3D Satellite Maps
CDIO Project Plan

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TSBB11 Project plan

Version 0.1

Abstract

This document describes the plan of the project 3D Satellite Maps based on data from Vricon AB. The document also contains system requirements and system overview. The project is performed according to the CDIO model - Concieve, Develop, Implement, Operate.

Contents

1 Introduction

This document describes the plan of the project 3D Satellite Maps based on data from Vricon AB, performed at the Institute of Technology at Linköping University in the course TSBB11 in late 2016. The goal of the project is to refine the visualization of buildings in existing 3D maps as well as classifying buildings into a set of subclasses such as villas, bridges and industry buildings. The project is part of the master program and will be performed according to the CDIO model - Concieve, Develop, Implement, Operate. The project will use the agile method Scrum in daily operations.

2 Background

Vricon AB models the world in 3D based on satellite photography. The buildings in the model are not always represented properly - the walls aren't orthogonal to the ground in most cases. The first part of this project will deal with this problem. The houses will be replaced with a model, much alike a monopoly shaped house, Figure 1. This will be achieved by classifying buildings as houses or non houses, extracting their size and replacing it with a house model of the same size.

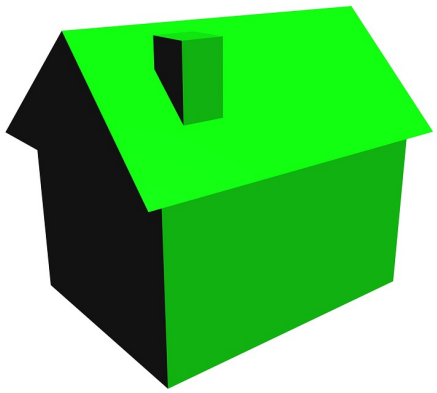

Figure 1: How the house model should look approximately

In the second part of this project, the buildings will be classified into a set of subclasses. The subclasses will be decided at a later stage but it is believed that e.g. churces, villas and bridges are suitable subclasses. The term building in this project is equivalent to man made objects including but not limited to houses, bridges and churches etc. There will be a class for unidentified buildings and a class for non-buildings.

3 Organisation

Definition of group members titles, client, supervisor and their responsibilities:

Name	**Title**	**Responsibility**
Fredrik Fridborn	Project leader & Product owner	The main contact person to the client and the supervisor.
Erik Lindgren	Scrum master	Ensure that the project is conducted in accordance to the scrum model. Reallocates resources based on workload. Responsible for giving a Scrum presentation on how to work with Scrum.
Andreas Brorsson	Git manager	Maintains good structure in the version management. In charge of merge / branch. Responsible for creating a simple cheatsheet for git commands. Responsible for giving a git presentation.
Johanna Hultberg	Document manager	Ensures that documents meet the standard before they are sent to project leader. Documents written in LaTeX either via ShareLatex or editor and version control via git.
Matilda Lorentzon	Booking & Kickoff	Book rooms for meetings and work and, most importantly, responsible for social gatherings.
Pelle Carlbom	Client	Verify that project requirements are met.
Abdelrahman Eldesokey	Supervisor	Supervises daily operations. Provides technical assistance. Attends weekly meetings.

Table 1: Organisation

4 Development

This project will use the model Scrum with sprints that are two weeks long. Each sprint will start with a sprint planning meeting and end with a review of the sprint. To visualize the Scrum board a digital version in Trello will be used. The documents will be written mainly in ShareLaTex.

5 Software

The main language will be Python. The reason for this is rapid development speed as well as the variety of packages available, most notably OpenCV and Tensorflow. For all the code to follow the same standard the code will be checked using Pylint. Version handling will be done in git. Before the code is merged into the master branch it has to be reviewed by another group member to make sure that it works as intended.

6 Resources

The project group will have access to previous project results and master thesis work within the area. The data provided by Vricon is the following: digital surface model (DSM), digital terrain model (DTM), digital height map (DHM) and ortho of Linköping. Resources for this project is approximately 240 hours per student, with five project members adding up to a total of 1200 hours dedicated to the project.

7 System overview

Below is a flowchart of the system. The input images will be GeoTIFF images provided by Vricon AB. The DTM is the Digital Terrain Model, a height map without man made objects.

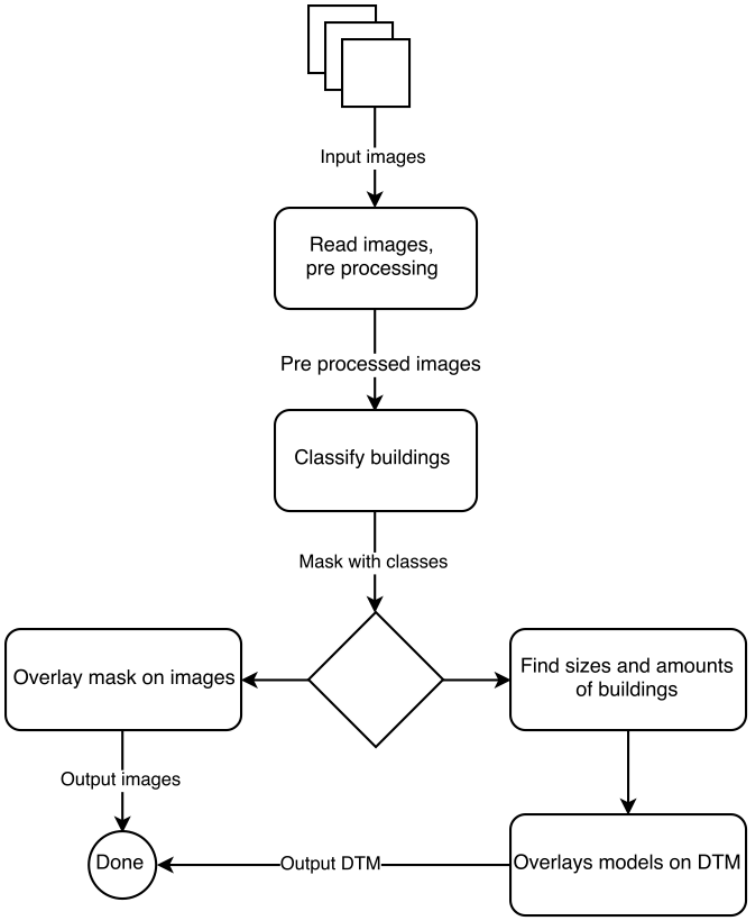

Figure 2: Flowchart of the system

8 System requirements

The requirements of the project are listed in the table below. The requirements can have three priority levels with 1 being the highest. The system should be able to:

Requirement	**Specification**	**Priority**
1	Estimate the size and shape of the houses on the DTM-map to gain a suitable model.	1
2	Replace houses with a house model which represent the size and shape of the structure on the DTM-map.	1
3	Count the amount of buildings in an image set.	1
4	Fill in missing data due to occlusion on buildings.	1
5	Classify at least ten different subclasses of buildings.	1
6	Calculate the area and volume of the building.	2

Table 2: Requirements

9 Milestones

Date	**Milestone**
2016-08-29	Project start.
2016-09-21	Stable version of project plan, requirements specification, system view to be submitted.
Half-time	Half-time presentation.
2016-12-12	All functionalities according to specification, test protocol, user guide, and draft of technical documentation to be submitted.
2016-12-21	Final presentations. Website and poster, presentation, reflection document, and final technical documentation to be submitted.

Table 3: Milestones