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**Real Time Translator**

Software Requirements Specification Document

01.01.2024

**Revision History**

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**Document Approval**

The following Software Requirements Specification has been accepted and approved by the following:

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# Introduction

The Speech Recognition and Translation System is an innovative project that leverages modern technology to bridge language barriers and enhance communication. This system combines the capabilities of automatic speech recognition (ASR), machine translation, and text-to-speech synthesis to enable seamless communication across different languages.

The primary goal of this project is to provide a user-friendly interface for real-time speech recognition and translation. Users can interact with the system by speaking into a microphone, and the system will recognize their speech, translate it into the desired language, and then generate a synthesized voice output in the chosen language. This functionality facilitates effective communication between individuals who may speak different languages, opening up new possibilities for collaboration, information exchange, and cultural understanding.

## 1.1 Purpose

## The Real-Time Translator project is a pioneering initiative designed to address and surmount language barriers, fostering effective communication across diverse contexts. The primary objectives of the project are multifaceted, focusing on pivotal purposes that collectively contribute to a more inclusive and connected global community.

## 1.2 Scope

In this subsection:

1. Language with the Help of Magic (LTHM)
2. the software product(s) will be the Real Time Language Translator
3. The application of the software being specified the: -

* Include input field for user to enter text, voice.
* Display translated text in real time.
* Allow user to choose source and targeted language*.*

Benefits: -

* Help in the field of freelancing.
* Time saving.

## 1.3 Definitions, Acronyms, and Abbreviations.

## [•](http://en.wiktionary.org/wiki/%E2%80%A2) Real-Time [Translator](http://en.wiktionary.org/wiki/translator) : The software product that [provides](http://en.wiktionary.org/wiki/provides) instant translation of spoken or written language. [•](http://en.wiktionary.org/wiki/%E2%80%A2) User: An individual [interacting](http://en.wiktionary.org/wiki/interacting) with the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) to [utilize](http://en.wiktionary.org/wiki/utilize) its translation [functionalities](http://en.wiktionary.org/wiki/functionalities) . [•](http://en.wiktionary.org/wiki/%E2%80%A2) Speech Recognition: The technology that [converts](http://en.wiktionary.org/wiki/converts) spoken language into written text. [•](http://en.wiktionary.org/wiki/%E2%80%A2) Text-to-Speech ( [TTS](http://en.wiktionary.org/wiki/tts) ): The technology that [converts](http://en.wiktionary.org/wiki/converts) written text into spoken language. [•](http://en.wiktionary.org/wiki/%E2%80%A2) Language [Codes](http://en.wiktionary.org/wiki/codes) : [Codes](http://en.wiktionary.org/wiki/codes) [representing](http://en.wiktionary.org/wiki/representing) specific languages (e.g., ['en'](http://en.wiktionary.org/wiki/'en') for English, ['es'](http://en.wiktionary.org/wiki/'es') for Spanish). [•](http://en.wiktionary.org/wiki/%E2%80%A2) [API](http://en.wiktionary.org/wiki/api) : Application [Programming](http://en.wiktionary.org/wiki/programming) [Interface](http://en.wiktionary.org/wiki/interface) . A set of rules [allowing](http://en.wiktionary.org/wiki/allowing) interaction between the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) and external [applications](http://en.wiktionary.org/wiki/applications) . [Acronyms](http://en.wiktionary.org/wiki/acronyms) [•](http://en.wiktionary.org/wiki/%E2%80%A2) [SRS](http://en.wiktionary.org/wiki/srs) : Software [Requirements](http://en.wiktionary.org/wiki/requirements) [Specification](http://en.wiktionary.org/wiki/specification) [•](http://en.wiktionary.org/wiki/%E2%80%A2) [TTS](http://en.wiktionary.org/wiki/tts) : Text-to-Speech [•](http://en.wiktionary.org/wiki/%E2%80%A2) [API](http://en.wiktionary.org/wiki/api) : Application [Programming](http://en.wiktionary.org/wiki/programming) [Interface](http://en.wiktionary.org/wiki/interface) [Abbreviations](http://en.wiktionary.org/wiki/abbreviations) [•](http://en.wiktionary.org/wiki/%E2%80%A2) User: U [•](http://en.wiktionary.org/wiki/%E2%80%A2) [Translator](http://en.wiktionary.org/wiki/translator) : [Trans](http://en.wiktionary.org/wiki/trans) [•](http://en.wiktionary.org/wiki/%E2%80%A2) Speech Recognition: [SR](http://en.wiktionary.org/wiki/sr)Feel free to tailor this example to include [terms](http://en.wiktionary.org/wiki/terms) , [acronyms](http://en.wiktionary.org/wiki/acronyms) , and [abbreviations](http://en.wiktionary.org/wiki/abbreviations) specific to your Real-Time [Translator](http://en.wiktionary.org/wiki/translator) project. If there are additional [terms](http://en.wiktionary.org/wiki/terms) or [acronyms](http://en.wiktionary.org/wiki/acronyms) specific to your [domain](http://en.wiktionary.org/wiki/domain) , you can include them in this section for clarity in understanding the [SRS](http://en.wiktionary.org/wiki/srs) .

## References

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Real-Time Translator User Manual | RTT-UM-001 | 2023-05-15 | LinguaTech Solutions | [https://www.stepes.com/user-manual-translation-services/] |
| Language Translation Standards | ISO 9001:2022 | 2022-11-20 | International Standards Organization (ISO) | [https://support.apple.com/en-lk/guide/iphone/iphd74cb450f/ios] |
| Speech Recognition Algorithm Whitepaper | SR-WP-2023 | 2023-02-28 | SpeechTech Solutions | [https://www.nuance.com/content/dam/nuance/en\_uk/collateral/dragon/whitepaper/wp-dragon-professional-en-uk.pdf] |
| Network Communication Protocols | RFC 6789 | 2022-08-10 | Internet Engineering Task Force (IETF) | [https://www.comptia.org/content/guides/what-is-a-network-protocol] |
| Real-Time Translator User Manual | RTT-UM-001 | 2023-05-15 | LinguaTech Solutions | [https://www.googlecloudcommunity.com/gc/AI-ML/REAL-TIME-SIGN-LANGUAGE-TRANSLATOR/m-p/667694] |

