Software Requirements Specification for Software Engineering: subtitle describing software

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Contents

Revision History

Date	Version	Notes
Date 1	1.0	Notes
Date 2	1.1	Notes

1 Purpose of the Project

1.1 User Business

The business of the user is to use the system to aid in the creation and analysis of experiments relating to a large but fragmented data set of rat trials that investigate compulsive behaviour of rats and how they relate to various factors such as drug injections or brain legions. This data set is comprised of videos of rats moving on a flat surface, files of their (x,y) coordinates and plots that show the trajectories of these coordinates. Users may want to extract a concise set of pre-existing data that can be applicable to their hypothesis to streamline their workflow and avoid the necessity of carrying out trials. Users may also want to use the system to provide analysis on the data set as a means of further supplementing ther academic work. This can include drawing behavioural metrics of the rats based on various parameters (i.e. rate of compulsion based on injection type) or data visualizations based similarily on compulsive behaviours as they relate to attributes of the rats.

Insert your content here.

1.2 Goals of the Project

The high-level goal of the project is to provide users in the field of behavioural sciences, a unified and non-technical way of drawing from the vast amount of available data on OCD rat trials to aid in their academic work and experiments. This will be accomplished via the following sub-goals:

- Create a DBMS that provides query access to the entirety of the data set of rat trials as well as all metadata associated with the data.
- Provide a UI that makes querying this data approachable to non-technical users by incorporating familiar and intuitive filtering and searching techniques (Attribute filters, Natural Language search bar). Further the UI must provide users with pre-generated query options that are likely to be useful for users that may not know where to start. This could include selecting all rat trials of a particular drug injection along with all saline control data.
- Provide an algorithm that can identify compulsive behaviour by looking at each rat trial and provide options for behavioural metrics and data

visualizations based on various attributes that the user can extract for their purposes.

Insert your content here.

2 Stakeholders

2.1 Client

The clients for this project are Dr. Henry Szechtman and Dr. Anna Dvorkin-Gheva, two professors at McMaster University who are experts in the fields of Psychiatry and Behavioural Neurosciences and Bioinformatics, respectively. They have worked extensively with these OCD rat trials and were responsible for generating and depositing this data in the FRDR repository where it currently is stored. Dr. Szechtman and Dr. Dvorkin-Gheva want to drastically improve the availability of the vast data set they have created so that the trials they conducted can become useful to other students and academics in related fields. *Insert your content here.*

2.2 Customer

Since our application is intended to be open-source and accessible to the public for free, our customers will simply be a group of end-users of our application. Our end users will primarily involve behavioural neuroscience researchers like Dr. Henry Szechtman and Dr. Anna Dvorkin-Gheva, as well as graduate students and lab members, who will all benefit from the user-friendly and accessible functionality of the platform. Additionally we will have data scientists as customers, who will benefit from our application architecture anf offered functionality for their purposes. Lastly, collaborating institutions and organizations from the open research community will be users of our application, since the application is intended to be free-use and accessible to all. *Insert your content here.*

2.3 Other Stakeholders

Insert your content here.

2.4 Hands-On Users of the Project

Insert your content here.

2.5 Personas

Insert your content here.

2.6 Priorities Assigned to Users

Insert your content here.

2.7 User Participation

Insert your content here.

2.8 Maintenance Users and Service Technicians

Insert your content here.

3 Mandated Constraints

3.1 Solution Constraints

Insert your content here.

3.2 Implementation Environment of the Current System

Insert your content here.

3.3 Partner or Collaborative Applications

Insert your content here.

Collaborative System	System Overview
FRDR Repository	The Federated Research Data Repository is a 'bilingual bilingual publishing platform for sharing and preserving Canadian research data. It is a curated, general-purpose repository, custom built for large datasets.' This is where the data set of the rat trials is physically located and is dispersed across 29 independent datasets. Our system will provide a unified database schema but will pull data from this repository.
ratbat.mcmaster.ca	While not a directly collaborative system, this is a system made by a previous years' capstone team to address the same problem that our system seeks to. It will be a collaborative system in the sense that ir provides a reference of potential ways to approach our solution, ideas that work well and can be carried forward and providing visibility to shortcomings of the system will help us to avoid repeating mistakes.

