Software Requirements Specification (SRS)

Project: QuickLink AI - USSD Voice Assistant

Date:29 June 2025

Version: 1.0

1. Introduction

1.1 Purpose

This document specifies the functional and non-functional requirements for the QuickLink AI - USSD Voice Assistant. The system enables users, especially those in low-connectivity and low-literacy areas, to access AI-driven educational assistance via USSD and voice-based interfaces without internet access.

1.2 Scope

QuickLink AI is a USSD-driven AI assistant accessible through a simple dial code (*542#). It offers two interaction modes—**Text Mode** and **Voice Mode**—and supports multilingual access (English, Afrikaans, other local langueges). It serves educational content, career guidance, and general knowledge, leveraging NLP capabilities while storing user interaction history for personalized responses.

1.3 Definitions, Acronyms, and Abbreviations

Term	Definition
USSD	Unstructured Supplementary Service Data
NLP	Natural Language Processing
IVR	Interactive Voice Response
AI	Artificial Intelligence

1.4 References

- Offline AI Model with Voice Interaction Concept Document (June 2025)
- Telecommunication Standards for USSD (MTC, Telecom Namibia)
- ISO/IEC 25010: System and Software Quality Models

2. Overall Description

2.1 Product Perspective

QuickLink AI is an independent AI-driven educational assistant utilizing telecom USSD infrastructure without requiring internet. The system interacts with users through text and voice channels with backend support for AI query handling and user profile management.

2.2 Product Functions

- **USSD Menu Navigation**
- **Voice Mode with AI Query Processing**
- **User Authentication & Onboarding**
- **Multilingual Support (English, Afrikaans and other local languages)**
- **User History Management (90 days)**
- **AI-Powered Educational Responses**

2.3 User Classes and Characteristics

User Type	**Characteristics**
General Users	Basic phone users, non-technical, often in rural areas
Admin Users	Manage the backend, database, and analytics

2.4 Operating Environment

- Mobile Networks (2G, 3G, 4G)
- USSD Gateway API (e.g., Africa's Talking, Twilio)
- Backend: Cloud-hosted (AWS, Azure, or on-prem)

2.5 Constraints

- No internet access required for end-users
- Must respond within telecom USSD session timeout limits (~180 seconds total)
- Language models must be lightweight

2.6 Assumptions and Dependencies

- Partnership with telecom providers for USSD and IVR hosting
- Reliable AI/NLP backend service

3. Specific Requirements

3.1 Functional Requirements (FR)

3.1.1 USSD Interaction Requirements

ID	Requirement	Priority
FR1	System shall display the main menu upon *542# dial	High
FR2	System shall provide mode options (Text/Voice)	High
FR3	System shall provide language selection options	High
FR4	System shall detect new users based on phone number	High
FR5	System shall prompt new users for name registration	High
FR6	System shall bypass registration for returning users	High
FR7	System shall accept user questions via text or voice	High

FR8	System shall render USSD menus within <2 seconds	High
FR9	System shall persist user language preference	High
FR10	System shall timeout after 30 seconds of inactivity	Medium

