CSC 431 – R (Spring 2025)

Call.US

Software Requirements Specification (SRS)

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Version History

Version	Date	Author(s)	Change Comments
1	2.24	Ximena	Delete AI Tools

Table of Contents

1. System Requirements

1.1 Functional Requirements

1.1.1 3D Body Rendering

Title	3D Body Rendering
Description	The app should capture the 3D image of the body of the person using depth sensors or AI-powered camera processing
Priority	0
Precondition(s)	User has granted control of camera to be used while app is open
Basic Flow	1 - User enters a call 2 - System activates camera and sensors 3 - AI processes the image and creates a 3D model of the body. 4 - 3D Model displayed
Postconditions(s)	Real time 3D model of the caller is rendered in the application
Use Case Diagram	<Link or number, if present>

1.1.2 User Authentication and Profile Management

Title	User Authentication and Profile Management
Description	Users must be able to have an account, log-in, register via email or phone number
Priority	1
Precondition(s)	User has to have email or phone number; app must be open
Basic Flow	1 - User opens the app and taps log-in or sign-in 2 - User enters phone or email credentials 3 - System verifies if account exists and initializes with those credentials
Postconditions(s)	User is authenticated and can access app’s features
Use Case Diagram	<Link or number, if present>

1.1.3 Video and Audio Processing

Title	Video and Audio Processing

Description	Users can send and receive audio and video. Audio should be spatial
Priority	0
Precondition(s)	Users have given access to camera and microphone features
Basic Flow	1 - User initiates a call 2 - The system establishes a connection 3 - Video and audio are transmitted in real time 4 - Users can interact in the VR environment
Postconditions(s)	A successful video call is established
Use Case Diagram	<Link or number, if present>

1.1.4 Networking and Data transmission

Title	Networking and data transmission
Description	The app must support low-latency high quality video calls
Priority	2
Precondition(s)	User must have a stable internet connection
Basic Flow	1 - System transmits 3D data 2 - Data is sent via server-based architecture 3 - The recipient’s device receives and renders the 3D information in real time
Postconditions(s)	Data is transmitted with minimal lag
Use Case Diagram	<Link or number, if present>

1.2 Non-Functional Requirements

1.2.1 Performance and Latency

Title	Performance and Latency
Description	The system must maintain a smooth call experience with minimal lag while ensuring 3D models render with 30+ FPS
Priority	1
Applicable FR(s)	Networking and Data transmission, 3D body rendering

1.2.2 Data Storage and Compression

Title	Data storage and compression
Description	The app should use efficient compression techniques to minimize bandwidth usage and avoid user’s storage to be compromised
Priority	3
Applicable FR(s)	Networking and Data transmission

1.2.3 Usability & Accessibility

Title	Usability & Accessibility
Description	The app should have an easy to use UI to ensure ease of navigation for VR and Non-VR users
Priority	4
Applicable FR(s)	User Authentication and Profile Management, Video and Audio Processing

1.2.4 Security

Title	Security
Description	The app must follow the best security practices to avoid data leaks of user information
Priority	0
Applicable FR(s)	Networking and Data transmission

32. System Constraints

32.1 Tool Constraints

2.1.1 Development Frameworks

Title	Development Frameworks
Description	Must support real-time 3D rendering and processing
Priority	1

2.1.2 SDK Compatibility

Title	SDK Compatibility
Description	Must be compatible with VR development kits
Priority	2

2.1.3 Testing Tools

Title	Testing Tools
Description	Specialized tools needed for VR and 3D model testing
Priority	2

32.2 Language Constraints

2.2.1 Programming Language Selection

Title	Programming Language Selection
Description	Must support efficient 3D processing and networking
Priority	1

2.2.2 Client-side Languages

Title	Client-side Languages
Description	JavaScript/TypeScript with WebGL or native code depending on platform
Priority	2

2.2.3 Server-Side Languages

Title	Server-Side Languages
Description	Must handle real-time data processing and streaming
Priority	2

2.2.4 Documentation Standards

Title	Documentation Standards
Description	Must include clear guidelines for both VR and non-VR features
Priority	4

