. (2015). Editorial preface. *International Journal of Digital Literacy and Digital Competence*, vol. 5 (*4*), pp. iv-x.
2. Cartelli, A. (2015). Tecnologia ed educazione in Annibale Pizzi e nella società contemporanea. In: Carcione F. (a cura di). *Annibale Pizzi (1937-2014) La pedagogia come progetto di vita e via di salvezza.* P. 107-116. Roccasecca (IT): Arte Stampa.
3. Cartelli, A. (2014). Progetto e realizzazione della base dati. In AA. VV., *BMB - Bibliografia dei manoscritti in scrittura beneventana*, Vol. 22. Roma: Viella.
4. Cartelli A., Palma M., Ruggiero S. (2013). L'insegnamento della paleografia nella società della conoscenza. In: Palma M., Vismara C. (a cura di). *Per Gabriella. Studi in ricordo di Gabriella Braga*. vol. I, p. 395-420, Cassino:Edizioni Università di Cassino.
5. Cartelli, A. (2013). From Smart Cities to Smart Environment: Hints and Suggestions for an Ecology of the Internet. *International Journal of Digital Literacy and Digital Competence*, vol. 3 (*4*), pp. 65-71.
6. Cartelli, A. (2013). *Fostering 21st Century Digital Literacy and Technical Competency*. Hershey (PA), USA: IGI Global, Information Science Reference.