

Institiúid Teicneolaíochta Cheatharlach



INSTITUTE *of*
TECHNOLOGY

CARLOW

At the heart of South Leinster

Design Document

What's it like Outside?

By

Dermot Rossiter

Supervised by

Paul Barry

Table of Contents

INTRODUCTION2

FIRST ITERATION2

SECOND ITERATION2

THIRD ITERATION3

Introduction

This report documents the steps taken to reach the final product of the project. Each iteration of the project will detail how the project was started, right up until the conclusion of the project.

First Iteration

The first iteration was a slow process. It mainly involved researching and learning how computer vision techniques worked. As I gained more knowledge into the topic, I setup OpenCV to work on my Ubuntu Virtual Machine, and then began testing out basic thresholding techniques on 2-3 different images taken by myself. This was another mistake. Testing the image over so few images was not sufficient in finding a solution to detect the sky region in any image.

From here, I downloaded a series of Images from Google images to run the vision techniques on. It didn't take long to realise that another approach was needed.

Second Iteration

The first approach provided great results in only a few images. It was not a good overall solution. Therefore, I decided to apply edge detection techniques to the images to try and find the best parameters for the blurring methods and the edge detection methods to work best in conjunction with each other, to find what works best across a wide range of images. This involved a huge amount of trial and error, but at the end I am satisfied with the final result. It's far from perfect, in some cases failing to find the horizon, or including edges around the clouds, but there was still enough sky region available to be analysed.

Third Iteration

The last iteration of the project was the process of applying colour segmentation on the series of images. Again this involved a lot of trial and error to find the best colour ranges for the bluish pixels in the sky region. Finding the colour ranges using the RGB colour codes was difficult, so I switched to HSV format. The best and most accurate approach to finding the best upper and lower boundaries for the HSV colour range was to create a simple trackbar program that enables the testing of different HSV values on images in real-time.

Once the product was completed to a satisfactory level, I concluded the project by finishing up on the rest of the documents.