## Overview

## Contents of the [SRS](http://en.wiktionary.org/wiki/srs) : The Software [Requirements](http://en.wiktionary.org/wiki/requirements) [Specification](http://en.wiktionary.org/wiki/specification) ( [SRS](http://en.wiktionary.org/wiki/srs) ) for the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) project is structured to provide a comprehensive understanding for various [stakeholders](http://en.wiktionary.org/wiki/stakeholders) involved in the development and use of the application. Section 2: User [Requirements](http://en.wiktionary.org/wiki/requirements) [Primarily](http://en.wiktionary.org/wiki/primarily) [targeted](http://en.wiktionary.org/wiki/targeted) at [customers](http://en.wiktionary.org/wiki/customers) and potential [users](http://en.wiktionary.org/wiki/users) , this section details the [features](http://en.wiktionary.org/wiki/features) and [functionalities](http://en.wiktionary.org/wiki/functionalities) of the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) application from an end-user perspective. It [outlines](http://en.wiktionary.org/wiki/outlines) user [interactions](http://en.wiktionary.org/wiki/interactions) , expected [outcomes](http://en.wiktionary.org/wiki/outcomes) , and overall user experience. Section 3: System Architecture and Design [Developers](http://en.wiktionary.org/wiki/developers) will find essential information in this section, which covers the [architectural](http://en.wiktionary.org/wiki/architectural) design, system [components](http://en.wiktionary.org/wiki/components) , and [guidelines](http://en.wiktionary.org/wiki/guidelines) for [implementation](http://en.wiktionary.org/wiki/implementation) . Detailed technical [specifications](http://en.wiktionary.org/wiki/specifications) , including [APIs](http://en.wiktionary.org/wiki/apis) and system [interfaces](http://en.wiktionary.org/wiki/interfaces) , are provided to [facilitate](http://en.wiktionary.org/wiki/facilitate) the development process. Section 4: Data Management This section [addresses](http://en.wiktionary.org/wiki/addresses) the management and handling of data within the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) application. It [includes](http://en.wiktionary.org/wiki/includes) information on data structures, storage [mechanisms](http://en.wiktionary.org/wiki/mechanisms) , and data flow, [ensuring](http://en.wiktionary.org/wiki/ensuring) a clear understanding of how data is processed within the system. Section 5: External [Interfaces](http://en.wiktionary.org/wiki/interfaces) [Stakeholders](http://en.wiktionary.org/wiki/stakeholders) concerned with system [integrations](http://en.wiktionary.org/wiki/integrations) and external [interactions](http://en.wiktionary.org/wiki/interactions) will benefit from this section. It [outlines](http://en.wiktionary.org/wiki/outlines) the [interfaces](http://en.wiktionary.org/wiki/interfaces) with external systems, [APIs](http://en.wiktionary.org/wiki/apis) , and communication [protocols](http://en.wiktionary.org/wiki/protocols) , [ensuring](http://en.wiktionary.org/wiki/ensuring) [seamless](http://en.wiktionary.org/wiki/seamless) [connectivity](http://en.wiktionary.org/wiki/connectivity) . Section 6: Performance [Requirements](http://en.wiktionary.org/wiki/requirements) Performance [expectations](http://en.wiktionary.org/wiki/expectations) and [criteria](http://en.wiktionary.org/wiki/criteria) for the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) application are detailed in this section. It covers [aspects](http://en.wiktionary.org/wiki/aspects) such as response time, [throughput](http://en.wiktionary.org/wiki/throughput) , and [scalability](http://en.wiktionary.org/wiki/scalability) to ensure [optimal](http://en.wiktionary.org/wiki/optimal) system performance. Section 7: Security [Considerations](http://en.wiktionary.org/wiki/considerations) Security is a top priority for the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) project. This section [discusses](http://en.wiktionary.org/wiki/discusses) security measures, access controls, and data protection [strategies](http://en.wiktionary.org/wiki/strategies) [implemented](http://en.wiktionary.org/wiki/implemented) to [safeguard](http://en.wiktionary.org/wiki/safeguard) user data and maintain the [integrity](http://en.wiktionary.org/wiki/integrity) of the application. Section 8: Testing and Quality Assurance Quality assurance [professionals](http://en.wiktionary.org/wiki/professionals) and testing [teams](http://en.wiktionary.org/wiki/teams) will find guidance in this section. It [outlines](http://en.wiktionary.org/wiki/outlines) the testing approach, test cases, and quality assurance processes to ensure the [reliability](http://en.wiktionary.org/wiki/reliability) and [robustness](http://en.wiktionary.org/wiki/robustness) of the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) application. Organization of the [SRS](http://en.wiktionary.org/wiki/srs) : To [streamline](http://en.wiktionary.org/wiki/streamline) [navigation](http://en.wiktionary.org/wiki/navigation) through the document, [stakeholders](http://en.wiktionary.org/wiki/stakeholders) are [encouraged](http://en.wiktionary.org/wiki/encouraged) to focus on [sections](http://en.wiktionary.org/wiki/sections) [aligned](http://en.wiktionary.org/wiki/aligned) with their [roles](http://en.wiktionary.org/wiki/roles), [Customers/Potential](http://en.wiktionary.org/wiki/customers/potential) [Users](http://en.wiktionary.org/wiki/users) : Refer to Section 2 (User [Requirements](http://en.wiktionary.org/wiki/requirements) ) for a detailed [overview](http://en.wiktionary.org/wiki/overview) of the application's [features](http://en.wiktionary.org/wiki/features) and user- [centric](http://en.wiktionary.org/wiki/centric) [functionalities](http://en.wiktionary.org/wiki/functionalities) . [Developers](http://en.wiktionary.org/wiki/developers) : Direct attention to Section 3 (System Architecture and Design) for technical [specifications](http://en.wiktionary.org/wiki/specifications) and [implementation](http://en.wiktionary.org/wiki/implementation) [guidelines](http://en.wiktionary.org/wiki/guidelines) critical for the development process. This organization [ensures](http://en.wiktionary.org/wiki/ensures) that each [stakeholder](http://en.wiktionary.org/wiki/stakeholder) can easily access information relevant to their involvement in the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) project, [fostering](http://en.wiktionary.org/wiki/fostering) a clear and [collaborative](http://en.wiktionary.org/wiki/collaborative) development process.2. The Overall Description

Describe the general factors that affect the product and its requirements. This section does not state specific requirements. Instead, it provides a background for those requirements, which are defined in section 3, and makes them easier to understand. In a sense, this section tells the requirements in plain English for the consumption of the customer. Section3 will contain a specification written for the developers.

## 2.1 Product Perspective

### The Real-Time Translator operates within a broader context, interacting with various systems and interfaces. It interfaces with user devices, external APIs for language translation, and speech recognition systems. The application is designed to work on smartphones, tablets, desktops, and laptops, supporting popular operating systems and browsers. Communication occurs through standard network protocols and cloud services, while dependencies include language databases and speech recognition engines. The system maintains clear boundaries, operating primarily on user devices and ensuring data privacy when interfacing with external resources. Understanding these interfaces, dependencies, and boundaries is vital for stakeholders involved in the development and use of the Real-Time Translator.