32.3 Platform Constraints

2.3.1 VR Headset Support

Title	VR Headset Support
Description	Must function on major VR platforms (Oculus, SteamVR, etc.)
Priority	0

2.3.2 Mobile Compatibility

Title	Cross-Platform Support
Description	All assets and scripts must adhere to cross-platform standards to avoid compatibility issues.
Priority	1

2.3.3 OS Compatibility

Title	OS Compatibility
Description	Must function across iOS, Android, Windows.
Priority	2

2.3.4 Browser Support

Title	Browser Support
Description	If web-based components exist, must support modern browsers
Priority	3

32.4 Hardware Constraints

2.4.1 Camera Requirements

Title	Camera Requirements
Description	Users need devices with front-facing cameras

Priority	1

2.4.2 Depth Sensing

Title	Depth Sensing
Description	Premium features may require depth-sensing cameras or LiDAR
Priority	2

2.4.3 Processing Power

Title	Processing Power
Description	Devices must support real-time 3D rendering at 30+ FPS
Priority	0

2.4.4 Memory Requirements

Title	Memory Requirements
Description	Sufficient RAM needed for concurrent video processing and rendering
Priority	2

2.4.5 Battery Consumption

Title	Battery Consumption
Description	Must optimize for minimal battery drain during calls
Priority	3

32.5 Network Constraints

2.5.1 Bandwidth Requirements

Title	Bandwidth Requirements
Description	Must function on connections of at least 5 Mbps upload/download
Priority	1

2.5.2 Data Optimization

Title	Data Optimization
Description	Must implement efficient compression to minimize data usage
Priority	2

2.5.3 Connection Stability

Title	Connection Stability
Description	Must handle connection drops gracefully
Priority	1

2.5.4 Network Diversity

Title	Network Diversity
Description	Must adapt to varying network conditions and quality
Priority	3

32.6 Deployment Constraints

2.6.1 Server Architecture

Title	Server Architecture
Description	Requires robust cloud infrastructure for real-time data handling
Priority	0

2.6.2 Global Coverage

Title	Global Coverage
Description	CDN or distributed server architecture needed for global users
Priority	2

2.6.3 Deployment Frequency

Title	Deployment Frequency
Description	Must balance feature updates with stability
Priority	4

2.6.4 Update Mechanism

Title	Update Mechanism
Description	Seamless updates required for both app and server components
Priority	3

32.7 Transition & Support Constraints

2.7.1 User Onboarding

Title	User Onboarding
Description	Must provide intuitive tutorials for new VR users
Priority	1

2.7.2 Migration Path

Title	Migration Path
Description	For users transitioning from traditional video calling
Priority	3

2.7.3 Customer Support

Title	Customer Support
Description	Specialized support needed for troubleshooting VR issues
Priority	2

2.7.4 Documentation

Title	Documentation
Description	Comprehensive user guides for both VR and non-VR interfaces
Priority	4

32.8 Budget & Schedule Constraints

2.8.1 Development Costs

Title	Development Costs
Description	3D and VR development typically requires specialized talent
Priority	1

2.8.1 Testing Requirements

Title	Testing Requirements
Description	VR testing requires specialized equipment
Priority	3

2.8.2 Licensing Costs

Title	Licensing Costs
Description	Potential third-party SDK or technology licensing fees
Priority	3

2.8.3 Maintenance Budget

Title	Maintenance Budget
Description	Ongoing support for complex technology stack
Priority	4

2.8.4 Martketing Allowance

Title	Marketing Allowance
Description	Budget for promoting new technology to users
Priority	5

32.9 Miscellaneous Constraints

2.9.1 Privacy Regulations

Title	Privacy Regulations
Description	The system must comply with GDPR, CCPA, or other relevant data privacy regulations.
Priority	0

2.9.2 Accessibility Standards

Title	Accessibility Standards
Description	Should adhere to accessibility guidelines despite VR focus
Priority	3

2.9.3 Cultural Considerations

Title	Cultural Considerations
Description	Must account for different regional preferences
Priority	4

