MOMENTS OF INERTIA

RECONNAISSANCE DES FORMES

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Abstract

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CHAPTER 1

INTRODUCTION

1.1 CONTEXT

This report is the result of a university assignment. It aims to prove that the student understood the motivation, goals and means of studying pattern recognition. Therefore, this is a way of summarizing a series of observations and experiments done on images containing shapes.

1.2 MOTIVATION

We want to be able to extract shapes from images and differentiate between them. Using various **shape attributes**, we should be able to conclude which shapes are similar, which are different, which of them are the same but just rotated at different angles, what their main axis of inertia is and so on. Being able to recognise these attributes would allow us to identify and categorise shapes from images. From there on, many posibilities exist: image indexing, searching for certain shapes (e.g. "images with squares") etc.

1.3 GOALS

Given multiple shapes, $S_1, \ldots, S_n$, each shape S_i being represented by its image pixels, find proper **shape indexes** that would allow us to classify these shapes and conclude on a shape's features (e.g. main axis of inertia for S_i). Therefore, we are interested in finding means (that is **shape attributes**, **shape invariants**) to uniquely identify them. The **shape invariants** would help us say that S_i and $S_j, i \neq j$ are the same, even if S_j is rotated at a certain angle, for example.

CHAPTER 2

METHODS

2.1 TECHNICAL ACKNOWLEDGEMENTS

The following code presented was written using *Python 3.7*. The images from which the shapes were extracted were used as gray images.

2.2 LOADING DATA

For the following, we're going to use gray images.

CHAPTER 3

RESULTS

CHAPTER 4

DISCUSSION

CHAPTER 5

CONCLUSION