Software Design Specification

<Virtual Department Tour>

Project Code:

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Submission Date:

20-December-2024

Document Information

Category	Information
Customer	UOS-CS
Project	<Virtual Department Tour>
Document	Software Design Specification
Document Version	1.0
Identifier	<PGBH01-2003-DS>
Status	Draft
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Approver(s)	PM
Issue Date	Dec. 24, 2024
Document Location	
Distribution	1. Advisor 2. PM 3. Project Office

Definition of Terms, Acronyms and Abbreviations

RS	Requirements Specifications, outlining the functional and non-functional needs of the website.
3D Vista	Software used to create the 3D virtual tour of the department.
VR	Virtual Reality, the immersive technology used for the virtual tour experience.
UI/UX	User Interface and User Experience, ensuring the website is user-friendly and visually appealing.
HTML	Hyper Text Markup Language, the standard language for building web pages.
CSS	Cascading Style Sheets, used for styling the website.
JS	JavaScript, scripting language to make the website interactive.

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~~**Section 1**~~

1. Introduction

Virtual tour websites serve as a powerful tool to bridge the gap between physical spaces and remote audiences. The Department of Computer Science, recognized for its innovation and academic excellence, offers an ideal context for such a project. By enabling students, faculty, and visitors to virtually explore departmental facilities, the proposed platform aims to enhance accessibility and engagement. Employing advanced techniques, this project will depict key spaces such as laboratories, offices, and collaborative areas with high visual fidelity. Through a combination of interactive virtual visualizations, intuitive web design, and reliable hosting solutions, the platform aspires to reach a global audience, foster engagement, and effectively showcase the department's resources.

1.1 Purpose of Document

This document serves to provide a comprehensive design framework for the project A Virtual Department Tour." It outlines the architectural, strategic, and detailed design elements to ensure robust development and deployment. The intended audience includes internal and external advisors, the project team, and other stakeholders. The project employs an object-oriented design methodology.

1.2 Project Overview

A "Virtual Department Tour" project aims to create an interactive virtual tour of the Computer Science Department using advanced virtual visualization. The platform will allow users to navigate key areas such as laboratories and classrooms interactively. Technologies like 3D Vista, HTML, CSS, and JavaScript will be used for development, ensuring compatibility and user engagement.

1.3 Scope

In-Scope Features:

- Develop a virtual tour using 3D Vista.
- Enable interactive navigation and multimedia hotspots.
- Ensure responsive design across devices.
- Host virtual assets on online storage.
- Incorporate basic analytics.

Out-of-Scope Features:

- Real-time guided tours or live interactions.
- Augmented reality (AR) or AI-driven chatbots.
- Multi-department or campus-wide integration.
- E-commerce or payment functionalities.

2. Design Considerations

This section outlines the critical aspects to address before finalizing the system design. It establishes a foundation to ensure the system is robust, scalable, and adaptable.

2.1 Assumptions and Dependencies

Assumptions:

- The software will use built-in or third-party services to detect and filter copyrighted images and videos.
- Secure communication will be ensured using SSL/TLS encryption, assuming compatible browser versions and security standards.
- Regular automated data backups will be implemented, relying on adequate storage infrastructure.
- Secure access control and authentication methods (e.g., OAuth, MFA) will manage user permissions.
- The software will follow global data protection laws (e.g., GDPR, CCPA).

Dependencies:

- It will depend on third-party services (e.g., Content ID) for copyright detection and cloud providers (e.g., AWS, Azure) for backup storage.
- Reliable encryption protocols (e.g., OpenSSL, TLS) will be necessary for secure links.
- Ongoing legal review will ensure adherence to copyright laws.
- Users' devices must support secure encryption standards (e.g., TLS 1.2+).

Sufficient storage and fast data transfer are needed for timely backups

2.2 Risks and Volatile Areas

- Changes in hosting solutions could affect deployment timelines.
- Compatibility issues with outdated devices or browsers.
- High dependency on user feedback for usability improvements.
- Limited expertise in virtual visualization tools among team members could delay the development process.
- Possible performance issues when rendering large virtual assets on lower-end devices.
- Difficulty in securing reliable online storage solutions for hosting virtual assets.
- Changes in project requirements during development may necessitate design adjustments.
- Unanticipated bugs or errors in interactive navigation features could disrupt user experience.
- External dependencies on internet connectivity and bandwidth may affect platform performance.

