Hyperspectral Image Analysis for Digital Restoration of Cultural Heritage
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ABSTRACT
The reconstruction of ancient documents and artworks without undermining the integrity and historic function of these is the main problem which experts have faced. For this reason, this work focuses on applying color interpolation techniques to hyperspectral images acquired by an image spectrometer, in order to achieve a digital restoration. The spectrometer has an important role in revealing the spatial and spectral information from an area of interest, this information will be processed, to have a better idea of the original appearance of the document. In this research we present the spectral characteristics of common inks as well as their behavior when they are imaged at the spectral portions ranging from 400 – 1000 nm.

COLOR INTERPOLATION
Colombino Codex

Interpolation Color Algorithm

Digitally Restored Images

Problem:
Interpolation algorithms are unable to restore contours because there is not enough information concerning these outline.

IMAGE ACQUISITION SYSTEM

Characteristics
1. Spectral range: 400 – 1000nm.
3. Hyperspec © Data Processing Unit (HDPU).
4. Provide scan, capture and analysis of hyperspectral data.

PIGMENT ANALYSIS

Plot of Spectral Reflectance Curves

FALSE COLOR IMAGES TO DIFFERENTIATE AMONG INKS

CONCLUSIONS
The images obtained by the Hyperspectral Camera in the range of 400 – 1000 nm, show how is possible to differentiate between one and another ink. The combination of images acquired at different portions of the electromagnetic spectrum allows to analyze information that was not visually detectable.

REFERENCES