Technology
Arts Sciences
TH Köln

Project Documentation

Interactive Lighting Detector

written by

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Image Processing in SS 2017

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3 Materials

Laura

The following sections describe the resources and tools required for the completion of the project.
Furthermore, the test images are presented in chapter 3.3.

3.1 Hardware

Laura

During the implementation phase, the application was run on two computers, which are described in the following two sections. Both computers needed to be able to deal with the software components described in section 3.2. An extract from your data sheet is shown in table 1 respectively table 2.

3.2 Software

Laura

In order to develop the *Interactive Lighting Detector Qt* was used (compare section 3.2.1). To take advantage of already existing functionalities the *OpenCV*-library, which is described in section 3.2.2, was taken advantage of.

3.2.1 QT

Laura

3.2.2 OpenCV

Laura

The *Open Source Computer Vision* (OpenCV) is an open source library for image- and video processing, which is among others available in the programming language

NAME?	Description
Processor	??
RAM	??
Graphic Card	??
Operating System	??

Table 1: Extract from the Data Sheet of the NAME?

.

Acer Aspire 5820TG	Description
Processor	Intel Core i3 CPU @ 2.40 GHz
RAM	4 GB
Graphic Card 1	AMD Mobilty Radeon HD 5000 Series
Graphic Card 2	Intel(R) HD Graphics
Operating System	Windows 10 Education 64 bit

Table 2: Extract from the Data Sheet of the Acer Aspire 5820TG Notebook.

C++. It has been introduced ten years ago and is developed by various programmers since then. This library offers the most common algorithms, as well as current developments in image processing [1].
Für dieses System ist vor allem das Modul `calib3d` [?] und das extra Modul `aruco` [?] verwendet. Das erste Modul `calib3d` bietet alle notwendigen Funktionen zur Erstellung, Verwendung und Weiterverarbeitung von intrinsischen und extrinsischen Kamerakalibrierungen an (vgl. Abschnitt ??). Während das Zweite alle benötigten Ressourcen und Funktionalitäten zum Tracking von *ArUco* Markern zur Verfügung stellt (vgl. Abschnitt ??).

3.3 Testimages

Laura

Due to the assumption that the objects shown on the test images described in section 3.3.1 have a too complicated shape, a second batch of images was made (compare section 3.3.2). Images of both batches were used to test the functionality of the the algorithms used for the lighting detection. All images have in common that besides the actual object they show a sundial to simplify the determination of the light direction for the user.

3.3.1 First Batch

For examples of the first batch of test images are shown on figure 1. Next to the mandatory sundial there are different objects depicted.

Laura

Figure 1: Examples of the Test Images of the first Batch.

3.3.2 Second Batch

Laura

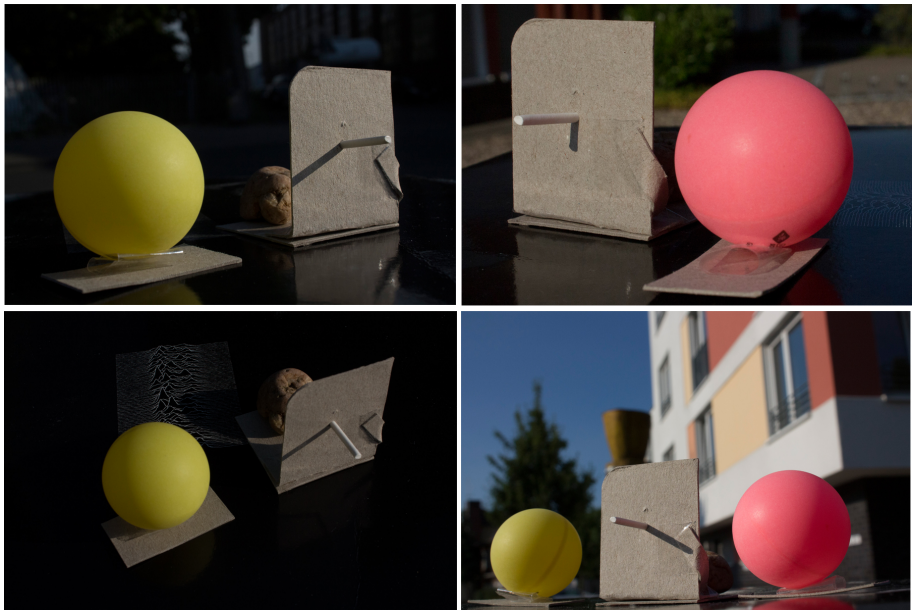

Figure 2: Examples of the Test Images of the second Batch.

