Testing Reports

Revision History:

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| Date | Author | Description |
| 2020/10/15 | Chenkai MA | Created and wrote the document |
| 2020/10/23 | Huixiang LIU | Added testing cases and some testing results |
| 2020/11/10 | Huixiang LIU | Added testing cases and some testing results for Lenke classification |
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## Introduction

## Intended Audience and Purpose

This document provides the testing method and results, corresponding to the requirement from the customer. It consists of 3 parts, the testing cases, the test plan, and the testing results.

## 1.2    How to use the document

You may refer to the content section for the structure of the document, in which Sec. Testing Cases collect the unit and module test information from each team; Sec. Testing Plan shows the steps and expected results of the integration test; Sec. Results describes the real world data out of the test, and the correspondence to the requirements.

## Testing Cases

In this section, my team propose our testing cases on unit and module testing.

## Algorithm for Edge Detection

We will process the pictures which were given to us and try to detect their edges.

|  |  |  |  |
| --- | --- | --- | --- |
| **Test Case No.** | **Description** | **Input** | **Desired output** |
| 0001 | Input a photo that doesn't meet the format and size requirements | A low quality photo | The algorithm returns an error message that the input doesn't meet the requirements. |
| 0002 | Input a correct X-ray photo | A correct X-ray photo | The algorithm returns a photo which has a curve fitting the bones on it. |
| 0003 | Test the accuracy of Edge Detection | A correct X-ray photo | The curve returned by the algorithm which fitting the bones should be very close to the curve formed by the bones. |

## Algorithm for the Degree of the Cobb

We will process the pictures which were given to us and try to calculate their degrees of the Cobb.

|  |  |  |  |
| --- | --- | --- | --- |
| **Test Case No.** | **Description** | **Input** | **Desired output** |
| 0004 | Input a photo that doesn't meet the format and size requirements | A low quality photo | The algorithm returns an error message that the input doesn't meet the requirements. |
| 0005 | Input a correct X-ray photo | A correct X-ray photo | The algorithm returns a photo which has a Cobb angel drawn on it and outputs its degree. |
| 0006 | Test the accuracy of calculating the degree of the Cobb | A correct X-ray photo | The degree of the Cobb returned by the algorithm should be very close to the degree calculated by the doctor. |

## Algorithm for Lenke Classification

We will process the pictures which were given to us and try to classify them into subtypes of Lenke classification based on the factors influencing the shoulder balance including the upper thoracic curve, the balance between the curves and the Cobb angle of the main curve.

|  |  |  |  |
| --- | --- | --- | --- |
| **Test Case No.** | **Description** | **Input** | **Desired output** |
| 0007 | Input a photo that doesn't meet the format and size requirements | A low quality photo | The algorithm returns an error message that the input doesn't meet the requirements. |
| 0008 | Input a correct X-ray photo | A correct X-ray photo | The algorithm returns a photo which has a Cobb angel drawn on it and outputs its degree and its Lenke classification. |
| 0009 | Test the accuracy of calculating the Lenke classification | A correct X-ray photo | The subtype of the Lenke classification returned by the algorithm should be very close to the subtype determined by the doctor. |
| 0010 | Test the running speed of the algorithm | 50 correct X-ray photos | Running time of the algorithm. |

## Testing Plan

Here comes the complete testing plan for integration, referring to the workflows in the system design document.

## Upload Pictures

The pictures which will be processed will be uploaded by the Server Team.

## Process Pictures

The pictures will be processed, and the Cobb Degree will be obtained.

## Give Advice

The advice will be given according to the Cobb Degree.

## Testing Results

The results of the integration are listed here and you may find the correspondence to the requirements in the requirement analysist document.

|  |  |  |  |
| --- | --- | --- | --- |
| **Test Case No.** | **Module** | **Result** | **Corresponding Requirement** |
| 0001 | Algorithm for Edge Detection | Pass | The algorithm returns an error message that the input doesn't meet the requirements. |
| 0002 | Algorithm for Edge Detection | Pass | The curve returned by the algorithm which fitting the bones should be very close to the curve formed by the bones. |
| 0003 | Algorithm for Edge Detection | The bone recognition effect of the upper thoracic vertebrae segment is not ideal, and the bone recognition effect of other segments is significant. | The curve returned by the algorithm which fitting the bones should be very close to the curve formed by the bones. |
| 0004 | Algorithm for the Degree of the Cobb | Pass | The algorithm returns an error message that the input doesn't meet the requirements. |
| 0005 | Algorithm for the Degree of the Cobb | Pass | The algorithm returns a photo which has a Cobb angel drawn on it and outputs its degree. |
| 0006 | Algorithm for the Degree of the Cobb | The test found that all errors will not exceed 10 degrees, and that more than 85% of the errors will not exceed 5 degrees. | The degree of the Cobb returned by the algorithm should be very close to the degree calculated by the doctor. |
| 0007 | Algorithm for Lenke Classification | Pass | The algorithm returns an error message that the input doesn't meet the requirements. |
| 0008 | Algorithm for Lenke Classification | Pass | The algorithm returns a photo which has a Cobb angel drawn on it and outputs its degree and its Lenke classification. |
| 0009 | Algorithm for Lenke Classification | If the error of the Cobb angle is within 5 degrees, the lenke classification is basically correct, and the accuracy of the lenke classification needs to be improved by improving the measurement accuracy of the Cobb angle. | The subtype of the Lenke classification returned by the algorithm should be very close to the subtype determined by the doctor. |
| 0010 | Algorithm for Lenke Classification | An average of 6 seconds per picture | Running time of the algorithm. |