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Real-Time Bridge Monitoring
Test Specification

Version 1.0

Revision History

Date	Version	Description	Author
11/22/13	1	Initial Version	Dev. Team

Table of Contents

1. SCOPE

1.1 System Overview

The bridge, we are monitoring, named "Borgforte" is situated on the Po river. On the bridge some of the piles are enforced but there is one pile which is week and needs to be monitored. On this pile there is a number of sensors measuring physical forces that different sources make on bridge. Moreover, two cameras are providing pictures from both sides of the bridge. All data from sensors and pictures from cameras are stored in files and send to the server in packages each hour.

Our goal is to make a system for storing, calculating and presenting all relevant data of the bridge. We have to extract data from .txt files and store them to database. After that, calculations have to be done according to parameters. The calculated level of danger of the bridge is also stored in a database. Finally, both current and history data along with pictures can be presented to the user.

1.2 Overview

The test specifications document contains : scope, referenced documents, test specifications and procedures. This document provides a detailed description of each test specification and the requirement it tests. The test procedures explains the actions step-by-step, shows the expected result, and any special condition that is necessary for testing. Each requirement from the Requirements Definition version 1.1 includes a unique identification (ID) and specified functionality. The test cases will be used by the team to check if the system meets the requirements.

2. REFERENCED DOCUMENTS

The following documents are either referenced or used in preparation of this document:

2.1 Project Specific Document References

Requirements Definition version 1.0 for the project **Real-Time Bridge Monitoring**
November 6, 2013

Design Description version 1.3 for the project **Real-Time Bridge Monitoring**
November 19, 2013

3. TEST SPECIFICATIONS AND PROCEDURES

3.1 Features to be Tested

a) Parsing

3.2 Features to not be Tested

a) Admin Functions
b) Engineer Functions
c) Human Controller Functions
d) External User Functions
e) Non-Fuctional Requirements

3.3 Features Pass/Fail Criteria

Any discrepancies identified are classified as one of three types defined in Table 3-1:

Table 3-1 Severity Rankings for Discrepancies

Severity	Description
Critical	
Major	
Minor	

3.4 Input Specifications

See the Operator Action column for the detailed input specifications in Section 3.6

3.5 Output Specifications

See the Expected Results column for the expected outputs of each operator action in Section 3.6

3.6 Test Specifications and Procedures

Parser

Test Name: Test Case 1: Parse of the received package from the sensors.
Description: The parser shall convert all the received data in the database, in the table of Raw_Data (1sec). Each value has to fill one row of the table.
Prerequisites: N/A

Step	Operator Action	Expected Results	Observed Results	Pass/Fail
1	Parser converts the received data into the database.	The table Raw_Data (1sec) shall be filled with converted data.		

Test Name: Test Case 2: Parse name of the analog and sonar files.
Description: The parser shall convert the names of files for analog and sonar sensor like this:sonar****** and analog******, where '******' represents the number of seconds that have elapsed since 1st January 1904.
Prerequisites: N/A

Step	Operator Action	Expected Results	Observed Results	Pass/Fail
1	Parser converts the names of files of analog and sonar sensors.	The names of files shall be sonar****** or analog******.		

Test Name: Test Case 3: Parse name of the picture files.
Description: The parser shall convert the names of pictures files like this: Modean[Mantova]******* where '******" represents the exact time and date when the pictures were taken.
Prerequisites: N/A

Step	Operator Action	Expected Results	Observed Results	Pass/Fail
1	Parser converts the names of pictures files taken form the cameras.	The names of files shall be Modean[Mantova]******.		

Test Name: Test Case 4: Parse unit measurement of wind speed.
Description: The parser shall convert the unit measurement of wind speed from 'mA' to 'm/s' according to the formula: V[m / s] = (((V [mA] ∗ 1000) − 4) ∗ 3,75), where V is the speed.
Prerequisites: N/A

Step	Operator Action	Expected Results	Observed Results	Pass/Fail
1	Parser converts the unit measurement of the wind speed.	The unit measurement of the wind speed shall be 'm/s'.		

Test Name: Test Case 5: Parse unit measurement of hydrometer sensor
Description: The parser shall convert the unit measurement of hydrometer sensor which measures the distance between the hydrometer and the water and the height of the water. The unit measurement shall be converted from 'mA' to 'm'. The conversion shall be done according to the formulas: h [m] = 20 + (((h[mA] ∗ 1000) − 4) ∗ (−1,25)) for the distance and hwater[m] = 29,86 − h [m] for the height of water.
Prerequisites: N/A

Step	Operator Action	Expected Results	Observed Results	Pass/Fail
1	Parser converts the unit measurement of the hydrometer data.	The unit measurement of the hydrometer data shall be 'm'.		