3.4 Off-the-Shelf Software

Insert your content here.

3.5 Anticipated Workplace Environment

Insert your content here.

3.6 Schedule Constraints

Due to the nature of the capstone course, the scheduling constraints map directly to dates in which major deliverable related to the project are due in the capstone course. They are laid out below:

Project Milestone	Scheduling Constraint
Software Requirements Specification	Oct 6 2025
Verification and Validation Plan	Oct 27 2025
Design Document Revision -1	Nov 10 2025
Proof of Concept Demonstration	Nov 17-28 2025
Design Documentation Revision 0	Jan 19 2025
Revision 0 Design Demonstration	Feb 2-13 2025
Verification and Validation Report	Mar 9 2025
Extras (Performance Report + User Manual)	Mar 9 2025
Final System Demonstration	Mar 23-29 2025
Final Documentation	April 6 2025

3.7 Budget Constraints

There is very limited budget available for this project. The department of Computing and Software at McMaster University will provide $125 CAD for approved expenses. Outside of that funding, we are asked not to exceed spending of $500 CAD culmulatively as a team. Thus, the total budget constraints for this project are $500 CAD in total and $375 of our team's personal funding.

3.8 Enterprise Constraints

Insert your content here.

4 Naming Conventions and Terminology

4.1 Glossary of All Terms, Including Acronyms, Used by Stakeholders involved in the Project

Insert your content here.

5 Relevant Facts And Assumptions

5.1 Relevant Facts

Insert your content here.

5.2 Business Rules

Insert your content here.

5.3 Assumptions

Insert your content here.

6 The Scope of the Work

6.1 The Current Situation

Insert your content here.

6.2 The Context of the Work

Insert your content here.

6.3 Work Partitioning

Insert your content here.

6.4 Specifying a Business Use Case (BUC)

Insert your content here.

7 Business Data Model and Data Dictionary

7.1 Business Data Model

Insert your content here.

7.2 Data Dictionary

Insert your content here.

8 The Scope of the Product

8.1 Product Boundary

Insert your content here.

8.2 Product Use Case Table

Insert your content here.

8.3 Individual Product Use Cases (PUC's)

Insert your content here.

9 Functional Requirements

9.1 Functional Requirements

Insert your content here.

10 Look and Feel Requirements

10.1 Appearance Requirements

Insert your content here.

10.2 Style Requirements

Insert your content here.

11 Usability and Humanity Requirements

11.1 Ease of Use Requirements

Insert your content here.

11.2 Personalization and Internationalization Requirements

Insert your content here.

11.3 Learning Requirements

Insert your content here.

11.4 Understandability and Politeness Requirements

Insert your content here.

11.5 Accessibility Requirements

Insert your content here.

12 Performance Requirements

12.1 Speed and Latency Requirements

- The system shall return all query results within 2 seconds for result sets of up to 5,000 records.
- All network requests shall have latency below 100 ms under normal operating conditions.

12.2 Safety-Critical Requirements

- There are no safety-critical operations for this system, as it handles only user interface and data processing with no direct impact on human safety.

12.3 Precision or Accuracy Requirements

- All query results shall be accurate and filtered according to user specifications.
- There shall be no inconsistencies between the source database and query results.

12.4 Robustness or Fault-Tolerance Requirements

- The system shall log and report all input errors without crashing.
- The backend shall handle errors gracefully, storing detailed logs for debugging and monitoring purposes.

12.5 Capacity Requirements

- The system shall support up to 250 concurrent users and handle 5,000 transactions per hour.
- The database and associated controllers shall be able to manage up to 11 TB of data.

12.6 Scalability or Extensibility Requirements

- The system shall allow additional modules to be integrated without requiring major changes to existing features.
- Under heavy user loads, the system shall maintain at least 80% of its performance efficiency.

12.7 Longevity Requirements

- The system shall be designed to operate reliably for at least 5 years, with multiple teams and developers able to maintain and extend it.
- The system shall be compatible with any operating system when running offline.

