Optimization of print quality with multi-channel printing

Résumé du projet de recherche (Langue 1)

The aim of this research is optimization of print quality with the focus on multi-channel image reproduction and multi-layer relief printing. Hereby determining the benefits and drawbacks of using more than the conventional CMYK channels for colour printing. This research, on investigating opportunities for multichannel printing, at Océ Print Logic Technologies will be in close collaboration with the European project of Colour Printing 7.0. The project can roughly be divided in two areas: 1. Use of extra colourants: extra colourants can be added to the CMYK printing system with the purpose of minimizing colour mismatches and increasing the achievable colour gamut (as the example of the Canon 12-color LUCIA pigment ink system). Additionally, including channels like varnish or fluorescent inks provide the ability to locally enhance the image and create new market opportunities. 2. Relief printing: relief can be added to the prints by printing multiple layers of ink at given locations. With this technique, relief can be added to prints, with the purpose of creating texture or to create desired views from different viewing angles or lighting directions. Additional channels of ink in multi-layer printing, create a focus on aspects such as improving the print quality, reducing the print costs and discovering new market opportunities. The combination of these fields of study will allow to print objects in relief that closely resemble the original. Now with the full spectrum of colours available even for different lighting conditions, local varnish/reflection and precise depth of the paint strikes in fine artwork can be reproduced.

Résumé du projet de recherche (Langue 2)

Due to the many colour conversions from image capture to image prints, recreating an image is often difficult to realize. In an attempt to build a system with consistent colour match from source to reproduction, multichannel printing will be used, with larger varieties of available inks and broader colour gamut. The goal is to minimize the colour and gamut mismatches between printing system and sample images, hereby selecting the optimal inks from a database based on weighted selection criteria. An algorithm will be developed to choose the selection of inks, based on the original image and different criteria given by perceptual quality metrics. Based on optimal spectral gamut mapping, image quality attributes are to be developed, as criteria to determine the choice of ink. One of the objectives is to create a colour space that can be used to minimize colour differences, also taking perceptual correlates such as hue and chroma into account (which are disregarded with many standard colour spaces). Also, spectral reproductions should be visually correct for different illuminants. Spatial consistency should be taken into account and therefore spatio-spectral gamut mapping is to be investigated. This type of gamut mapping should be able to handle banding artifacts, by considering both spatial colour artifacts and overall reproduction quality.

Informations complémentaires (Langue 1)

This research will be in close collaboration with the European project of Colour Printing 7.0 (CP7.0). The CP7.0 project is a training and research project funded by Marie Curie Initial Training Networks. It is led by The Norwegian Color Research Laboratory at Gjøvik University College and executed in collaboration with five full network partners and eight associated partners from academia and industry throughout Europe. Seven PhD students and one post doc from different European universities (such as the University of the West of England, Technische Universität Darmstadt, Télécom ParisTech, Linköpings Universität) will collaborate on the subject "Next Generation Multi-Channel Printing".