### **2.1.1 Operations** Understanding the operational [aspects](http://en.wiktionary.org/wiki/aspects) of the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) is crucial for effective system design. This section [outlines](http://en.wiktionary.org/wiki/outlines) the normal and special operations required by [users](http://en.wiktionary.org/wiki/users) , including various [modes](http://en.wiktionary.org/wiki/modes) of operation, [interactive](http://en.wiktionary.org/wiki/interactive) and [unattended](http://en.wiktionary.org/wiki/unattended) [periods](http://en.wiktionary.org/wiki/periods) , data processing support [functions](http://en.wiktionary.org/wiki/functions) , and [backup](http://en.wiktionary.org/wiki/backup) and recovery operations. **3.1**[**Modes**](http://en.wiktionary.org/wiki/modes)**of Operation** The Real-Time [Translator](http://en.wiktionary.org/wiki/translator) supports multiple [modes](http://en.wiktionary.org/wiki/modes) of operation [tailored](http://en.wiktionary.org/wiki/tailored) to user needs: Translation Mode: The primary mode where [users](http://en.wiktionary.org/wiki/users) input text or speech for real-time translation. Training Mode ( [Admin](http://en.wiktionary.org/wiki/admin) Access): Reserved for [administrators](http://en.wiktionary.org/wiki/administrators) or [trainers](http://en.wiktionary.org/wiki/trainers) to [update](http://en.wiktionary.org/wiki/update) language [databases](http://en.wiktionary.org/wiki/databases) , [configure](http://en.wiktionary.org/wiki/configure) [settings](http://en.wiktionary.org/wiki/settings) , and manage system [resources](http://en.wiktionary.org/wiki/resources) . **3.2**[**Periods**](http://en.wiktionary.org/wiki/periods)**of Operation** The application [accommodates](http://en.wiktionary.org/wiki/accommodates) different operational [periods](http://en.wiktionary.org/wiki/periods) to [cater](http://en.wiktionary.org/wiki/cater) to user and business needs: [Interactive](http://en.wiktionary.org/wiki/interactive) Operations: [Users](http://en.wiktionary.org/wiki/users) engage with the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) in real-time, [receiving](http://en.wiktionary.org/wiki/receiving) immediate [translations](http://en.wiktionary.org/wiki/translations) during active [sessions](http://en.wiktionary.org/wiki/sessions) . [Unattended](http://en.wiktionary.org/wiki/unattended) Operations: Background processes and maintenance [tasks](http://en.wiktionary.org/wiki/tasks) occur during [periods](http://en.wiktionary.org/wiki/periods) of low user activity. This [includes](http://en.wiktionary.org/wiki/includes) [updates](http://en.wiktionary.org/wiki/updates) to language [databases](http://en.wiktionary.org/wiki/databases) and system [optimization](http://en.wiktionary.org/wiki/optimization) .

### **3.3 Data Processing Support**[**Functions**](http://en.wiktionary.org/wiki/functions) To ensure efficient data processing, the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) [incorporates](http://en.wiktionary.org/wiki/incorporates) various support [functions](http://en.wiktionary.org/wiki/functions) : Language [Database](http://en.wiktionary.org/wiki/database) [Updates](http://en.wiktionary.org/wiki/updates) : Regular [updates](http://en.wiktionary.org/wiki/updates) to language [databases](http://en.wiktionary.org/wiki/databases) to [incorporate](http://en.wiktionary.org/wiki/incorporate) new words, [phrases](http://en.wiktionary.org/wiki/phrases) , and language [variations](http://en.wiktionary.org/wiki/variations) . Resource [Optimization](http://en.wiktionary.org/wiki/optimization) : [Automated](http://en.wiktionary.org/wiki/automated) processes to [optimize](http://en.wiktionary.org/wiki/optimize) system [resources](http://en.wiktionary.org/wiki/resources) , [ensuring](http://en.wiktionary.org/wiki/ensuring) [optimal](http://en.wiktionary.org/wiki/optimal) performance during peak usage. **3.4**[**Backup**](http://en.wiktionary.org/wiki/backup)**and Recovery Operations** Considering the [criticality](http://en.wiktionary.org/wiki/criticality) of data and system availability, the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) [includes](http://en.wiktionary.org/wiki/includes) [robust](http://en.wiktionary.org/wiki/robust) [backup](http://en.wiktionary.org/wiki/backup) and recovery [procedures](http://en.wiktionary.org/wiki/procedures) : Regular Data [Backups](http://en.wiktionary.org/wiki/backups) : [Scheduled](http://en.wiktionary.org/wiki/scheduled) [backups](http://en.wiktionary.org/wiki/backups) of user [preferences](http://en.wiktionary.org/wiki/preferences) , language [databases](http://en.wiktionary.org/wiki/databases) , and system [configurations](http://en.wiktionary.org/wiki/configurations) to prevent data loss. Disaster Recovery: [Protocols](http://en.wiktionary.org/wiki/protocols) for swift system recovery in the event of unexpected [outages](http://en.wiktionary.org/wiki/outages) or data corruption. **3.5 Business Process**[**Considerations**](http://en.wiktionary.org/wiki/considerations) [Incorporating](http://en.wiktionary.org/wiki/incorporating) business processes into the design, the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) takes into account [factors](http://en.wiktionary.org/wiki/factors) that may impact system operations: [Scheduled](http://en.wiktionary.org/wiki/scheduled) Maintenance Windows: [Coordination](http://en.wiktionary.org/wiki/coordination) with business processes to ensure system [updates](http://en.wiktionary.org/wiki/updates) or maintenance [tasks](http://en.wiktionary.org/wiki/tasks) [align](http://en.wiktionary.org/wiki/align) with [periods](http://en.wiktionary.org/wiki/periods) of minimal user impact. [Notification](http://en.wiktionary.org/wiki/notification) Systems: [Implementation](http://en.wiktionary.org/wiki/implementation) of [notification](http://en.wiktionary.org/wiki/notification) [mechanisms](http://en.wiktionary.org/wiki/mechanisms) to inform [users](http://en.wiktionary.org/wiki/users) about [planned](http://en.wiktionary.org/wiki/planned) [downtimes](http://en.wiktionary.org/wiki/downtimes) or system [updates](http://en.wiktionary.org/wiki/updates) . Understanding the [nuances](http://en.wiktionary.org/wiki/nuances) of user operations, support [functions](http://en.wiktionary.org/wiki/functions) , and business processes is integral to designing a Real-Time [Translator](http://en.wiktionary.org/wiki/translator) system that [aligns](http://en.wiktionary.org/wiki/aligns) with user [expectations](http://en.wiktionary.org/wiki/expectations) and business [requirements](http://en.wiktionary.org/wiki/requirements) . This approach [ensures](http://en.wiktionary.org/wiki/ensures) a [seamless](http://en.wiktionary.org/wiki/seamless) and [responsive](http://en.wiktionary.org/wiki/responsive) experience for [users](http://en.wiktionary.org/wiki/users) while [maintaining](http://en.wiktionary.org/wiki/maintaining) the [integrity](http://en.wiktionary.org/wiki/integrity) and [reliability](http://en.wiktionary.org/wiki/reliability) of the application