3. System Architecture

3.1 System Level Architecture

The platform consists of the following elements:

- Frontend interface developed using HTML, CSS, and JavaScript.
- Virtual tour elements created and hosted via 3D Vista.
- Online storage for secure hosting of assets.
- Interaction tracking and analytics components.

3.2 Sub-System / Component / Module Level Architecture

- User Interface Module: Manages user interactions and navigation.
- Virtual tour Viewer Module: Embeds and displays virtual tours.
- Data Management Module: Handles asset storage and access permissions.

4. Design Strategies

This section outlines key design strategies that shape the system's architecture and organization, addressing scalability, modularity, and user needs.

4.1 Strategy 1: Scalability and Compatibility

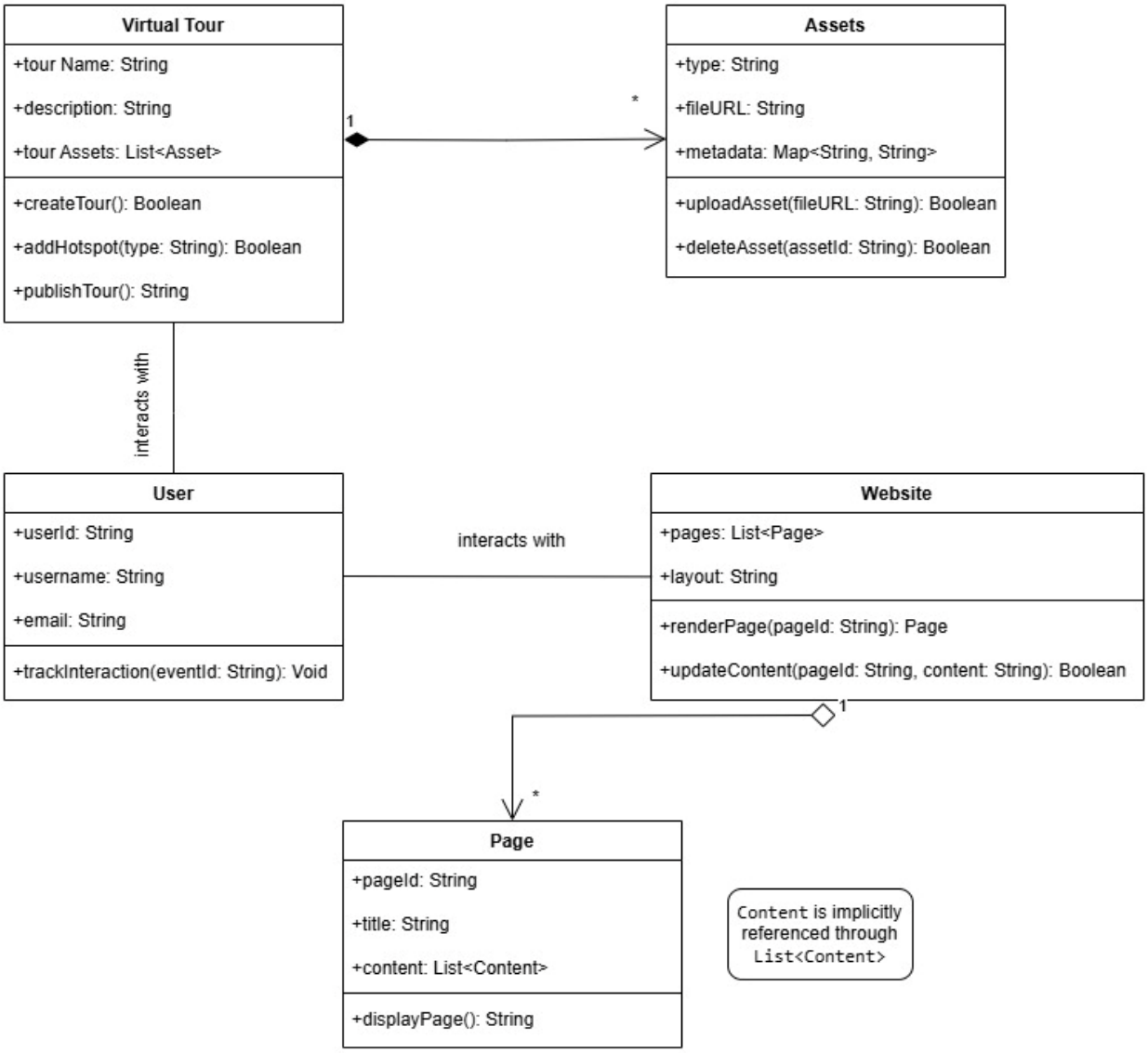
- The system will be designed to allow future integration with additional departments.
- Responsive web design ensures compatibility across various devices and screen sizes.
- Hosting solutions will be scalable to accommodate increased traffic

5. Detailed System Design

A detailed design should include the following:

- Detailed class diagrams showcasing the interactions between UI, data management, and virtual tour viewer.

