Ground-Truthing Tool for Document Image Analysis Requirements Specification

Version 1.0

September 16, 2015

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1. Executive Summary

1.1 Project Overview

Design and implement a Graphical User Interface that will allow the user to load, display and manipulate document images.

2. Product/Service Description

2.1 Product Context

For Document Image Analysts, it is essential to work with an excellent Graphical User Interface. In this way, they will be able to easily handle a large variety of images and carry out a process of a paramount importance: Ground-Truth creation.

The goal of the project is to elaborate an intuitive Graphical User Interface which will not jeopardize the Ground-Truth creation process.

2.2 User Characteristics

The user of the Graphical User Interface has the following characteristics:

- He is a Computer Scientist or Computer Engineer.
- He has good knowledge of Machine Learning/Pattern Recognition, Computer Vision and Image Processing.
- He needs an easy-to-use Graphical User Interface which will not slow down his work with Document Images processing.

2.3 Constraints

The Graphical User Interface has to:

- Be User-Friendly. It means handy and understandable.
- Respond correctly and in a very short period of time to the user inputs.

3. Requirements

3.1 Functional Requirements

- Priority 1 – The requirement is a "must have".
- Priority 2 – The requirement is needed for improved processing, and the fulfillment of the requirement will create immediate benefits
- Priority 3 – The requirement is a "nice to have" which may include new functionality

Req#	Requirement	Comments	Priority	Date Rvwd	Developer
FR_01	The GUI should allow the user to load a Document Image.	No	1	9/15/2015	David Carmona
FR_02	The GUI should allow the user to navigate through the Document Image using a vertical and a horizontal scrollbar.	No	1	9/15/2015	David Carmona
FR_03	The GUI should allow the user to navigate through the image using his mouse pointer.	No	1	9/15/2015	David Carmona
FR_04	The GUI should allow the user to draw a rectangle on the Document Image and give it a unique identification number.	No	1	9/15/2015	David Carmona
FR_05	The GUI should allow the user to write a personal annotation and link it to a rectangle.	No	1	9/15/2015	David Carmona
FR_06	The GUI should allow the user to load and read the associated annotation of a rectangle.	No	1	9/15/2015	David Carmona
FR_07	The GUI should clearly indicate the rectangles which are linked to a user annotation.	No	2	9/15/2015	David Carmona
FR_08	The GUI should clearly indicate the rectangles which are not linked to a user annotation.	No	2	9/15/2015	David Carmona

Req#	Requirement	Comments	Priority	Date Rvwd	Developer
FR_09	The GUI should save (in a text or xml file) the identification number, the coordinates (x-axis and y-axis) of the top-left vertex, the associated annotation and the length of the vertical and horizontal edges of each rectangle in the picture. The text/xml file and the Document Image have the same name.	No	1	9/15/2015	David Carmona
FR_10	If the user has modified the Document Image then the GUI should allow him to save it with all the modifications.	No	1	9/15/2015	David Carmona
FR_11	The GUI should display the Document Image when the user chooses the associated txt/xml file from the GUI File Open Dialog	No	2	9/15/2015	David Carmona
FR_12	The GUI should display the Document Image when the user directly clicks on the txt/xml file from its repertory.	No	2	9/15/2015	David Carmona
FR_13	The user should be able to zoom in and out of the document image.	No	1	9/15/2015	David Carmona

4. User Scenarios/Use Cases

Precondition: The user has started the Graphical User Interface.
Use Case: Load a document image directly from its repository.
System: Graphical User Interface
Level: Subfunction
Intention Context: The user wants to directly load the document image from its repository.
Primary Actor: User
Main Success Scenario:

1. User clicks on the option "Open" of the system menu bar.
2. System displays a File Open Dialog.
3. User goes to the appropriate repository and chooses the document image he desires to load.
4. System displays the document image.
5. System creates a text/xml file associated to the document image. The text/xml file and the document image have the same name.

Extensions:

4.a.a) The document image is corrupted and cannot be loaded.

4.a.a.1) System displays an error message. The use case resumes at step 2.

4.a.b) The document image format is not supported by the System.

4.a.b.1) Systems displays an error message. The user case resumes at step 2.

5.a) System is not able to create the text/xml file associated to the document image.

5.a.1) System shows an error window. End of the use case.