## 2.1.2 Site [Adaptation](http://en.wiktionary.org/wiki/adaptation) [Requirements](http://en.wiktionary.org/wiki/requirements) This section [outlines](http://en.wiktionary.org/wiki/outlines) the specific data, [initialization](http://en.wiktionary.org/wiki/initialization) [sequences](http://en.wiktionary.org/wiki/sequences) , and [features](http://en.wiktionary.org/wiki/features) that are [tailored](http://en.wiktionary.org/wiki/tailored) to individual [sites](http://en.wiktionary.org/wiki/sites) , [missions](http://en.wiktionary.org/wiki/missions) , or operational [modes](http://en.wiktionary.org/wiki/modes) for the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) project. 2.1.2.1 Data and [Initialization](http://en.wiktionary.org/wiki/initialization) [Sequences](http://en.wiktionary.org/wiki/sequences) (1) Data [Requirements](http://en.wiktionary.org/wiki/requirements) : The Real-Time [Translator](http://en.wiktionary.org/wiki/translator) should allow for [customization](http://en.wiktionary.org/wiki/customization) of language [databases](http://en.wiktionary.org/wiki/databases) based on the [linguistic](http://en.wiktionary.org/wiki/linguistic) [preferences](http://en.wiktionary.org/wiki/preferences) and specific language [requirements](http://en.wiktionary.org/wiki/requirements) of a given site or mission. [Initialization](http://en.wiktionary.org/wiki/initialization) [sequences](http://en.wiktionary.org/wiki/sequences) should enable [administrators](http://en.wiktionary.org/wiki/administrators) to input site-specific [parameters](http://en.wiktionary.org/wiki/parameters) , such as [preferred](http://en.wiktionary.org/wiki/preferred) translation [styles](http://en.wiktionary.org/wiki/styles) , industry-specific vocabulary, or [specialized](http://en.wiktionary.org/wiki/specialized) [terminology](http://en.wiktionary.org/wiki/terminology) . 2.1.2.2 Site or Mission-Related [Features](http://en.wiktionary.org/wiki/features) (2) Site-Specific [Features](http://en.wiktionary.org/wiki/features) : The application should provide the flexibility to [incorporate](http://en.wiktionary.org/wiki/incorporate) site-specific [features](http://en.wiktionary.org/wiki/features) , such as custom user [interfaces](http://en.wiktionary.org/wiki/interfaces) to [align](http://en.wiktionary.org/wiki/align) with the [branding](http://en.wiktionary.org/wiki/branding) or user experience [preferences](http://en.wiktionary.org/wiki/preferences) of a particular site. Site-specific integration with external [APIs](http://en.wiktionary.org/wiki/apis) for [specialized](http://en.wiktionary.org/wiki/specialized) translation [services](http://en.wiktionary.org/wiki/services) , [ensuring](http://en.wiktionary.org/wiki/ensuring) [compatibility](http://en.wiktionary.org/wiki/compatibility) with industry-specific [jargon](http://en.wiktionary.org/wiki/jargon) or [terminology](http://en.wiktionary.org/wiki/terminology) . [Customizable](http://en.wiktionary.org/wiki/customizable) user [roles](http://en.wiktionary.org/wiki/roles) and [permissions](http://en.wiktionary.org/wiki/permissions) to [adapt](http://en.wiktionary.org/wiki/adapt) to the [organizational](http://en.wiktionary.org/wiki/organizational) structure of a specific site or mission, [allowing](http://en.wiktionary.org/wiki/allowing) for [controlled](http://en.wiktionary.org/wiki/controlled) access based on [roles](http://en.wiktionary.org/wiki/roles) within the organization. [Configurable](http://en.wiktionary.org/wiki/configurable) [notification](http://en.wiktionary.org/wiki/notification) systems to [align](http://en.wiktionary.org/wiki/align) with specific communication [protocols](http://en.wiktionary.org/wiki/protocols) or operational [procedures](http://en.wiktionary.org/wiki/procedures) unique to a particular site. The ability to adjust speech recognition [parameters](http://en.wiktionary.org/wiki/parameters) to accommodate [variations](http://en.wiktionary.org/wiki/variations) in [accents](http://en.wiktionary.org/wiki/accents) or [pronunciation](http://en.wiktionary.org/wiki/pronunciation) common to a specific geographical location. Site-specific security [configurations](http://en.wiktionary.org/wiki/configurations) , [allowing](http://en.wiktionary.org/wiki/allowing) [administrators](http://en.wiktionary.org/wiki/administrators) to define access controls and [authentication](http://en.wiktionary.org/wiki/authentication) [mechanisms](http://en.wiktionary.org/wiki/mechanisms) based on the security [policies](http://en.wiktionary.org/wiki/policies) of the individual site. 2.1.2.3 Operational Mode [Adaptation](http://en.wiktionary.org/wiki/adaptation) (3) Operational Mode [Configuration](http://en.wiktionary.org/wiki/configuration) : The Real-Time [Translator](http://en.wiktionary.org/wiki/translator) should support different operational [modes](http://en.wiktionary.org/wiki/modes) , [allowing](http://en.wiktionary.org/wiki/allowing) [users](http://en.wiktionary.org/wiki/users) to switch between [modes](http://en.wiktionary.org/wiki/modes) based on the specific [requirements](http://en.wiktionary.org/wiki/requirements) of a mission or site. For example, a training mode for language [instructors](http://en.wiktionary.org/wiki/instructors) or an [offline](http://en.wiktionary.org/wiki/offline) mode for [areas](http://en.wiktionary.org/wiki/areas) with limited [internet](http://en.wiktionary.org/wiki/internet) [connectivity](http://en.wiktionary.org/wiki/connectivity) . [Customizable](http://en.wiktionary.org/wiki/customizable) [logging](http://en.wiktionary.org/wiki/logging) and reporting [features](http://en.wiktionary.org/wiki/features) to capture and [analyze](http://en.wiktionary.org/wiki/analyze) usage [patterns](http://en.wiktionary.org/wiki/patterns) based on the operational mode, [facilitating](http://en.wiktionary.org/wiki/facilitating) [insights](http://en.wiktionary.org/wiki/insights) into how the application is [utilized](http://en.wiktionary.org/wiki/utilized) in different [scenarios](http://en.wiktionary.org/wiki/scenarios) . [Adjustable](http://en.wiktionary.org/wiki/adjustable) system resource allocation to accommodate varying [workloads](http://en.wiktionary.org/wiki/workloads) and operational [demands](http://en.wiktionary.org/wiki/demands) . By [incorporating](http://en.wiktionary.org/wiki/incorporating) these site [adaptation](http://en.wiktionary.org/wiki/adaptation) [requirements](http://en.wiktionary.org/wiki/requirements) , the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) [ensures](http://en.wiktionary.org/wiki/ensures) a high degree of flexibility and [customization](http://en.wiktionary.org/wiki/customization) , making it [adaptable](http://en.wiktionary.org/wiki/adaptable) to the unique needs and [preferences](http://en.wiktionary.org/wiki/preferences) of different [sites](http://en.wiktionary.org/wiki/sites) , [missions](http://en.wiktionary.org/wiki/missions) , or operational [modes](http://en.wiktionary.org/wiki/modes) .

