Visual Odometry Pipeline

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Sandbox

Figure 1: Cute pig image

Symbols, Nomencalture

Introduction

The aim of this mini project is the development of a visual odometry pipeline. This pipeline takes the consecutive gray-scale images of a single digital camera as input. Therefore the pipeline developed in this mini project is a monocular visual odometry pipeline.

The output of the pipeline is the position of the camera in relation to its initial position for each frame.

keywords: (VO, sequential, monocular, markov assumption)

Implementation

Framework

(keywords: MATLAB, Git)

Coordinate Frames

In this mini project the coordinate frames were defined as shown in fig. 2. The camera coordinates are in a way oriented, that the x-y plane lies parallel to the image plane, while the z-axis is pointing towards the scenery. The world frame however is oriented in such a way that the x-y plane is parallel to the ground and the the z-axis is pointing upwards.

The origin of the world frame is at the same location as the origin of the first boot-strap image.

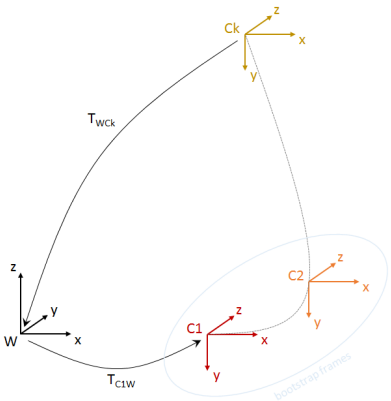

Figure 2: Coordinate Frames

Pipeline overview

The pipeline consists mainly of two parts, its initialisation and its continuous operation. Both of them are discussed within the two following sections.

Options and parameters

(keywords: parameter handling, GUI)

Initialization

Continuous Operation

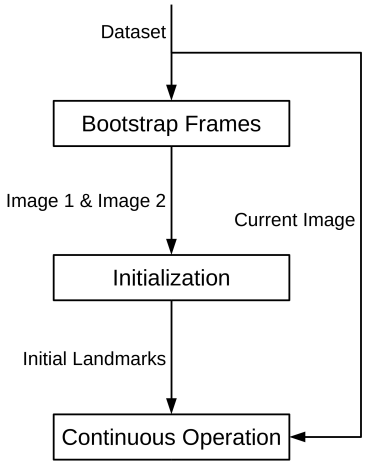

Figure 3: Rough Flow chart

Results

Overall performance

(keywords: Real time ness, comparison to groundtruth, compare different datasets Impact of features)

Discussion

What have we learned, what worked?
Possible future work, improvements (loop closure, ...)

Conclusion

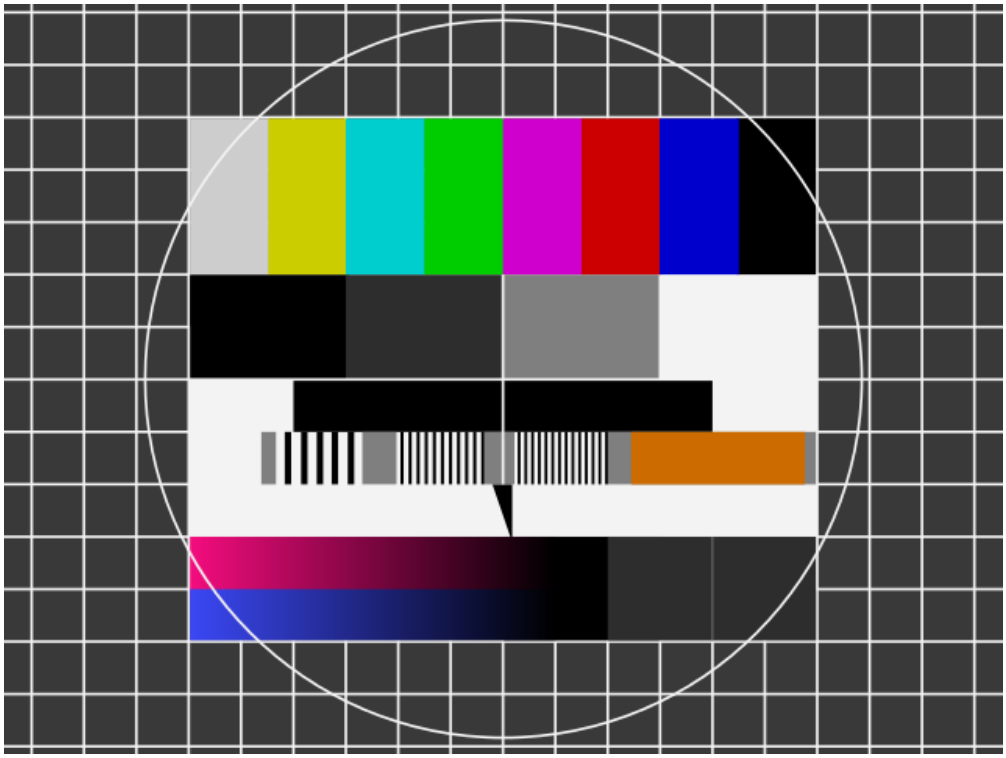

Figure 4: Init Flow chart

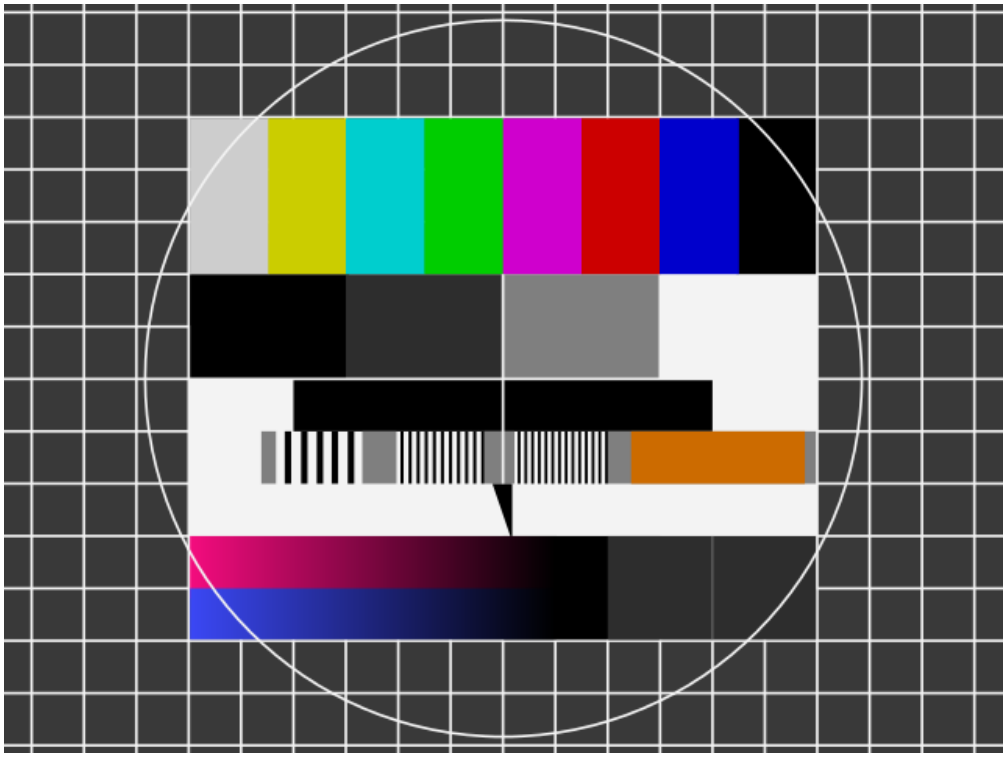

Figure 5: Cont Flow chart