Use Case: Load a document image using the associated text/xml file
System: Operating System
Level: Subfunction
Intention Context: The user wants to load the document image by double-clicking on the associated text/xml file.
Primary Actor: User
Main Success Scenario:

1. User double-clicks on the text/xml file icon.
2. System loads the Graphical User Interface.
3. The Graphical User Interface displays the document image.

Extensions:

4.a.a) The document image is corrupted and cannot be loaded.

4.a.a.1) System displays an error message. The use case resumes at step 2.

4.a.b) The document image format is not supported by the System.

4.a.b.1) Systems displays an error message. The user case resumes at step 2.

5.a) System is not able to create the text/xml file associated to the document image.

5.a.1) System shows an error window. End of the use case.

Preconditions:
- The user has started the Graphical User Interface.
- The user made previously some modifications on the document image he now wants to load.

Use Case: Load a document image using the text/xml file.
System: Graphical User Interface
Level: Subfunction
Intention Context: The user wants to load the document image using the text/xml file.
Primary Actor: User
Main Success Scenario:

1. User clicks on the option "Open" of the system menu bar.
2. System displays a File Open Dialog.
3. User goes to the appropriate repository and chooses the text/xml file he desires to load.
4. System displays the document image.

Extensions:

4.a.a) The text/xml file is corrupted and cannot be loaded.

　　4.a.a.1) System displays an error window. The use case resumes at step 2.

4.a.b) The text/xml file is not linked to any document image.

　　4.a.b.1) System displays an error window. The use case resumes at step 2.

4.a.c) The user does not select a text/xml file but another.

　　4.a.c.1) System displays an error window. The use case resumes at step 2.

Preconditions:
- The user has started the Graphical User Interface.
- The user made previously some modifications on the document image he now wants to load.

Use Case: Load a document image using the text/xml file.
System: Graphical User Interface
Level: Subfunction
Intention Context: The user wants to load the document image using the text/xml file.
Primary Actor: User
Main Success Scenario:

1. User clicks on the option "Open" of the system menu bar.
2. System displays a File Open Dialog.
3. User goes to the appropriate repository and chooses the text/xml file he desires to load.
4. System displays the document image.

Extensions:

4.a.a) The text/xml file is corrupted and cannot be loaded.

　　4.a.a.1) System displays an error window. The use case resumes at step 2.

4.a.b) The text/xml file is not linked to any document image.

　　4.a.b.1) System displays an error window. The use case resumes at step 2.

4.a.c) The user does not select a text/xml file but another.

　　4.a.c.1) System displays an error window. The use case resumes at step 2.

Preconditions:
- The user has started the Graphical User Interface.
- The Graphical User Interface has loaded the document image.

Use Case: Navigate through the document image.
System: Graphical User Interface
Level: User-Goal
Intention Context: The user wants to navigate through the document image using the scrollbar or the mouse pointer.
Primary Actor: User
Main Success Scenario:

1. User clicks on the option "Navigate" of the task bar.
2. System allows the user to navigate through the document image using the mouse pointer.
3. User uses the scrollbars in order to navigate through the document image.
4. System allows the user to navigate through the document image using the scrollbars.

Preconditions:
- The user has started the Graphical User Interface.
- The Graphical User Interface has loaded the document image.

Use Case: Zoom in and out of the document image.
System: Graphical User Interface
Level: User-Goal
Intention Context: The user wants to zoom in and out of the document image.
Primary Actor: User
Main Success Scenario:

1. User uses the mouse wheel in order to zoom in or out of the document image.
2. System zoom in or out of the document image.
3. User uses one of the two buttons following buttons of the task bar in order to zoom in or out of the document image: "Zoom In", "Zoom Out".
4. System zoom in or out of the document image.

Preconditions:
- The user has started the Graphical User Interface.
- The Graphical User Interface has loaded the image selected by the user and created the text/xml file associated to it.

Use Case: Draw a rectangle
System: Graphical User Interface
Level: User-Goal
Intention Context: The user wants to draw a rectangle on the document image.
Primary Actor: User
Main Success Scenario:

1. User clicks on the option "Draw a rectangle" of the Tool bar.
2. User draws the rectangle on the document image.
3. System gives a unique identification number to the rectangle.
4. System saves in the text/xml file the identification number, the top-left vertex coordinates (x-axis,y-axis) and the length of the vertical and horizontal edges of the rectangle.