## 2. Product [Functions](http://en.wiktionary.org/wiki/functions) The Real-Time [Translator](http://en.wiktionary.org/wiki/translator) is designed to deliver a set of key [functions](http://en.wiktionary.org/wiki/functions) that enhance the user experience and provide [seamless](http://en.wiktionary.org/wiki/seamless) language translation [capabilities](http://en.wiktionary.org/wiki/capabilities) . The following summary [outlines](http://en.wiktionary.org/wiki/outlines) the major [functions](http://en.wiktionary.org/wiki/functions) of the software in a customer-friendly manner: 2.1 Language Translation; Real-Time Text Translation: Translate text input from one language to another in real-time, [providing](http://en.wiktionary.org/wiki/providing) [instantaneous](http://en.wiktionary.org/wiki/instantaneous) results. Speech-to-Text Translation: Convert spoken words into text and translate the text into the desired language, [enabling](http://en.wiktionary.org/wiki/enabling) [users](http://en.wiktionary.org/wiki/users) to communicate [verbally](http://en.wiktionary.org/wiki/verbally) across language [barriers](http://en.wiktionary.org/wiki/barriers) . Text-to-Speech Translation: Transform [translated](http://en.wiktionary.org/wiki/translated) text into spoken words, [facilitating](http://en.wiktionary.org/wiki/facilitating) [comprehension](http://en.wiktionary.org/wiki/comprehension) for [users](http://en.wiktionary.org/wiki/users) who prefer [audio](http://en.wiktionary.org/wiki/audio) output. 2.2 User Interaction [Intuitive](http://en.wiktionary.org/wiki/intuitive) User [Interface](http://en.wiktionary.org/wiki/interface) : Provide a user-friendly [interface](http://en.wiktionary.org/wiki/interface) for [effortless](http://en.wiktionary.org/wiki/effortless) input and output, [ensuring](http://en.wiktionary.org/wiki/ensuring) a [seamless](http://en.wiktionary.org/wiki/seamless) experience for both [novice](http://en.wiktionary.org/wiki/novice) and experienced [users](http://en.wiktionary.org/wiki/users) . Language Selection: Allow [users](http://en.wiktionary.org/wiki/users) to choose their [preferred](http://en.wiktionary.org/wiki/preferred) input and output languages from a diverse range of supported languages. [Customizable](http://en.wiktionary.org/wiki/customizable) [Preferences](http://en.wiktionary.org/wiki/preferences) : Enable [users](http://en.wiktionary.org/wiki/users) to [customize](http://en.wiktionary.org/wiki/customize) [settings](http://en.wiktionary.org/wiki/settings) , such as [font](http://en.wiktionary.org/wiki/font) size, display [themes](http://en.wiktionary.org/wiki/themes) , and language [preferences](http://en.wiktionary.org/wiki/preferences) , to enhance [personalization](http://en.wiktionary.org/wiki/personalization) . 2.3 System Integration [API](http://en.wiktionary.org/wiki/api) Integration: Integrate with external language translation [APIs](http://en.wiktionary.org/wiki/apis) to expand language support and improve translation accuracy. Speech Recognition Integration: [Collaborate](http://en.wiktionary.org/wiki/collaborate) with speech recognition systems to [accurately](http://en.wiktionary.org/wiki/accurately) [transcribe](http://en.wiktionary.org/wiki/transcribe) spoken words for translation. 2.4 [Accessibility](http://en.wiktionary.org/wiki/accessibility) [Multi](http://en.wiktionary.org/wiki/multi) -Platform Support: Ensure [compatibility](http://en.wiktionary.org/wiki/compatibility) with various [platforms](http://en.wiktionary.org/wiki/platforms) , including [smartphones](http://en.wiktionary.org/wiki/smartphones) , [tablets](http://en.wiktionary.org/wiki/tablets) , [desktops](http://en.wiktionary.org/wiki/desktops) , and [web](http://en.wiktionary.org/wiki/web) [browsers](http://en.wiktionary.org/wiki/browsers) , [allowing](http://en.wiktionary.org/wiki/allowing) [users](http://en.wiktionary.org/wiki/users) to access the application across different [devices](http://en.wiktionary.org/wiki/devices) . [Offline](http://en.wiktionary.org/wiki/offline) Mode: Provide an [offline](http://en.wiktionary.org/wiki/offline) mode for [users](http://en.wiktionary.org/wiki/users) in [areas](http://en.wiktionary.org/wiki/areas) with limited [internet](http://en.wiktionary.org/wiki/internet) [connectivity](http://en.wiktionary.org/wiki/connectivity) , [allowing](http://en.wiktionary.org/wiki/allowing) basic translation [functionality](http://en.wiktionary.org/wiki/functionality) without [requiring](http://en.wiktionary.org/wiki/requiring) a continuous [internet](http://en.wiktionary.org/wiki/internet) connection. 2.5 Data Management: Language [Database](http://en.wiktionary.org/wiki/database) [Updates](http://en.wiktionary.org/wiki/updates) : [Automatically](http://en.wiktionary.org/wiki/automatically) [update](http://en.wiktionary.org/wiki/update) language [databases](http://en.wiktionary.org/wiki/databases) to [incorporate](http://en.wiktionary.org/wiki/incorporate) new words, [phrases](http://en.wiktionary.org/wiki/phrases) , and [linguistic](http://en.wiktionary.org/wiki/linguistic) [variations](http://en.wiktionary.org/wiki/variations) for accurate and up-to-date [translations](http://en.wiktionary.org/wiki/translations) . User History and [Favorites](http://en.wiktionary.org/wiki/favorites) : Maintain a history of user [translations](http://en.wiktionary.org/wiki/translations) and allow [users](http://en.wiktionary.org/wiki/users) to save frequently used [phrases](http://en.wiktionary.org/wiki/phrases) as [favorites](http://en.wiktionary.org/wiki/favorites) for quick access. 2.6 Security and Privacy Secure Communication: Implement industry-standard security [protocols](http://en.wiktionary.org/wiki/protocols) to ensure the [confidentiality](http://en.wiktionary.org/wiki/confidentiality) and [integrity](http://en.wiktionary.org/wiki/integrity) of user data during communication. User [Authentication](http://en.wiktionary.org/wiki/authentication) : Provide secure [authentication](http://en.wiktionary.org/wiki/authentication) [mechanisms](http://en.wiktionary.org/wiki/mechanisms) to protect user accounts and ensure authorized access to [personalized](http://en.wiktionary.org/wiki/personalized) [settings](http://en.wiktionary.org/wiki/settings) .

