Software Requirements Specification for Software Engineering: subtitle describing software

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Contents

Revision History

Date	Version	Notes

1 Purpose of the Project

1.1 User Business

Individuals with speech impairments face significant barriers when interacting with digital devices. VoiceBridge addresses this gap by providing an accurate, inclusive, and accessible speech-to-control system that enables users to communicate with their devices using their speech, regardless of clarity of articulation. Building on familiar technology, such as personal computers and mobile devices, may be one of the most cost-effective and easily adoptable approaches for improving an individual with disability's autonomy and access to the world around them. The rise of ASR technology and Artificial Intelligence (AI) integrations in the industry provides a novel landscape of opportunities to improve accessibility interfaces. VoiceBridge exploits bleeding-edge technology for a practical and impactful application.

1.2 Goals of the Project

ID	Goal	Description
G1	**Accurate Speech Transcription**	Reliably convert impaired or slurred speech into text.
G2	**Command Mapping**	Translate recognized speech into actionable browser commands.
G3	**User Independence**	Enable users with speech impairments to browse autonomously.
G4	**Lightweight & Accessible Design**	Keep the system simple, fast, and cost-effective.
G5	**Cross-Browser Compatibility**	Support major browsers (e.g., Chrome, Edge, Firefox).
G6	**Robust Error Handling**	Detect and recover gracefully from common failures.
G7	**Data Privacy & Security**	Protect user data and ensure secure local processing.
G8	**Customizable Interface**	Allow users to adjust sensitivity, shortcuts, and feedback modes.
G9	**Scalable Architecture**	Design the system for future integration beyond browsers.

Table 1: Project Goals for VoiceBridge

2 Stakeholders

2.1 Client

The primary client for the VoiceBridge project is the organization or individual funding or commissioning the system. The client is primarily concerned with achieving the following goals: **G1**, **G5**, and **G9**, ensuring accurate speech transcription, cross-browser compatibility, and scalable architecture.

2.2 Customer & Hands-On Users of the Project

The primary customers are also the users of the project, them being individuals with speech impairments, who seek independence and autonomy through technology. Their needs directly relate to: **G1**, **G2**, **G3**, and **G8**.

2.3 Other Stakeholders

Secondary stakeholders include experts in linguistics, speech processing, and healthcare domains:

- Speech researchers and linguistics specialists, including the project supervisor, Dr. Christian Brodbeck, who provide insight toward **G1** and **G6**.
- Healthcare professionals and speech therapists who advise on usability and accessibility, contributing to **G3** and **G8**.
- Accessibility advocates and organizations interested in promoting the application, aligned with **G4** and **G5**.
- Software developers who implement and maintain the system, supporting **G9** and **G6**.

Tertiary stakeholders include caregivers and professionals who interact with end users, supporting **G3** and **G7**.

2.4 Personas

Potential end users of VoiceBridge include:

- **Amira**, a 45-year-old with Parkinson's disease, uses the system to log into Gmail and send emails.
- **David**, a stroke survivor, uses the system to browse the web and make purchases.

2.5 Priorities Assigned to Users

The highest priorities are assigned to end users with speech impairments, as their experience with the system defines its success. Secondary priorities include caregivers and technical experts who support the end users in using and maintaining the system.

2.6 User Participation

Individuals matching the target user profiles will be recruited for prototype testing and personalization development. Their participation directly supports refining goals **G1**, **G2**, **G3**, and **G8**.

2.7 Maintenance Users and Service Technicians

Maintenance Users:

- **Role:** End-users or caregivers performing basic troubleshooting and initiating support requests.
- **Responsibilities:**
  - Reporting errors or unexpected system behavior (**G6**).
  - Installing application updates (**G9**).
  - Managing user-specific configurations (**G8**).

Service Technicians:

- **Role:** Trained technical staff with deeper access to system logs and back-end services.
- **Responsibilities:**
  - Investigating reported issues (**G6**).
  - Ensuring transcription accuracy (**G1**).
  - Deploying updates and patches (**G9**).

- Ensuring compatibility with operating systems and accessibility frameworks (**G5**).
- Performing preventive maintenance, including performance monitoring and optimization (**G1**, **G6**).

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.

3.4 Off-the-Shelf Software

Insert your content here.

3.5 Anticipated Workplace Environment

Insert your content here.

3.6 Schedule Constraints

Insert your content here.

3.7 Budget Constraints

Insert your content here.

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.

4.2 Technical Terminology

ASR - Automatic Speech Recognition
TTS - Text To Speech
STT - Speech To Text

4.3 Medical Terminology

Aphasia - A condition that robs you of the ability to communicate. It can affect your ability to speak, write and understand language, both verbal and written. Aphasia usually occurs suddenly after a stroke or a head injury. But it can also come on gradually, as in the case of a brain tumor or a progressive neurological disease.
ALS - Amyotrophic Lateral Sclerosis
Dysarthria - A motor speech disorder that makes it hard to speak. It is caused by damage to the nervous system, which can affect the muscles used for speaking. People with dysarthria may have slurred or slow speech, and they may have difficulty controlling the pitch, volume, and rhythm of their speech.

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

Insert your content here.

12.2 Safety-Critical Requirements

Insert your content here.

12.3 Precision or Accuracy Requirements

Insert your content here.

12.4 Robustness or Fault-Tolerance Requirements

Insert your content here.

12.5 Capacity Requirements

Insert your content here.

12.6 Scalability or Extensibility Requirements

Insert your content here.

12.7 Longevity Requirements

Insert your content here.

13 Operational and Environmental Requirements

13.1 Expected Physical Environment

Insert your content here.

13.2 Wider Environment Requirements

Insert your content here.

13.3 Requirements for Interfacing with Adjacent Systems

Insert your content here.

13.4 Productization Requirements

Insert your content here.

13.5 Release Requirements

Insert your content here.

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?