IMAGE PROCESSING PROJECT: ESTIMATING GESTATIONAL AGE AND FETAL WEIGHT FROM ULTRASONOGRAPHY IMAGE BASED ON CROWN RUMP LENGTH AND GESTATIONAL SAC

Software Design Specification

Version 1.0

Revision History

Date	Version	Description	Author
08/08/2015	1.0 (Draft)	Initial Draft created.	Roberto Julianto K

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1. INTRODUCTION

1.1 Purpose

This SRS describe the requirements and specifications of the Image Processing Project. The purpose of this project is to estimate gestational age and fetal weight of the ultrasound image processing by using Crown Rump Length (CRL) and Gestational Sac (GS).

1.2 Scope

The project is intended to estimate the gestational age and weight based on CRL and GS. It is implemented from morphology and segmentation operation of Image Processing. The goal is the number that represent the gestational age and fetal weight.

1.3 Document's Intended Audience

The audience of this project are users (called Observer), who want to know age of pregnancy and the condition of fetal (ex. Pregnant mother, doctor, etc).

2. SYSTEM OVERVIEW

2.1 FUNCTIONAL REQUIREMENTS

Complete features on this project are

- Find CRL
- Find GS
- Find GA
- Find FW

2.2. DEFINITION AND ACRONYMS

GA	: Gestational Age
FW	: Fetal Weight
CRL	: Crown Rump Length
GS	: Gestational Sac

3. DESIGN CONSIDERATIONS

3.1 ASSUMPTION

Here is some assumption for this project:

1. The image that will be used is 8-weeks fetal USG image.
2. The language will be used is C++ with additional library OpenCV 3.0.
3. The template is Console Win32 Application.
4. The solution platform compiler is X64.

3.2 CONSTRAINTS

The current constraints on the project are related to the image because it is not obtained directly from USG tool, but image from internet and different image has different image processing method.

3.3 OPERATING ENVIRONTMENT

The project is intended to be operated in Windows 8.1 64 bit.

3.4 DESIGN METHODOLOGY

The design of this project utilizes a procedural approach.

3.5 USER INTERFACE

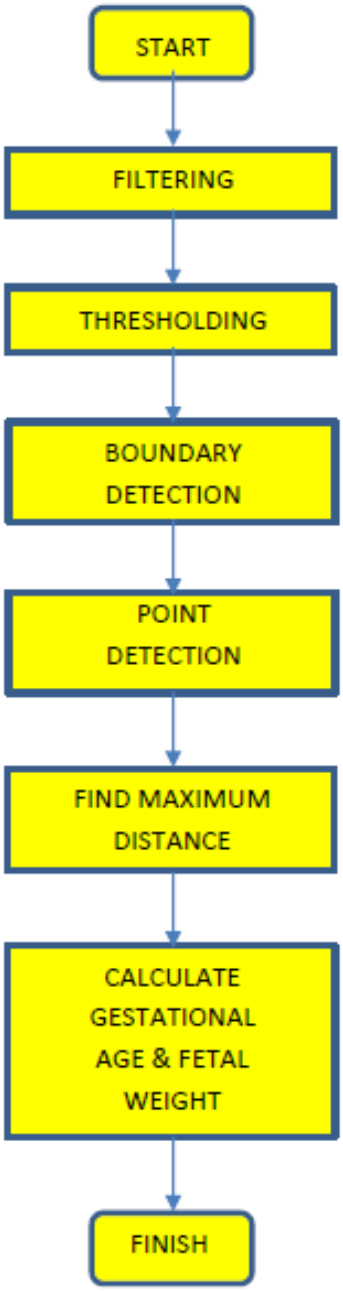
The project interfaces via console application.