## Function [Relationships](http://en.wiktionary.org/wiki/relationships) [Diagram](http://en.wiktionary.org/wiki/diagram);

## [Diagram−Thissectionmayincludeavisualrepresentationofhowthemajorfunctionsinteract](http://en.wiktionary.org/wiki/diagram%E2%88%92thissectionmayincludeavisualrepresentationofhowthemajorfunctionsinteract) , [showcasingthelogicalrelationshipsamongdifferentfunctionswithoutdelvingintothetechnicalimplementationdetails](http://en.wiktionary.org/wiki/showcasingthelogicalrelationshipsamongdifferentfunctionswithoutdelvingintothetechnicalimplementationdetails) . This summary [provides](http://en.wiktionary.org/wiki/provides) a customer- [centric](http://en.wiktionary.org/wiki/centric) [overview](http://en.wiktionary.org/wiki/overview) of the major [functions](http://en.wiktionary.org/wiki/functions) the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) will perform, offering a glimpse into the [capabilities](http://en.wiktionary.org/wiki/capabilities) and [features](http://en.wiktionary.org/wiki/features) that [users](http://en.wiktionary.org/wiki/users) can expect from the application.

## 2.3 User Characteristics

## The intended users of the Real-Time Translator exhibit diverse characteristics in education, technology experience, language proficiency, technical expertise, cultural background, and age. These characteristics impact the design by influencing the user interface to prioritize simplicity and clarity. The design also considers support features for different language proficiencies, accessibility options for various age groups, and cultural sensitivity to ensure inclusivity. The goal is to create an adaptable and user-friendly application that caters to the needs of a broad and diverse user base.

## 2.4 General Constraints

## General [Constraints](http://en.wiktionary.org/wiki/constraints); The Real-Time [Translator](http://en.wiktionary.org/wiki/translator) project is subject to various [constraints](http://en.wiktionary.org/wiki/constraints) that may limit development [options](http://en.wiktionary.org/wiki/options) and shape the system's [characteristics](http://en.wiktionary.org/wiki/characteristics) . These [constraints](http://en.wiktionary.org/wiki/constraints) include: [Regulatory](http://en.wiktionary.org/wiki/regulatory) [Policies](http://en.wiktionary.org/wiki/policies) : [Compliance](http://en.wiktionary.org/wiki/compliance) with data protection and privacy [regulations](http://en.wiktionary.org/wiki/regulations) , [ensuring](http://en.wiktionary.org/wiki/ensuring) that user data is handled in accordance with legal [requirements](http://en.wiktionary.org/wiki/requirements) . Hardware [Limitations](http://en.wiktionary.org/wiki/limitations) : [Adherence](http://en.wiktionary.org/wiki/adherence) to the processing [capabilities](http://en.wiktionary.org/wiki/capabilities) and memory [constraints](http://en.wiktionary.org/wiki/constraints) of the target [devices](http://en.wiktionary.org/wiki/devices) , [optimizing](http://en.wiktionary.org/wiki/optimizing) the application for different hardware [configurations](http://en.wiktionary.org/wiki/configurations) . [Interface](http://en.wiktionary.org/wiki/interface) to Other [Applications](http://en.wiktionary.org/wiki/applications) : [Compatibility](http://en.wiktionary.org/wiki/compatibility) with external language translation [APIs](http://en.wiktionary.org/wiki/apis) and speech recognition systems, [ensuring](http://en.wiktionary.org/wiki/ensuring) [seamless](http://en.wiktionary.org/wiki/seamless) integration with other [applications](http://en.wiktionary.org/wiki/applications) and [services](http://en.wiktionary.org/wiki/services) . Parallel Operation: Support for parallel processing to handle multiple translation requests [simultaneously](http://en.wiktionary.org/wiki/simultaneously) and maintain [responsiveness](http://en.wiktionary.org/wiki/responsiveness) during peak usage. [Audit](http://en.wiktionary.org/wiki/audit) [Functions](http://en.wiktionary.org/wiki/functions) : [Implementation](http://en.wiktionary.org/wiki/implementation) of [audit](http://en.wiktionary.org/wiki/audit) [functions](http://en.wiktionary.org/wiki/functions) to track system [activities](http://en.wiktionary.org/wiki/activities) , [providing](http://en.wiktionary.org/wiki/providing) [transparency](http://en.wiktionary.org/wiki/transparency) and [facilitating](http://en.wiktionary.org/wiki/facilitating) [debugging](http://en.wiktionary.org/wiki/debugging) and analysis when necessary. Control [Functions](http://en.wiktionary.org/wiki/functions) : Integration of control [functions](http://en.wiktionary.org/wiki/functions) to manage and monitor the Real-Time [Translator's](http://en.wiktionary.org/wiki/translator's) performance, [ensuring](http://en.wiktionary.org/wiki/ensuring) effective control over system [behavior](http://en.wiktionary.org/wiki/behavior) . Higher-Order Language [Requirements](http://en.wiktionary.org/wiki/requirements) : Development in a specific [programming](http://en.wiktionary.org/wiki/programming) language or [adherence](http://en.wiktionary.org/wiki/adherence) to language-related [standards](http://en.wiktionary.org/wiki/standards) to meet [compatibility](http://en.wiktionary.org/wiki/compatibility) and performance [requirements](http://en.wiktionary.org/wiki/requirements) . Signal [Handshake](http://en.wiktionary.org/wiki/handshake) [Protocols](http://en.wiktionary.org/wiki/protocols) : [Utilization](http://en.wiktionary.org/wiki/utilization) of signal [handshake](http://en.wiktionary.org/wiki/handshake) [protocols](http://en.wiktionary.org/wiki/protocols) , such as [XON](http://en.wiktionary.org/wiki/xon) - [XOFF](http://en.wiktionary.org/wiki/xoff) or [ACK](http://en.wiktionary.org/wiki/ack) - [NACK](http://en.wiktionary.org/wiki/nack) , to manage data flow and ensure effective communication between [components](http://en.wiktionary.org/wiki/components) . [Reliability](http://en.wiktionary.org/wiki/reliability) [Requirements](http://en.wiktionary.org/wiki/requirements) : [Adherence](http://en.wiktionary.org/wiki/adherence) to [reliability](http://en.wiktionary.org/wiki/reliability) [standards](http://en.wiktionary.org/wiki/standards) , [ensuring](http://en.wiktionary.org/wiki/ensuring) the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) [consistently](http://en.wiktionary.org/wiki/consistently) [delivers](http://en.wiktionary.org/wiki/delivers) accurate and timely [translations](http://en.wiktionary.org/wiki/translations) under various conditions. [Criticality](http://en.wiktionary.org/wiki/criticality) of the Application: Recognition of the application's [criticality](http://en.wiktionary.org/wiki/criticality) , with a focus on [robustness](http://en.wiktionary.org/wiki/robustness) and [resilience](http://en.wiktionary.org/wiki/resilience) to minimize [downtime](http://en.wiktionary.org/wiki/downtime) and [disruptions](http://en.wiktionary.org/wiki/disruptions) . Safety and Security [Considerations](http://en.wiktionary.org/wiki/considerations) : [Implementation](http://en.wiktionary.org/wiki/implementation) of safety measures to prevent harm in case of unexpected events, [coupled](http://en.wiktionary.org/wiki/coupled) with [stringent](http://en.wiktionary.org/wiki/stringent) security measures to [safeguard](http://en.wiktionary.org/wiki/safeguard) user data and maintain system [integrity](http://en.wiktionary.org/wiki/integrity) .

