Project Plan
GoPro Trails
Images and Graphics, Project Course CDIO
TSBB11

Group Members
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Version 1.1

Thursday 20th September, 2018

1 Project Management

A model of how the project will be managed as well as roles of people included in the project are described in this section.

1.1 Project Model

The project model used for this project is the Scrum Model [1], meaning the development will be divided into shorter sprints. All requirements that are known to be needed in the product are listed in a Product Backlog, which is dynamic and continues to change to identify what the product needs in an ongoing process throughout the project. See Appendix A. For each sprint, a set of Product Backlog items are selected to be implemented.

1.2 Customer

The customer who requests the development of the product in this project is Per-Erik Forssén. The project team is responsible to fulfill the demands specified in requirements, which are decided by the customer.

1.3 Roles Regarding Project Members

The project team consists of a Project Owner, a Scrum Master and team members (developers). The Project Owner speaks for the customer and user as well as taking primary responsibility for the Backlog. The Scrum Master helps the team move along based on the principles of the Scrum Model. The people assigned to these roles may change during the project.

1.3.1 Project Owner

The responsibilities for the Project Owner are:

1. Speaking for the customer.
2. Making sure that the items in the Backlog are clearly described.
3. Ordering the items in the Backlog.
4. Making sure the project proceeds on time.

1.3.2 Scrum Master

The responsibilities for the Scrum Master are:

1. Making sure the Scrum Model is being maintained.
2. Making sure the items in the current sprint log are evenly distributed between the members.
3. Clearing away obstacles for the scrum members.

1.3.3 Developer

The responsibilities for the developers are:

1. Working on the problems listed in the current sprint backlog.
2. Reporting on progress or on any obstacles that appear.

1.3.4 Assigned Primary Roles

The assigned primary roles are listed below.

Daniel Cranston	Developer
Carl Ekman	Developer
Lisa Eriksson	Project Owner
Freja Fagerblom	Scrum Master
Filip Skarfelt	Developer

1.4 Meeting Plan

The project group will have at least one meeting every week. Current status and potential problems will be discussed during this meeting. The mentor will be invited to participate on these weekly meetings.

The customer will be invited to these weekly meetings more seldom. The plan is to show the current work and receive feedback from the customer on the occasions he is present.

2 Description of Project

The project is described in this section.

2.1 Overview and Purpose

The main end result of the project is a desktop application that automates the generation of a sparse SfM solution given video and related metadata from a GoPro Hero 6 with integrated IMU. The framework Kontiki [2] will be used.

The application also handles georeferencing of the created solution into a map service (such as Google Maps) and visualizes the trajectory of the camera throughout the video sequence. The idea is that the trajectory obtained from georeferencing will be superior to the pure GPS data from the camera, the difference between the two will also be visualized within the map service.

As a further request from the customer, the camera calibration steps and relative transformation between image and IMU measurements that come with Kontiki will be investigated and corrected if needed. The reason for this request is that Kontiki was developed with the older GoPro Hero 3 in mind, whereas this project will use the newer GoPro Hero 6.

A user manual as well as a website showcasing the project will also be created. The website will contain a project description, information about the project, client and hardware used, download links, and related documents and documentation.

2.2 Deliverables

The above text is here condensed into a list of all items to be delivered to the Customer.

1. Application described above
2. User manual
3. Project website
4. Video showcasing the result
5. Presentation of the project to an audience
6. Technical documentation

2.3 Limitations

Some low priority features may be excluded due to time limitations. Aside from this, any unforeseen limitations will be discussed with the customer and a way of handling agreed upon.

3 Development Strategy

The development strategy is presented in this section.

3.1 Programming Language and Libraries

The project will be implemented using the Python programming language. Code will be well documented using Python docstrings. The project will use the visual-inertial fusion SfM library Kontiki [2]. More specifically, the Python bindings for Kontiki will be used. Some additions to Kontiki may have to be made in C++.

3.2 Versioning

The code and documents will be stored in a repository created on a GitLab server hosted by LiU. The code and documents will be versioned using GIT.

4 Resources

The resources available in the project are presented in this section.

4.1 People

- Felix Järemo-Lawin: project mentor that can provide assistance during the project. Assistance is limited to a total of 24 hours.
- Hannes Ovrén: author of Kontiki. Can provide assistance regarding usage of Kontiki.

4.2 Material

- GoPro Hero 6 black with integrated IMU
- GoPro vest
- Bike attachment GoPro accessory

4.3 Economy

Each group member will allocate 240 hours, in accordance with the course syllabus.

5 Points of Decision and Milestones

The points of decision and milestones are listed in table 1.

Table 1: Points of decision and milestones.

Point of decision	**Description**	**Date**
BP1	Staffing of the project.	2018-09-03
BP2	Stable version of project plan, requirements specification, system view to be submitted.	2018-09-25
Milestone 1	Product demo for customer.	Week 46 (12/11-16/11)
BP5	All functionalities according to specification, test protocol, user guide, and draft of technical documentation shall be fulfilled.	2018-12-06
BP6	Website, presentation, reflection document and final technical documentation finished.	2018-12-17

6 Priorities

The requirements with priority 1 will be handled before those with priority 2, see Appendix A. In the case extra time is available when all listed requirements in the requirement specification are fulfilled, further functionality may be added.

References

[1] J. S. Ken Schwaber, *The scrum guide*, https://www.scrumguides.org/docs/scrumguide/v2016/2016-Scrum-Guide-US.pdf, 2017.

[2] H. Ovrén, *Kontiki - the continuous time toolkit*, https://github.com/hovren/kontiki, 2018.

Appendices

A Requirement Specification

Requirements Specification
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Version 1.0

Monday 10th September, 2018

1 Requirements

Table 1 shows the requirements. The requirements with priority 1 must be fulfilled while those with priority 2 will be fulfilled if there is time available.

Table 1: Requirements.

Requirement #	**Functionality**	**Priority**
1	Investigate and if needed correct the transformation between image and intertial measurements	1
2	Verify the intrinsic camera calibration, and if needed recalibrate the camera	1
3	Extract inertial data stream from GoPro format	1
4	Extract GPS data stream from GoPro format	1
5	Feed data streams into Kontiki	1
6	Georeference the SfM solution into a map service	1
7	Visualize SfM trajectories in a map service	1
8	Visualize GPS trajectories in a map service	1
9	Create a website	1
10	Create command line interface to the program	1
11	Create a user manual	1
12	Write technical documentation	1
13	Create a video	1
14	Create dense correspondences	2
15	Apply meshing to the dense 3D point cloud	2
16	Create graphical user interface application	2