

# COLOUR IMAGE SEGMENTATION UNDER NATURAL LIGHTING CONDITIONS

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## Abstract

Colour segmentation process under natural lighting conditions is a complex problem mainly due to the presence of highlights and shadows that mask the actual true colour information. In these cases, it is necessary to look for representation spaces that minimise such effects.

In this paper, a reduced spherical coordinates system is introduced in order to discriminate the illuminant influence from the colour information provided by the sensor. After describing the transformation process, some guidelines for illuminant modelling are reported.

A set of natural scenes (cereal field images) under ambient lighting has been used to validate the method. Once the original images have been transformed, classical segmentation methods (as thresholding or clustering) showed the feasibility of the proposed approach.

*Key Words* : Colour Segmentation, Colour Spaces, Natural Lighting.

## 1 Introduction

Working under natural lighting conditions, image segmentation based on colour features used to be a complex problem. Typical colour spaces, as RGB, result unsuitable due to colour values of the different objects are modified as a function of the amount of light they are receiving. Even though other colour spaces, such as IHS or Lab [1] try to overcome these difficulties decomposing colour into luminance and chrominance signals, former drawbacks are not properly solved.

According to the light reflection process described in the Dichromatic Reflection Model [2], it is necessary a representation space able to discriminate between the intrinsic object colour (matte) and the lighting influence, as shown in Fig. 1