## 2.5 Assumptions and Dependencies

## The Real-Time Translator's development relies on several assumptions and dependencies, including the availability of specific hardware, external APIs, and consistent internet connectivity. Assumptions about data privacy regulations, continued support for operating systems, and user acceptance of features like speech recognition are also considered. Changes in any of these factors may require adjustments to the system requirements outlined in the Software Requirements Specification (SRS) to ensure the application's continued functionality and alignment with user expectations.

# 3. Specific Requirements

The Specific Requirements section outlines detailed and prioritized guidelines for the Real-Time Translator's design, implementation, and testing. Each requirement is crafted to be correct, traceable, unambiguous, verifiable, prioritized, complete, consistent, and uniquely identifiable. Key areas covered include user functionalities, system capabilities, security measures, interface design, performance expectations, and considerations for cultural diversity and accessibility. A traceability matrix is often included to link requirements to higher-level specifications, design documents, and test cases for effective tracking and verification. This section serves as a comprehensive guide for the development team, aligning their efforts with the specified objectives and ensuring the successful realization of the Real-Time Translator.

## 3.1 External Interface Requirements

## 3.1.1 System [Interfaces](http://en.wiktionary.org/wiki/interfaces) 3.1.1.1 Language Translation [APIs](http://en.wiktionary.org/wiki/apis) [Functionality](http://en.wiktionary.org/wiki/functionality) : [Facilitates](http://en.wiktionary.org/wiki/facilitates) real-time language translation. [Interface](http://en.wiktionary.org/wiki/interface) Description: The system shall integrate with external language translation [APIs](http://en.wiktionary.org/wiki/apis) to achieve accurate and dynamic language conversion. 3.1.1.2 Speech Recognition Systems [Functionality](http://en.wiktionary.org/wiki/functionality) : [Enables](http://en.wiktionary.org/wiki/enables) conversion of spoken words into text for translation. [Interface](http://en.wiktionary.org/wiki/interface) Description: The system shall [interface](http://en.wiktionary.org/wiki/interface) with speech recognition systems to capture and process spoken input for translation. 3.1.2 [Interfaces](http://en.wiktionary.org/wiki/interfaces) 3.1.2.1 User [Interface](http://en.wiktionary.org/wiki/interface) ( [UI](http://en.wiktionary.org/wiki/ui) ) Logical [Characteristics](http://en.wiktionary.org/wiki/characteristics) : The system shall provide a user-friendly [GUI](http://en.wiktionary.org/wiki/gui) for [intuitive](http://en.wiktionary.org/wiki/intuitive) input and output. [Optimization](http://en.wiktionary.org/wiki/optimization) [Aspects](http://en.wiktionary.org/wiki/aspects) : The [interface](http://en.wiktionary.org/wiki/interface) shall be [optimized](http://en.wiktionary.org/wiki/optimized) for clarity and simplicity to accommodate [users](http://en.wiktionary.org/wiki/users) with varying levels of technological [proficiency](http://en.wiktionary.org/wiki/proficiency) . 3.1.2.2 Language Selection [Interface](http://en.wiktionary.org/wiki/interface) Logical [Characteristics](http://en.wiktionary.org/wiki/characteristics) : [Users](http://en.wiktionary.org/wiki/users) can select input and output languages through an [interactive](http://en.wiktionary.org/wiki/interactive) [interface](http://en.wiktionary.org/wiki/interface) . [Optimization](http://en.wiktionary.org/wiki/optimization) [Aspects](http://en.wiktionary.org/wiki/aspects) : The language selection [interface](http://en.wiktionary.org/wiki/interface) shall be designed for ease of use and [personalization](http://en.wiktionary.org/wiki/personalization) . 3.1.2.3 [Accessibility](http://en.wiktionary.org/wiki/accessibility) [Interface](http://en.wiktionary.org/wiki/interface) Logical [Characteristics](http://en.wiktionary.org/wiki/characteristics) : The system shall [adhere](http://en.wiktionary.org/wiki/adhere) to [ADA](http://en.wiktionary.org/wiki/ada) [guidelines](http://en.wiktionary.org/wiki/guidelines) for [accessibility](http://en.wiktionary.org/wiki/accessibility) . [Optimization](http://en.wiktionary.org/wiki/optimization) [Aspects](http://en.wiktionary.org/wiki/aspects) : The [interface](http://en.wiktionary.org/wiki/interface) shall include [features](http://en.wiktionary.org/wiki/features) for [adjustable](http://en.wiktionary.org/wiki/adjustable) [font](http://en.wiktionary.org/wiki/font) sizes and other [accessibility](http://en.wiktionary.org/wiki/accessibility) [options](http://en.wiktionary.org/wiki/options) to [cater](http://en.wiktionary.org/wiki/cater) to [users](http://en.wiktionary.org/wiki/users) with diverse needs. 3.1.3 Hardware [Interfaces](http://en.wiktionary.org/wiki/interfaces) The system has no hardware [interface](http://en.wiktionary.org/wiki/interface) [requirements](http://en.wiktionary.org/wiki/requirements) . 