Reflection Report on Bridge Corrosion

Cynthia Liu

1 Changes in Response to Feedback

Feedbacks from Dr. Smith and peer reviewers are reflected in the documents.

1.1 SRS and Hazard Analysis

There are not siginificant changes to the SRS, however, many details are added or justified.

1.1.1 System Context

In the initial SRS, only user input was considered in the system context section. However, it has now been updated to include developer input as well. This change was made because to generate the database, the software require developer input for proper functionality.

1.1.2 Terminology and Definitions

I added and further explained the terminologies I used in the document, thanks to the peer reviewers who gave me advice on what was not clear.

1.1.3 Goal statements

As the feedback from SRS presentation and from Dr. Smith, I refine the goals to one goal, which is predicting the chloride exposure for bridges in Ontario in the past and future and allow user to input coordinate and return the prediction for that location.

1.1.4 Functional Requirements

From the feedback of Dr. Smith, I condensed the five requirements to three, removing the ones that should belong to VnV plan and reflected it in later documents.

1.1.5 Other Typos

I also fixed the many typos in SRS, a version of the origin SRS is here for comparison with the current version.

1.2 Design and Design Documentation

After getting feedback from peer review and Dr. Smith, I implemented significant changes to the design documentation, primarily focusing on enhancing its level of detail. In the previous version of my design document, I omitted the detail formulas for the calculation because I thought they could be found in SRS, but that is not enough for someone who is only reading the design document. So I include those and make it more detail by separating the calculation process by steps. Also, I rename some modules to make the name end with T to indicate it is an abstract data type.

1.2.1 Unlikely Changes

There was some ambiguity for UC3, which is about visualization. I rephrase the sentence so that it simply mean “there would be visualization” rather than talking about the type of visualization.

1.2.2 Modules

In the first version of my software, I put the calculation process within one module, but then I realize that is not detailed enough and it will be hard for information hiding, as each step of the calculation has its own secret, which is the different formula. So I separate the calculation by steps, with one step aiming to solve a single equation. This is also good for maintainability, if the formula for one step changes, only the corresponding module need to be changed. The Use Hierarchy changes correspondingly as well, the comparsion could be found in Section 4.

1.3 VnV Plan and Report

The VnV Plan changed a lot as well because there was a coding language change between my initial drafting and the completion of MG and MIS.

1.3.1 Automated Testing and Verification Tools

This is the section that includes the coding language. In the beginning, I planned to use Matlab to generate the database and Python to make the software that users are interacting with, but after getting feedback from Dr. Smith I changed it to do everything in Python. So this section changes correspondingly.

1.3.2 System Test Description

One thing I did for consistency is that I updated modified the values in table to be the ones I actually used in test cases. I also moved the origin “Intermediate Tests - test model calculation” to the unit test section as suggested.

1.3.3 Unit Test Description

I finished this section after MG and MIS, all the test cases could be found in the test folder, and in this section I also provide reference link to the files. The detail explanation for each test case is included in the code comments, with this section acts as an overview of the decisions.

2 Design Iteration (LO11)

There are many iterations during the whole design process. At first I planned to use Matlab and R because Dr. Yang and Mingsai had been using it, and I thought it might be good for maintainability to use some language and tools that they are familiar with. When preparing for the prove of concept presentation I started the implementatin, and found Python being a better choice to identify the Ontario boundary, as outlined in Requirement R1 of the SRS.

I spent some time working with Matlab and get the accurate result, which helped building up my confidence, then I started to think about the feedback from Dr. Smith, to do the whole project in Python. This shift was facilitated by the availability of built-in libraries and dependencies, making the transition relatively straightforward. The final version of the project reflects this decision.

Others than that, I also did many minor changes in each iteration, such as renaming the file for understandability, restructure the code, adding comments, etc.

3 Design Decisions (LO12)

The chloride exposure database in this project relies on climate and traffic models sourced from online public resources. It's assumed that these data are reliable and well-maintained by their developers. However, it's important to note a limitation: locations within the same 25 $\times$ 25 grid are considered to have the same chloride exposure rate. While this may not be the most accurate scenario, it represents the best approach available within the project's scope.

4 Appendix

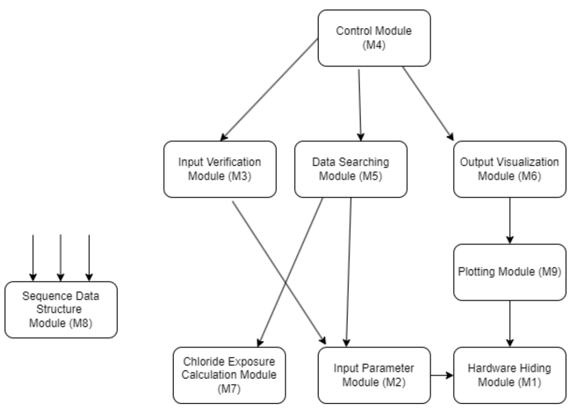

Figure 1: UsesHierarchy before

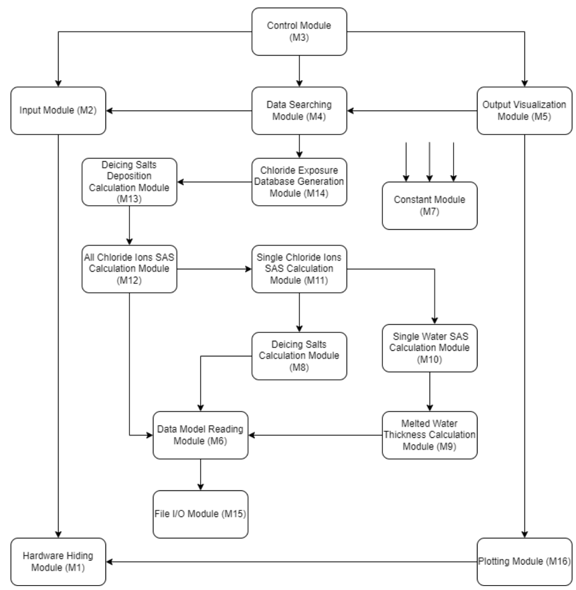

Figure 2: UsesHierarchy after