3.5.1 Expected Input: Image

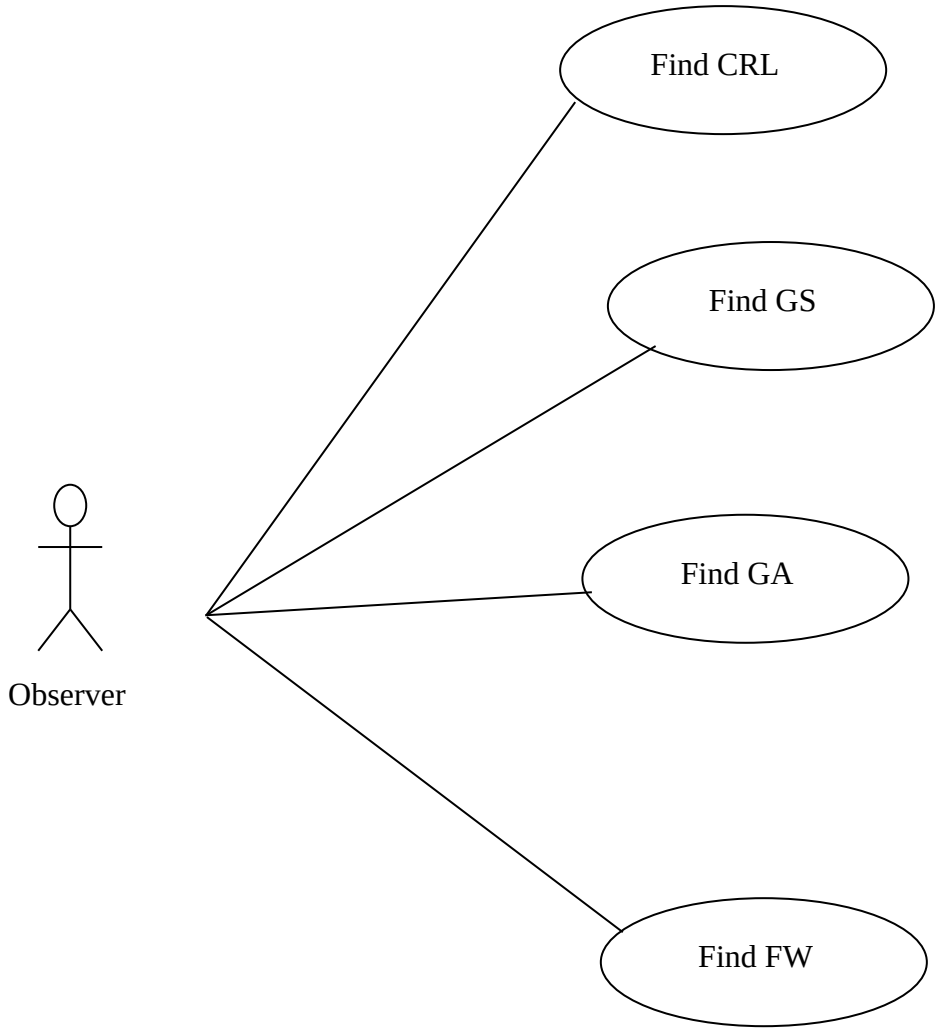
3.5.2 Output: Result Image, length(CRL) or diameter(GS), gestational age, fetal weight.