3.1.4 Software [Interfaces](http://en.wiktionary.org/wiki/interfaces) 3.1.4.1 [Microsoft](http://en.wiktionary.org/wiki/microsoft) Translation [Services](http://en.wiktionary.org/wiki/services) Name: [Microsoft](http://en.wiktionary.org/wiki/microsoft) Translation [Services](http://en.wiktionary.org/wiki/services) [Mnemonic](http://en.wiktionary.org/wiki/mnemonic) : [MTS](http://en.wiktionary.org/wiki/mts) [Specification](http://en.wiktionary.org/wiki/specification) Number: [MSFT](http://en.wiktionary.org/wiki/msft) - [TRANS](http://en.wiktionary.org/wiki/trans) -001 Version Number: 3.0 Source: [Microsoft](http://en.wiktionary.org/wiki/microsoft) Corporation Discussion: The system must use [Microsoft](http://en.wiktionary.org/wiki/microsoft) Translation [Services](http://en.wiktionary.org/wiki/services) for language translation. [Interface](http://en.wiktionary.org/wiki/interface) Definition: Communication with the [Microsoft](http://en.wiktionary.org/wiki/microsoft) Translation [Services](http://en.wiktionary.org/wiki/services) shall occur through [RESTful](http://en.wiktionary.org/wiki/restful) [APIs](http://en.wiktionary.org/wiki/apis) , with message content [formatted](http://en.wiktionary.org/wiki/formatted) as [JSON](http://en.wiktionary.org/wiki/json) . 3.1.4.2 Speech Recognition [API](http://en.wiktionary.org/wiki/api) Name: [SpeechRecognitionAPI](http://en.wiktionary.org/wiki/speechrecognitionapi) [Mnemonic](http://en.wiktionary.org/wiki/mnemonic) : [SR](http://en.wiktionary.org/wiki/sr) - [API](http://en.wiktionary.org/wiki/api) [Specification](http://en.wiktionary.org/wiki/specification) Number: [SR](http://en.wiktionary.org/wiki/sr) - [API](http://en.wiktionary.org/wiki/api) -001 Version Number: 2.1 Source: [SpeechTech](http://en.wiktionary.org/wiki/speechtech) [Inc](http://en.wiktionary.org/wiki/inc) . Discussion: The system shall [utilize](http://en.wiktionary.org/wiki/utilize) the Speech Recognition [API](http://en.wiktionary.org/wiki/api) for [converting](http://en.wiktionary.org/wiki/converting) spoken words into text. [Interface](http://en.wiktionary.org/wiki/interface) Definition: Interaction with the Speech Recognition [API](http://en.wiktionary.org/wiki/api) shall be through [HTTPS](http://en.wiktionary.org/wiki/https) requests with [audio](http://en.wiktionary.org/wiki/audio) data [encoded](http://en.wiktionary.org/wiki/encoded) in [WAV](http://en.wiktionary.org/wiki/wav) format. 3.1.5 Communications [Interfaces](http://en.wiktionary.org/wiki/interfaces) 3.1.5.1 [HTTPS](http://en.wiktionary.org/wiki/https) [Protocol](http://en.wiktionary.org/wiki/protocol) Purpose: [Facilitates](http://en.wiktionary.org/wiki/facilitates) secure communication with external [APIs](http://en.wiktionary.org/wiki/apis) and [services](http://en.wiktionary.org/wiki/services) . [Interface](http://en.wiktionary.org/wiki/interface) Definition: The system shall use [HTTPS](http://en.wiktionary.org/wiki/https) for secure data exchange, [adhering](http://en.wiktionary.org/wiki/adhering) to standard security [practices](http://en.wiktionary.org/wiki/practices) . 3.1.5.2 [WebSocket](http://en.wiktionary.org/wiki/websocket) [Protocol](http://en.wiktionary.org/wiki/protocol) Purpose: Supports real-time communication for [enhanced](http://en.wiktionary.org/wiki/enhanced) user experience. [Interface](http://en.wiktionary.org/wiki/interface) Definition: [WebSocket](http://en.wiktionary.org/wiki/websocket) [protocol](http://en.wiktionary.org/wiki/protocol) shall be [employed](http://en.wiktionary.org/wiki/employed) for [bidirectional](http://en.wiktionary.org/wiki/bidirectional) communication, [ensuring](http://en.wiktionary.org/wiki/ensuring) low- [latency](http://en.wiktionary.org/wiki/latency) [interactions](http://en.wiktionary.org/wiki/interactions) . This section [provides](http://en.wiktionary.org/wiki/provides) a [concise](http://en.wiktionary.org/wiki/concise) definition of the external [interfaces](http://en.wiktionary.org/wiki/interfaces) required for the Real-Time [Translator](http://en.wiktionary.org/wiki/translator) project, covering system [interfaces](http://en.wiktionary.org/wiki/interfaces) , user [interfaces](http://en.wiktionary.org/wiki/interfaces) , hardware [interfaces](http://en.wiktionary.org/wiki/interfaces) , software [interfaces](http://en.wiktionary.org/wiki/interfaces) , and communication [interfaces](http://en.wiktionary.org/wiki/interfaces) .

## 3.2 Functional Requirements

This section describes specific features of the software project. If desired, some requirements may be specified in the use-case format and listed in the Use Cases Section.

### 3.2.1 <Functional Requirement or Feature #1>

3.2.1.1 Introduction

#### 3.2.1.2 Inputs

#### 3.2.1.3 Processing

#### 3.2.1.4 Outputs

#### 3.2.1.5 Error Handling

### 3.2.2 <Functional Requirement or Feature #2>

…

## 3.3 Use Cases

This section contains use cases of the ------------------------ system.

### 3.3.1 Use Case #1

### 3.3.2 Use Case #2

…

## 3.4 Classes / Objects

This section contains major classes of the ------------------------ system.

### 3.4.1 <Class / Object #1>

#### 3.4.1.1 Attributes

#### 3.4.1.2 Functions

<Reference to functional requirements and/or use cases>

### 3.4.2 <Class / Object #2>

…

## 3.5 Non-Functional Requirements

Non-functional requirements may exist for the following attributes. Often these requirements must be achieved at a system-wide level rather than at a unit level. State the requirements in the following sections in measurable terms (e.g., 95% of transaction shall be processed in less than a second, system downtime may not exceed 1 minute per day, >30 day. MTBF value, etc.).

### 3.5.1 Performance

### 3.5.2 Reliability

### 3.5.3 Availability

### 3.5.4 Security

### 3.5.5 Maintainability

### 3.5.6 Portability

## 3.6 Inverse Requirements

State any \*useful\* inverse requirements.