2.9.4 Power Consumption

Title	Power Consumption
Description	Must optimize for extended use on mobile devices
Priority	2

2.9.5 Audio Quality

Title	Audio Quality
Description	Spatial audio requires specialized processing and testing
Priority	1

2.9.6 Ethical Considerations

Title	Ethical Considerations
Description	Body scanning and rendering raises privacy concerns
Priority	1

33. Requirements Modeling

3.1.1 3D Body Rendering

Actors: User, System
Description: The system captures the user's 3D body image and renders it in real time during a video call.
Use-Case Flow:

1. The user joins a call.
2. The system activates the camera and depth sensors.
3. AI processes the input and generates a 3D model.
4. The model is rendered in real time and displayed to participants.

(Insert Use-Case Diagram here)

3.1.2 User Authentication and Profile Management

Actors: User, Authentication System
Description: The system allows users to register, log in, and manage their profiles securely.
Use-Case Flow:

1. The user opens the app and selects either "Sign In" or "Sign Up."
2. The user enters their email/phone number and password.
3. The system verifies credentials and grants access to the user.

(Insert Use-Case Diagram here)

3.1.3 Video and Audio Processing

Actors: User, System
Description: The system enables real-time video and spatial audio communication.
Use-Case Flow:

1. The user initiates or joins a video call.
2. The system establishes a connection and begins transmitting audio and video data.
3. The system processes spatial audio to create a realistic VR experience.
4. Users interact with each other with synchronized video and audio.

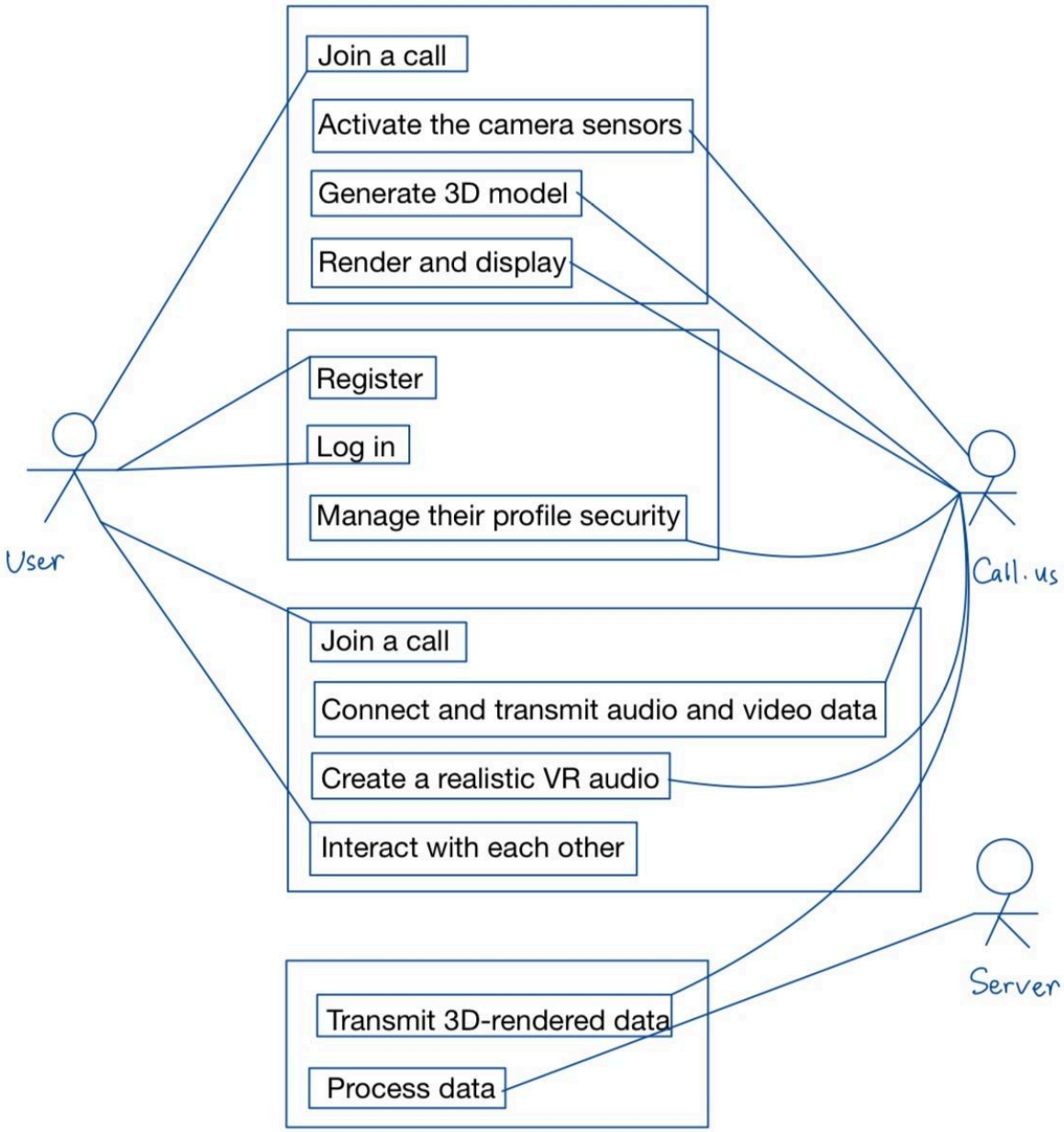
(Insert Use-Case Diagram here)