3.1.2 User Management Requirements

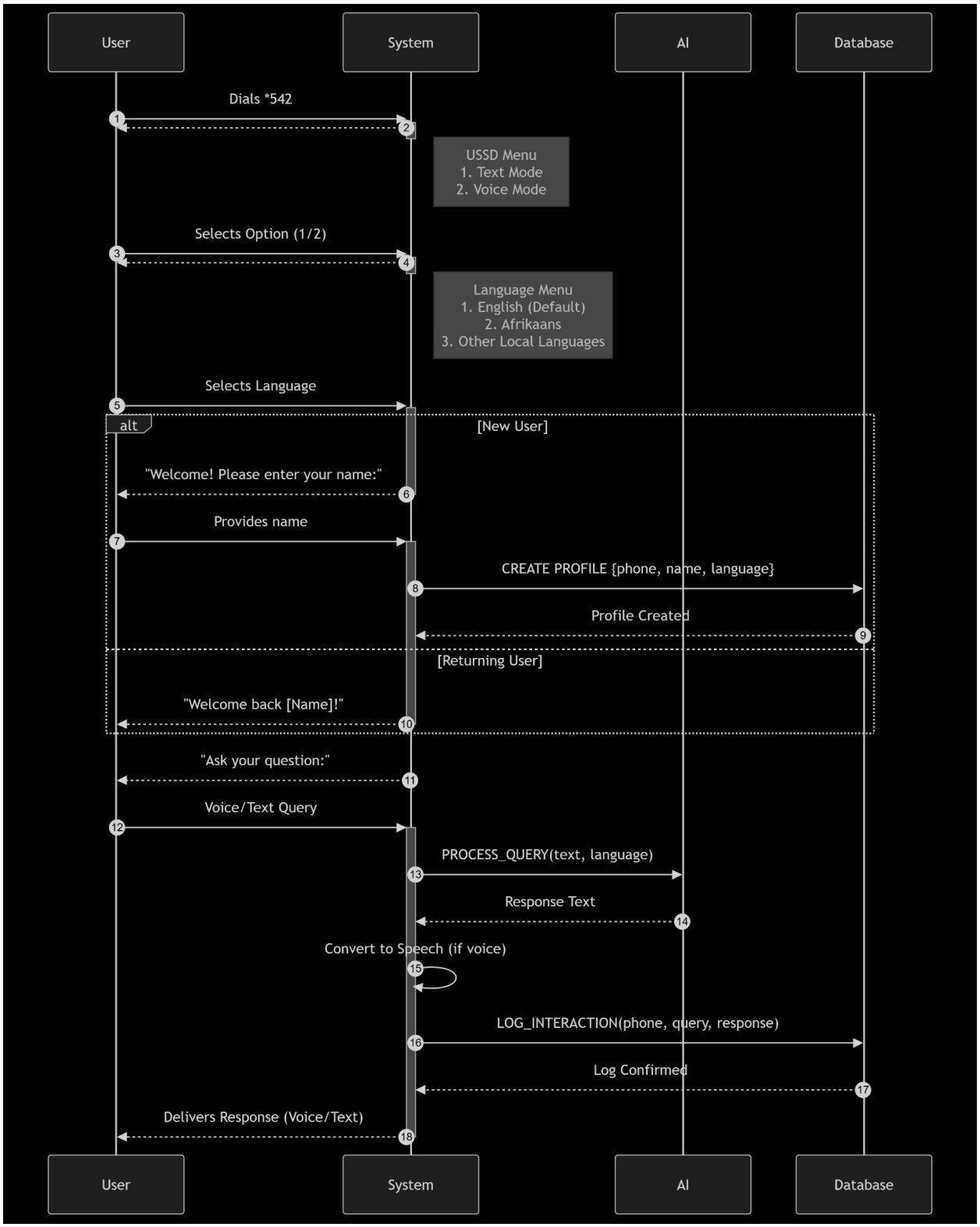
ID	Requirement	Priority
FR11	New users shall complete onboarding steps	High
FR12	Returning users bypass onboarding	High
FR13	System shall store query history for 90 days	Medium
FR14	System shall allow querying previous history	Medium

3.2 Non-Functional Requirements (NFR)

ID	Requirement	Target/Value
NFR1	System uptime	99.9%
NFR2	Menu load time	<1.5 seconds
NFR3	Concurrent users supported	1000+
NFR4	Data storage retention for user history	90 days
NFR5	Multilingual support for more languages	English(default language), Afrikaans and other local language
NFR6	Privacy compliance	GDPR/Local Laws
NFR7	Failover and disaster recovery	Backup every 12 hours
NFR8	Response latency for AI answers(backend)	<3 seconds

4. System Models

4.1 USSD Interaction Flow



5. Database Schema Overview

User Table

Field	Type	Description
phone	String	Primary Key
name	Sring	User’s full name
language	String	‘EN’, ‘AF’, others
created_at	Datetime	Account creation
history	JSON	List of interactions

History Entry Format

```
{
  "query": "Explain gravity",
  "response": "Gravity is the force...",
  "time": "2025-06-29T18:15:00Z"
}
```

6. Performance Requirements

- **USSD Session Stability:** Must operate within telecom limits (~180 seconds max).
- **Response Time:** Menu prompts <1.5s; AI answers <3s.
- **Concurrent Usage:** At least 1000 simultaneous sessions.

7. Security and Privacy Requirements

- All user data must be encrypted at rest and in transit.
- Comply with **GDPR**, **Data Protection Act (Namibia)**.
- Allow users to delete their data upon request.

8. Appendix

- **USSD Gateway APIs:** Africa's Talking, Twilio, MTC Namibia API
- **AI Backend:** OpenAI API, Llama2, or lightweight NLP models hosted on local servers.
- **Voice Processing:** Optional IVR system for spoken queries.

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