Extensions:

4.a) System fails to save the above information in the text/xml file.

   4.a.a.1) System displays an error message. End of the use case.

Preconditions:
- The user has started the Graphical User Interface.
- The Graphical User Interface has loaded the image selected by the user and created the text/xml file associated to it.
- The user has done some modifications to the document image.

Use Case: Save the document image
System: Graphical User Interface
Level: User-Goal
Intention Context: The user wants to save the document image.
Primary Actor: User
Main Success Scenario:

1. User clicks on the "Save" option of the menu bar.
2. System displays a File Save dialog box.
3. User saves the document image with the appropriate name.
4. System saves the document image and the associated text/xml file.

Extensions:

4.a) System fails to save the document image and/or the text/xml file

4.a.a.1) System displays an error message. End of the use case.

Preconditions:
- The user has started the Graphical User Interface.
- The Graphical User Interface has loaded the document image selected by the user.
- The user has already drawn a rectangle on the document image.

Use Case: Make an annotation
System: Graphical User Interface
Level: User-Goal
Intention Context: The user wants to make an annotation and link it to a rectangle.
Primary Actor: User
Main Success Scenario:

1. User double-clicks on the rectangle he wants.
2. System displays a window showing the rectangle identification number and a text input field.
3. User writes the annotation in the text input field and presses the "Save" button.
4. System saves the annotation in the text/xml file associated to the document image.

Extensions:

2.a) User wants to exit from the window showing the rectangle identification number and the text input field

2.a.1) User presses the button "Cancel". End of the use case.

4.a) System fails to save the annotation in the text/xml file associated to the image.

4.a.1) System displays an error message. End of the use case.

Preconditions:

- The user has started the Graphical User Interface.
- The Graphical User Interface has loaded the document image selected by the user.
- The user has already drawn a rectangle on the document image.
- The user has already made an annotation associated to a rectangle.

Use Case: Modify an annotation
System: Graphical User Interface
Level: User-Goal
Intention Context: The user wants to modify an annotation associated to a rectangle.
Primary Actor: User
Main Success Scenario:

1. User double-clicks on the rectangle he wants.
2. System displays a window showing the rectangle identification number and a text input field where the previous annotation is.
3. User modifies the annotation and press the "Save" button.
4. System saves the modified annotation in the text/xml file associated to the document image.

Extensions:

2.a) User wants to exit from the window showing the rectangle identification number and the

text input field

2.a.1) User presses the button "Cancel". End of the use case.

4.a) System fails to save the annotation in the text/xml file associated to the image.

4.a.1) System displays an error message. End of the use case.

Preconditions:
- The user has started the Graphical User Interface.
- The Graphical User Interface has loaded the document image selected by the user.

Use Case: Modify an annotation
System: Graphical User Interface
Level: User-Goal
Intention Context: The user wants to modify an annotation associated to a rectangle.
Primary Actor: User
Main Success Scenario:

1. User double-clicks on the rectangle he wants.
2. System displays a window showing the rectangle identification number and a text input field where the previous annotation is.
3. User modifies the annotation and press the "Save" button.
4. System saves the modified annotation in the text/xml file associated to the document image.

Extensions:

2.a) User wants to exit from the window showing the rectangle identification number and the

text input field.

2.a.1) User presses the button "Cancel". End of the use case.

4.a) System fails to save the annotation in the text/xml file associated to the image.

4.a.1) System displays an error message. End of the use case.

5. Planning

Project plan

Planned   Real   % done

Activities	START DATE	TERM PLAN	ACTUAL START	ACTUAL DURATION	PERCENTAGE DONE
Load and display a document image + create text/xml associated file	1	1	1	1	0%
Draw a rectangle + Unique ID	2	2	2	2	0%
User writes the annotation	4	1	4	1	0%
Write image information in the text/xml file	5	2	5	2	0%
Load + read user annotation when user double-clicks on the rectangle	7	2	7	2	0%
Indicate annotated rectangles	9	1	9	1	0%
Load a document image by double-clicking directly on the text/xml file	10	2	10	2	0%
Load a document image with the GUI using the text/xml file	12	1	12	1	0%
Save image modifications	13	1	13	1	0%
Zoom in and out of the image	14	1	14	1	0%
Navigate using the mouse pointer	14	1	14	1	0%
Navigate using the scrollbar	14	1	14	1	0%