4. ARCHITECTURAL DESIGN

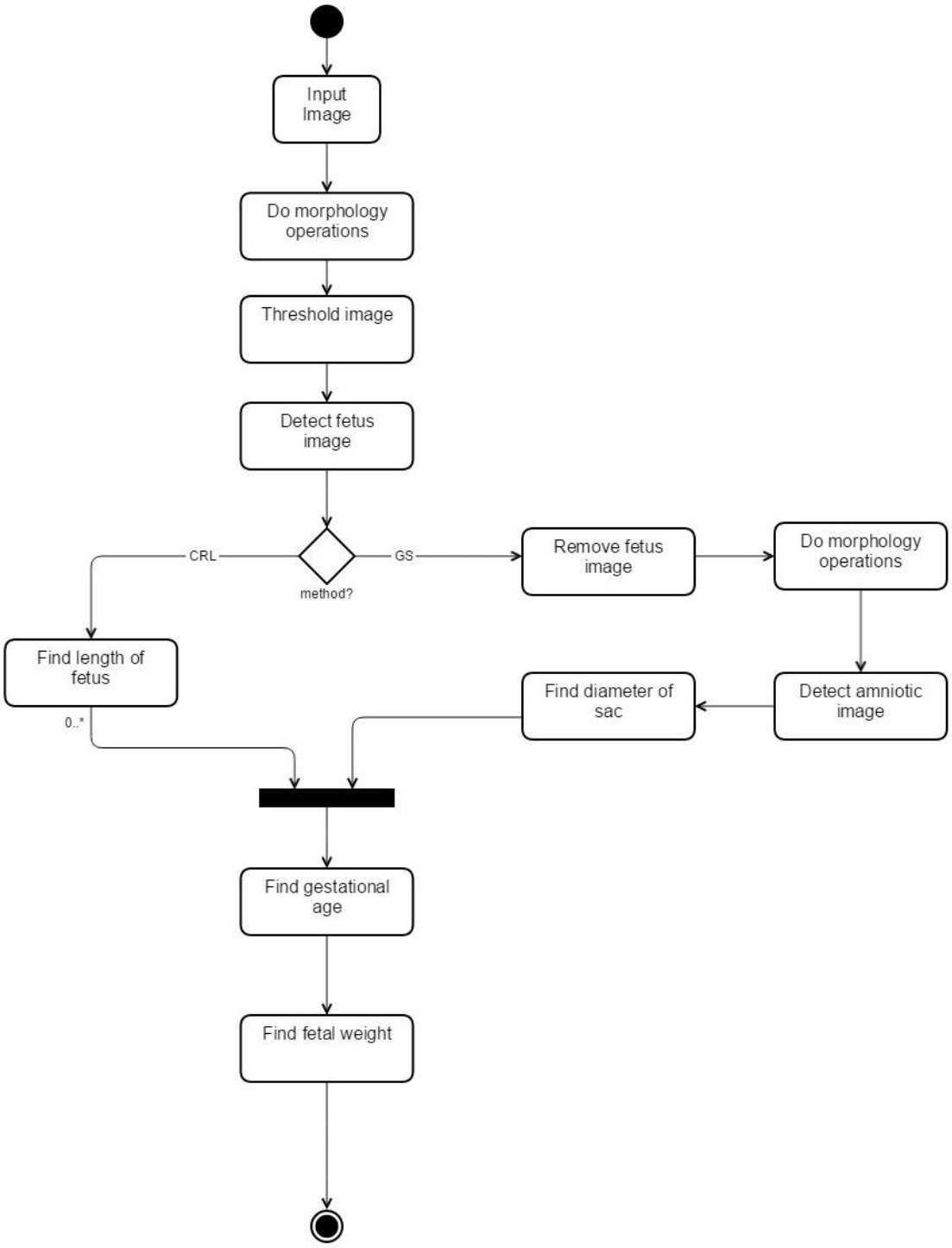
4.1 PIPELINE DIAGRAM



4.2 USE CASE DIAGRAM

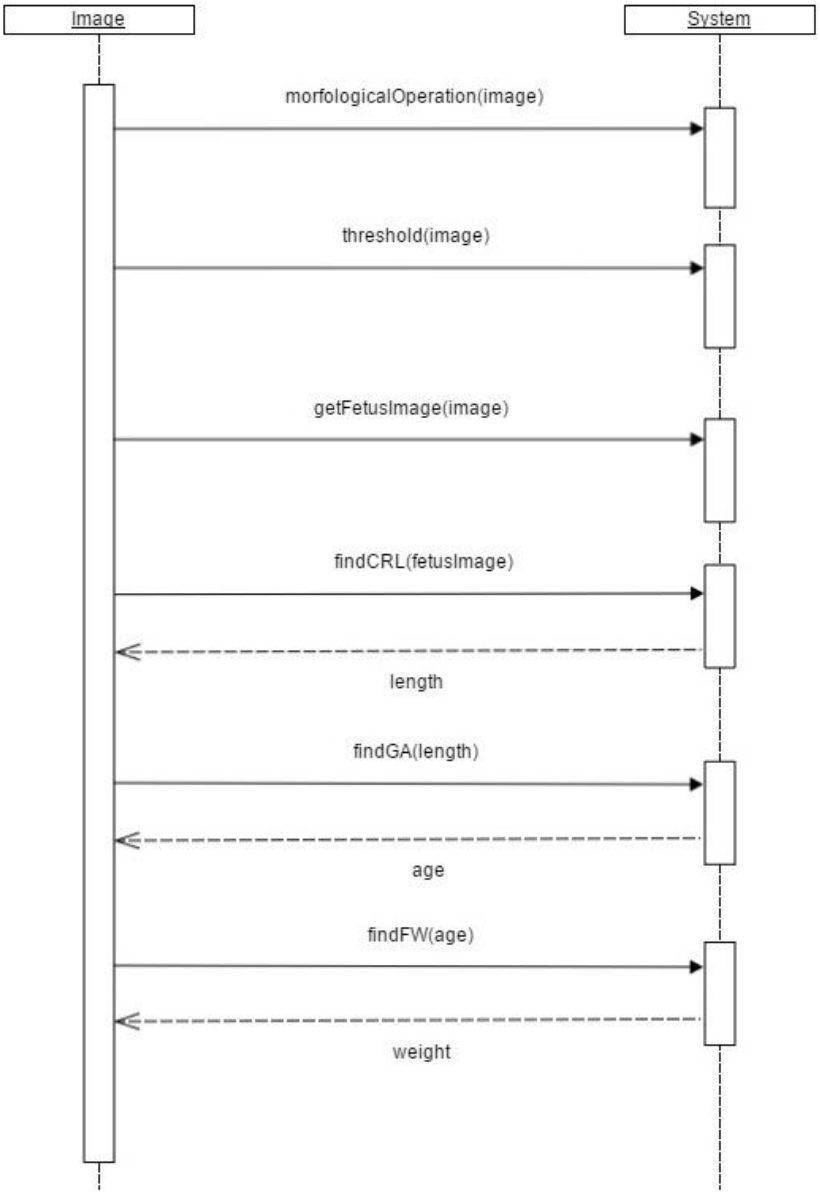


4.3 ACTIVITY DIAGRAM



4.4 SEQUENCE DIAGRAM

4.4.1 CRL



4.4.2 GS

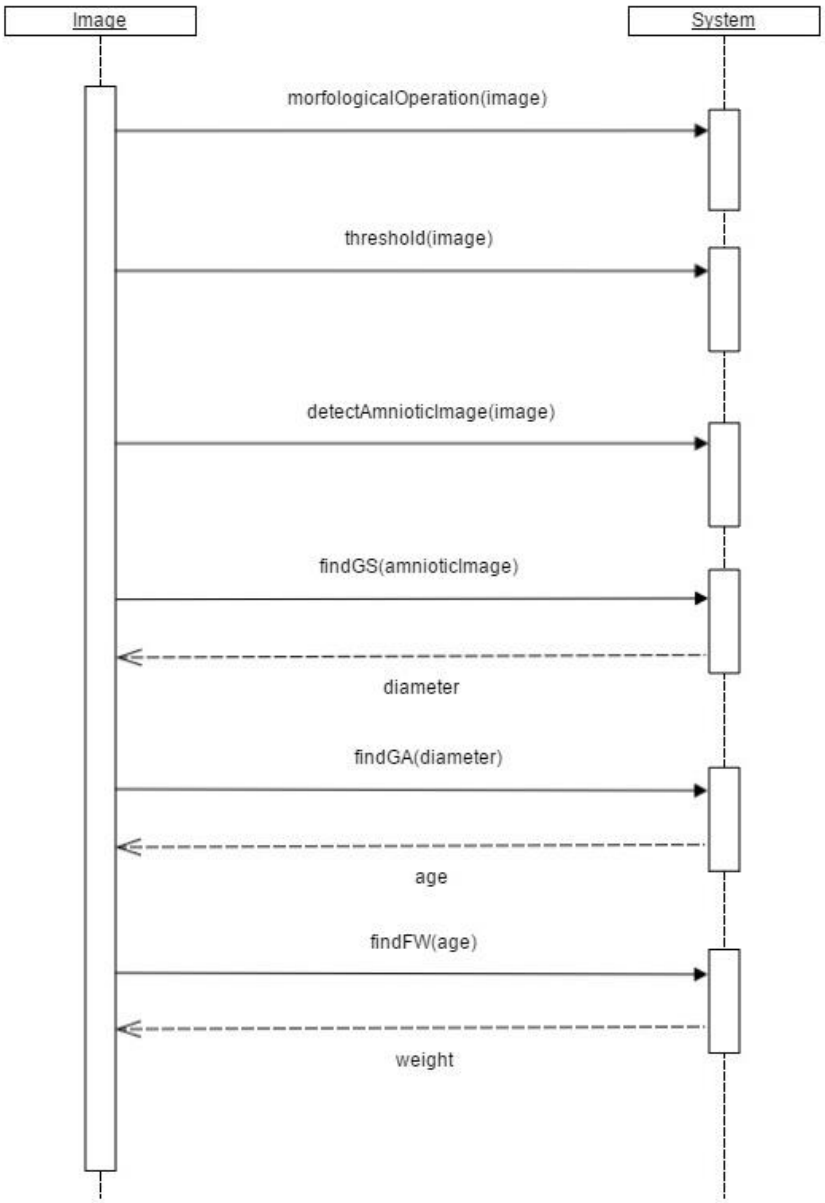


Image
System
morfologicalOperation(image)
threshold(image)
detectAmnioticImage(image)
findGS(amnioticImage)
diameter
findGA(diameter)
age
findFW(age)
weight

5. REFERENCES

Gonzales, Rafael C. Woods, Richard E. 2008. Digital Image Processing 3rd Edition. USA: Pearson.

https://en.wikipedia.org/wiki/Crown-rump_length

https://en.wikipedia.org/wiki/Gestational_sac

http://www.glowm.com/section_view/heading/Assessment%20of%20Gestational%20Age%20by%20Ultrasound/item/206