Test Name: Test Case 6: Parse unit measurement of wind direction
Description: The parser shall convert the unit measurement of wind direction from 'mA' to '°'(degree) according to the formula:dir [°] = (((dir [mA] ∗ 1000) − 4) ∗ 22,5).
Prerequisites: N/A

Step	Operator Action	Expected Results	Observed Results	Pass/Fail
1	Parser converts the unit measurement of the wind direction.	The unit measurement of the wind speed shall be '°' (degree).		

Test Name: Test Case 7: Parse the timestamp of analog files.
Description: The parser shall parse the column of the timestamps in the way that each row of the column shall have the timestamp of the detection of the sample. The decimals for the timestamp are allowed to be dropped.
Prerequisites: N/A

Step	Operator Action	Expected Results	Observed Results	Pass/Fail
1	Parser parses the timestamps of analog files.	Each row of the 'timestamp' column shall have a value that represents the time of detection of the sample.		

Test Name: Test Case 8: Parse the distance: sonar sensor-bottom of the river
Description: The parser shall parse the distance between the sonar sensor and the bottom of the river according to the formula: hBottom[m] = 12,3 − xx.xx [m].
Prerequisites: N/A

Step	Operator Action	Expected Results	Observed Results	Pass/Fail
1	Parser parses the distance between the sonar sensor and the bottom of the river.	The data shall be visible in the first column of the sonar*****.txt file.		

Test Name: Test Case 9: Parse the timestamp of sonar files

Description: The parser shall parse the column of the timestamps in the way that each row of the column shall have the timestamp of the detection of the sample. The decimals for the timestamp are allowed to be dropped.
Prerequisites: N/A

Step	Operator Action	Expected Results	Observed Results	Pass/Fail
1	Parser parses the timestamps of analog files.	Each row of the 'timestamp' column shall have a value that represents the time of detection of the sample.		

3.7 Test allocation of Requirements

Requirement Number	Requirement Description	Test Case Where Verified
RE-V1.1	Each received package must be parsed into the database in the following way. Every hour the system receives a packet in which there are an analog file, a sonar file both with 3600 values and two images, one for camera. All these values are to be converted from the parser into the db, in the table of Raw_data(1sec). Each values has to fill one row of the table.	1
RE-V1.1	For the analog and sonar sensors, the name of the files should be parsed in the following way. In the file names, analog*********.txt and sonar**********.txt, the ID (**...) represents the number of seconds that have elapsed since 1st January 1904 (using Labview encode), on the Greenwich meridian.	2
RE-V1.1	For the picture files, the ID of the name Modean[Mantova]********.jpg should represent the exact time and date when the picture was taken.	3
RE-V1.1	The first column of the analog*********.txt file should be parsed in the following way. Each row in the column represents the wind speed (measured in mA). It should be converted to [m / s] by using the following formula: V [m / s] = (((V [mA] ∗ 1000) − 4) ∗ 3,75).	4

RE-V1.1	The second column of the analog*********.txt file should be parsed in the following way. Each row in the column represents the distance between the hydrometer and the level of water (measured in mA). The actual distance [m] should be parsed by using the following formula: h [m] = 20 + (((h [mA] ∗ 1000) − 4) ∗ (−1,25)). The water height should be parsed by using the following formula: hwater[m] = 29,86 − h [m].	5
RE-V1.1	The third column of the analog*********.txt file should be parsed in the following way. Each row in the column represents the wind direction (measured in mA). It should be converted to [°] by using the following formula: dir [°] = (((dir [mA] ∗ 1000) − 4) ∗ 22,5).	6
RE-V1.1	The fourth column of the analog*********.txt file should be parsed in the following way. Each row in the timestamp of the detection of the sample(Labview encode). The decimals for the timestamp are allowed to be dropped.	7
RE-V1.1	The first column from the sonar**********.txt file should be parsed in the following way. The first column is the distance between sonar and the bottom of the river (measured in meters). The height of the bottom [m] should be parsed by using the following formula: hBottom[m] = 12,3 − xx.xx [m].	8
RE-V1.1	The second column from the sonar**********.txt file is the timestamp of the detection of the sample and should be parsed by using the Labview encode: the number represents the number of seconds that have elapsed since 1st January 1904, on the Greenwich meridian.	9