4 System

Vera

4.1 Lighting Model

Vera

4.2 Contours

Vera

4.2.1 Find Contours

Vera

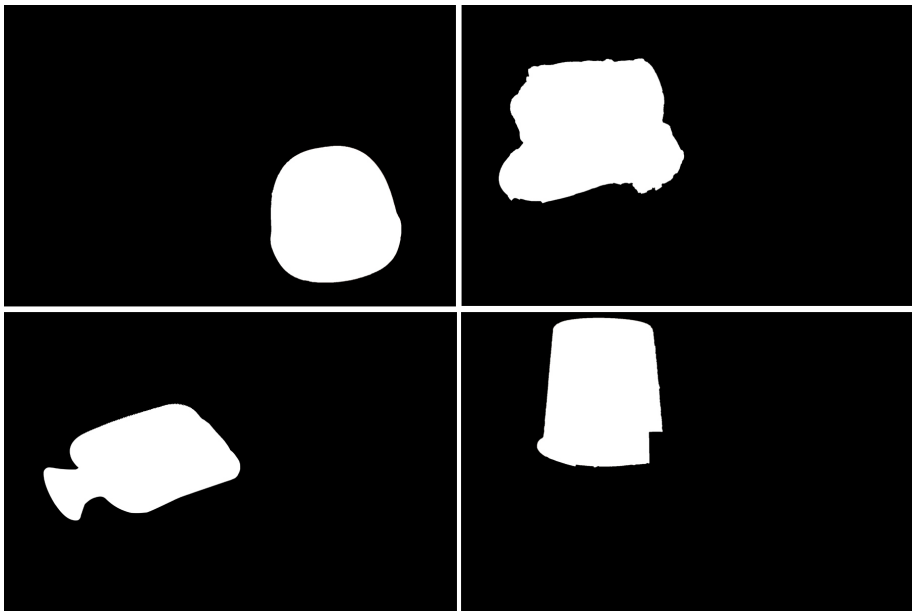

Figure 3: Bildunterschrift.

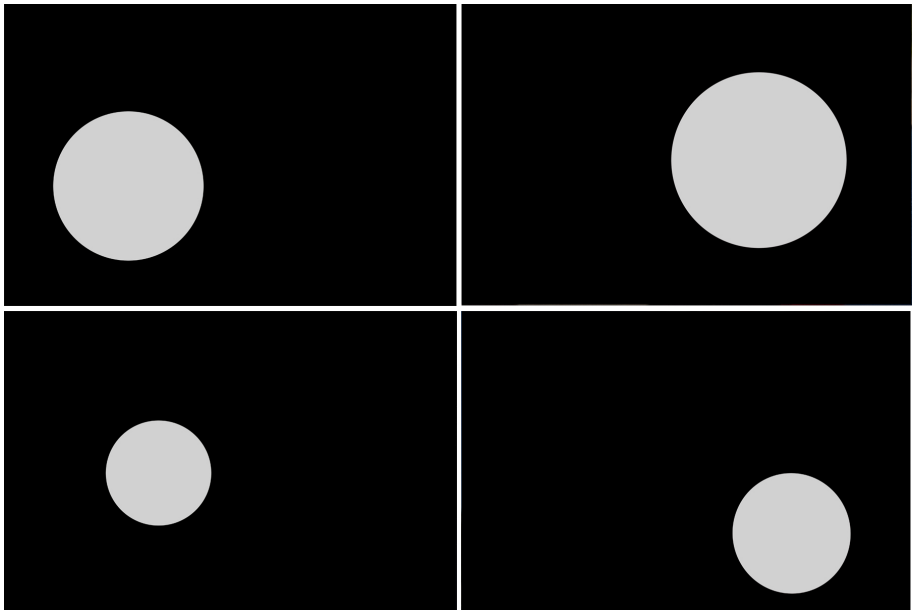

Figure 4: Bildunterschrift.

4.3 Subcontours

Vera

4.4 Different Approaches

Laura

4.4.1 1. Approach: One Lightvector

Laura

4.4.2 2. Approach: Averaging Lightvectors

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4.4.3 3. Approach: Lightvector with highest Intensity

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5 Evaluation

Vera und Laura: Stichpunkte

Vera: Ausformulierung

6 Project Management

Laura

6.1 Project Definition

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6.2 Project Planning

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6.3 Project Execution

Laura

6.4 Project Completion

Laura

7 Conclusion

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References

[1] I. Culjak, D. Abram, T. Pribanic, H. Dzapo, and M. Cifrek. A brief introduction to opencv. pages 1725–1730, May 2012.