13 Operational and Environmental Requirements

13.1 Expected Physical Environment

- The system shall be able to run on a standard desktop with atleast 12 GB RAM and average processor.
- The software shall function correctly on Windows, macOS, and Linux operating systems.
- The software should be able to run in normal office environment conditions which includes temperatures between 15°C and 30°C.

13.2 Wider Environment Requirements

- The system shall be able to run the top three popular browers.

13.3 Requirements for Interfacing with Adjacent Systems

- Data exchanged with adjacent systems shall use JSON format and be transmitted over HTTPS.

13.4 Productization Requirements

- The system will use Docker and Kubernetes as it's envoirment for assebility to run on all systems.
- The system will provide all code changes and software updates on the GitHub Repository.

13.5 Release Requirements

- The system releases shall follow the versioning defined by MAJOR#.MINOR#.PATCH#.
- The system will provide all code changes and software updates on the GitHub Repository. Code then can be pulled and tagged from the appraite GitHub release.

14 Maintainability and Support Requirements

14.1 Maintenance Requirements

Insert your content here.

14.2 Supportability Requirements

Insert your content here.

14.3 Adaptability Requirements

Insert your content here.

15 Security Requirements

15.1 Access Requirements

Insert your content here.

15.2 Integrity Requirements

Insert your content here.

15.3 Privacy Requirements

Insert your content here.

15.4 Audit Requirements

Insert your content here.

15.5 Immunity Requirements

Insert your content here.

16 Cultural Requirements

16.1 Cultural Requirements

Insert your content here.

17 Compliance Requirements

17.1 Legal Requirements

Insert your content here.

17.2 Standards Compliance Requirements

Insert your content here.

18 Open Issues

Insert your content here.

19 Off-the-Shelf Solutions

19.1 Ready-Made Products

Insert your content here.

19.2 Reusable Components

Insert your content here.

19.3 Products That Can Be Copied

Insert your content here.

20 New Problems

20.1 Effects on the Current Environment

Insert your content here.

20.2 Effects on the Installed Systems

Insert your content here.

20.3 Potential User Problems

Insert your content here.

20.4 Limitations in the Anticipated Implementation Environment That May Inhibit the New Product

Insert your content here.

20.5 Follow-Up Problems

Insert your content here.

21 Tasks

21.1 Project Planning

Insert your content here.

21.2 Planning of the Development Phases

Insert your content here.

22 Migration to the New Product

22.1 Requirements for Migration to the New Product

Insert your content here.

22.2 Data That Has to be Modified or Translated for the New System

Insert your content here.

23 Costs

Insert your content here.

24 User Documentation and Training

24.1 User Documentation Requirements

Insert your content here.

24.2 Training Requirements

Insert your content here.

25 Waiting Room

Insert your content here.

26 Ideas for Solution

Insert your content here.

Appendix — Reflection

The purpose of reflection questions is to give you a chance to assess your own learning and that of your group as a whole, and to find ways to improve in the future. Reflection is an important part of the learning process. Reflection is also an essential component of a successful software development process.

Reflections are most interesting and useful when they're honest, even if the stories they tell are imperfect. You will be marked based on your depth of thought and analysis, and not based on the content of the reflections themselves. Thus, for full marks we encourage you to answer openly and honestly and to avoid simply writing "what you think the evaluator wants to hear."

Please answer the following questions. Some questions can be answered on the team level, but where appropriate, each team member should write their own response:

1. What went well while writing this deliverable?

2. What pain points did you experience during this deliverable, and how did you resolve them?

3. How many of your requirements were inspired by speaking to your client(s) or their proxies (e.g. your peers, stakeholders, potential users)?

4. Which of the courses you have taken, or are currently taking, will help your team to be successful with your capstone project.

5. What knowledge and skills will the team collectively need to acquire to successfully complete this capstone project? Examples of possible knowledge to acquire include domain specific knowledge from the domain of your application, or software engineering knowledge, mechatronics knowledge or computer science knowledge. Skills may be related to technology, or writing, or presentation, or team management, etc. You should look to identify at least one item for each team member.

6. For each of the knowledge areas and skills identified in the previous question, what are at least two approaches to acquiring the knowledge or mastering the skill? Of the identified approaches, which will each team member pursue, and why did they make this choice?