Fig: Class diagram of virtual department tour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1
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+content: List<Content>
+displayPage(): String
Content is implicitly referenced through List<Content>

- Sequence diagrams depicting user navigation and multimedia interactions

Fig: Sequence diagram of virtual department tour

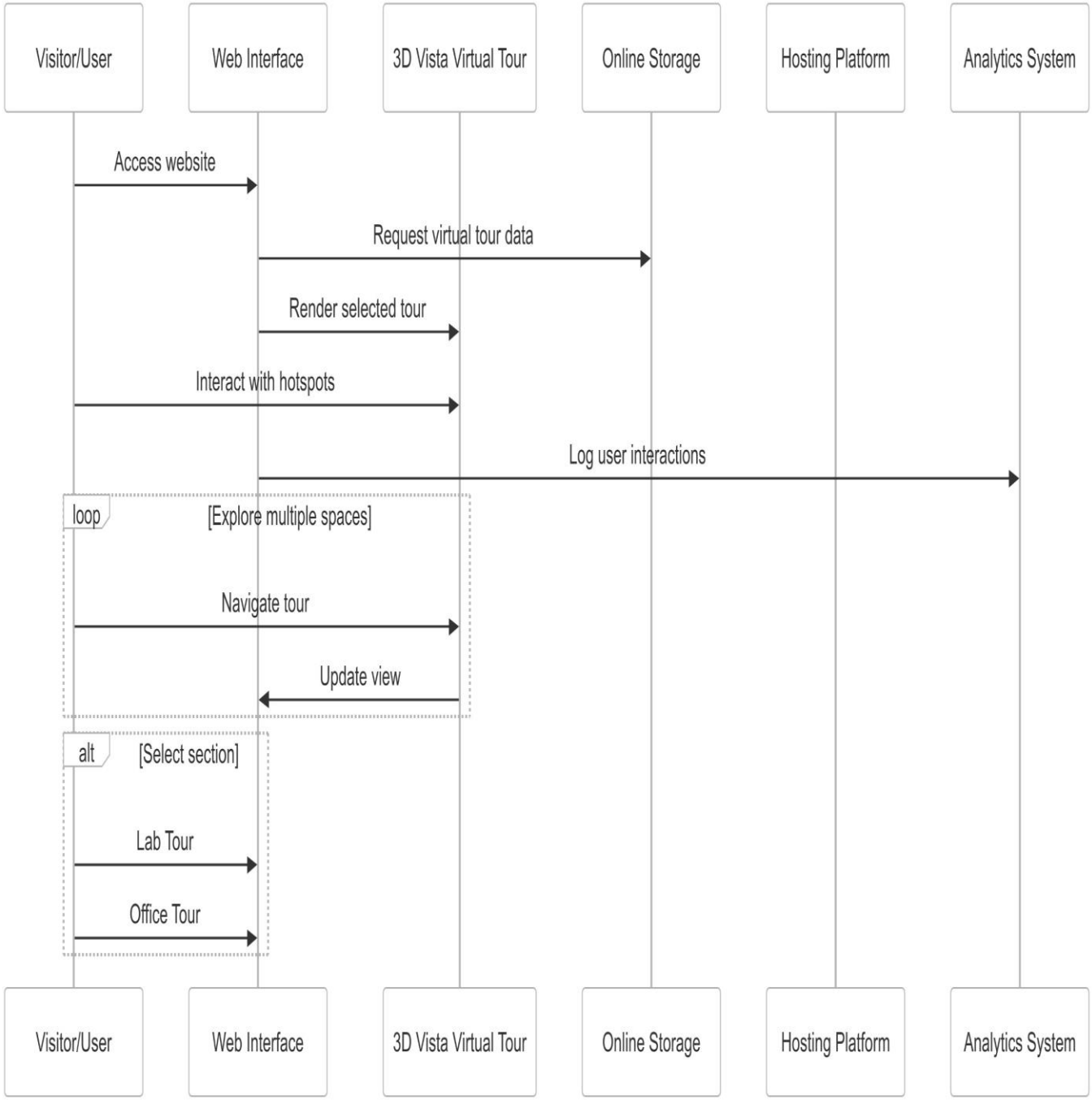
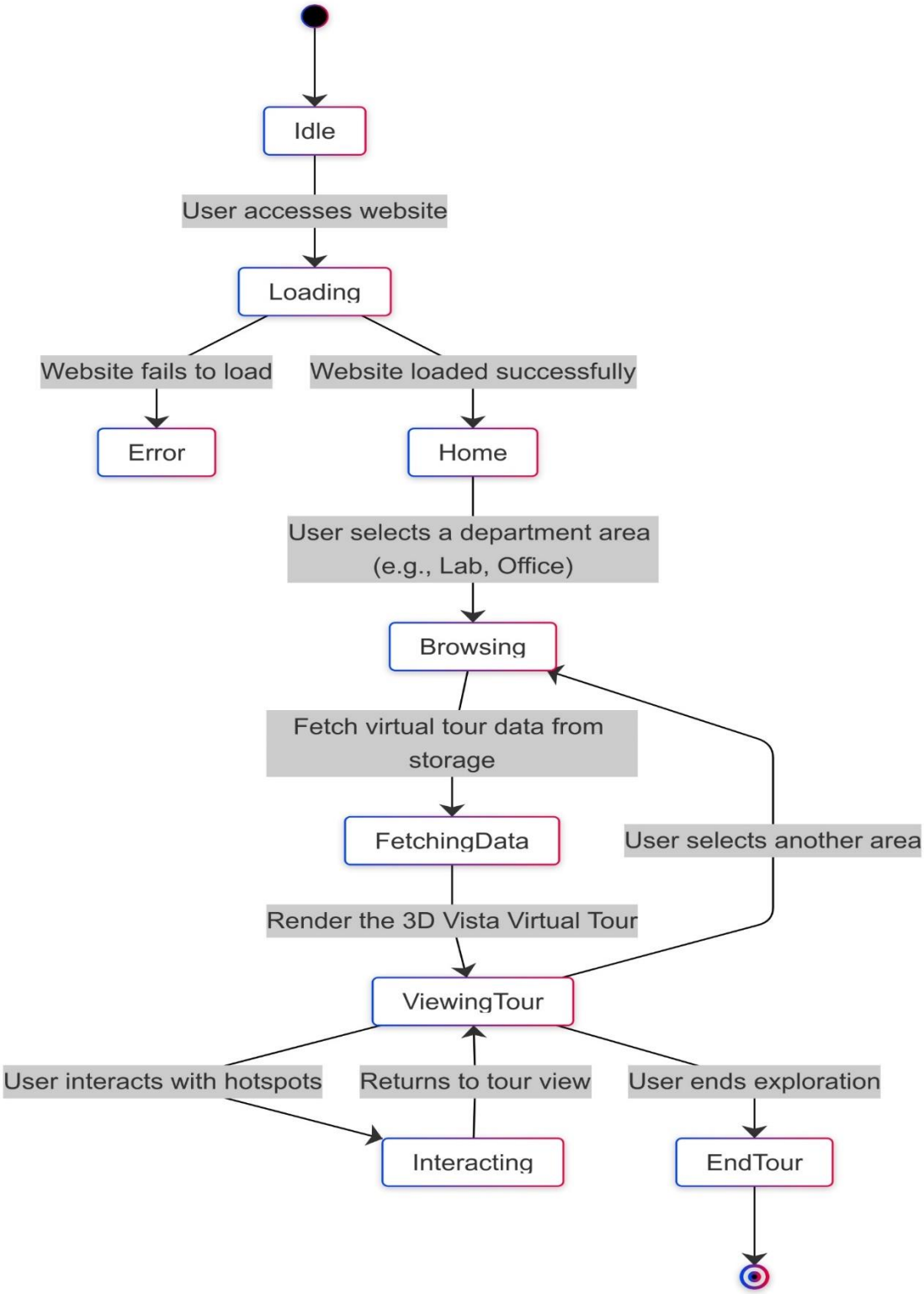


Fig: State transition diagram of virtual department tour



- Logical data models for user interactions and analytics.
- Detailed GUI wireframes for user interface development.

6. Appendices

1. Appendix A: Glossary of Terms

- 3D Hotspot: Interactive markers providing additional content.
- Responsive Design: Web design approach for optimal cross-device compatibility.

2. Appendix B: Tools and Technologies

- 3D Vista: Platform for virtual tour creation.
- HTML, CSS, JS: Core web development languages.
- Google Cloud Storage: Backend solution for storing virtual tour.