3.1.4 Networking and Data Transmission

Actors: User, System, Server
Description: The system ensures seamless data transmission for real-time 3D rendering.
Use-Case Flow:

1. The system transmits 3D-rendered data to the server.

2. The server processes and forwards the data to the recipient’s device.
3. The recipient’s device receives and renders the 3D model with minimal latency.



4 Evolutionary Requirements

4.1 Functional Requirements

4.1.1 User Avatar customizations

Title	User avatar customizations
Description	The user will be able to create their own avatar and it will be displayed in their profiles if user so wishes
Priority	5
Precondition(s)	User has a profile and wants to create an avatar
Postconditions(s)	1 - User initiates avatar creation 2 - User customizes their avatar 3 - System stores the avatar and displays on their profile 4 - The avatar appears in future calls
Use Case Diagram	<Link or number, if present>

4.1.2 Large Scale Multi-user support

Title	Large Scale Multi-user support
Description	The user will be able to hold and join calls of 10+ participants
Priority	3
Precondition(s)	Basic call functionality is already implemented
Postconditions(s)	1 - System automatically adjust network information to allow for more participants in call 2 - AI optimizes rendering based on distance from the player to avoid lag 3 - Users interact in a smooth 3D VR environment
Use Case Diagram	<Link or number, if present>

4.1.3 AI-Powered In Real time Language Translation

Title	AI-Powered In Real time Language Translation
Description	User will be able to translate the recipient’s voice input to the language of their choice
Priority	5
Precondition(s)	Users are engaging in conversation
Postconditions(s)	1 - System detects spoken language in real time 2 - AI Processes and translates the input to the selected language 3 - Translated audio is presented to the user, with subtitles for easier comprehension
Use Case Diagram	<Link or number, if present>

4.2 Non-Functional Requirements

4.2.1 Adaptive Bandwidth Usage

Title	Adaptive Bandwidth Usage
Description	The system should dynamically adjust resolution and data transmission based on the available network's conditions
Priority	2
Applicable FR(s)	Networking & Data Transmission, Large-Scale Multi-User Support

4.2.2 Blockchain-Based Identity Verification

Title	Blockchain-Based Identity Verification
Description	The user should be able to use blockchain to ensure a more secure connection if they so choose
Priority	5
Applicable FR(s)	User Authentication & Profile Management

4.2.3 Advanced AI Optimization for Rendering & Networking

Title	Advanced AI Optimization for Rendering & Networking
Description	AI should dynamically optimize rendering and networking to maintain high performance as the system scales.
Priority	1
Applicable FR(s)	Networking & Data Transmission, Large-Scale Multi-User Support