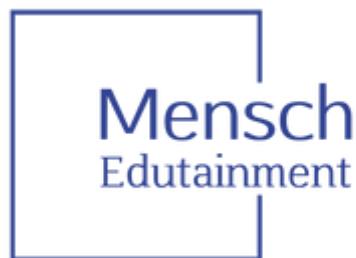




**Interactive Museum Guide and Content Creation System
for Mensch Edutainment**

24-2-D-5



Final Project by

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Abstract

The "Interactive Museum Guide and Content Creation System" is designed primarily for museum and gallery owners, providing them with a comprehensive and intuitive platform to create, manage, and update exhibit content. This system allows museum staff to efficiently produce virtual exhibitions tours with multimedia content, including audio, images, and textual descriptions, directly from their mobile devices. The core of this project is the robust content management system (CMS) tailored for ease of use and flexibility, enabling seamless updates and customizations without the need for extensive technical expertise or external developer assistance.

The output of this system is a dynamic mobile application for visitors, enhancing their museum experience through engaging and interactive content. The visitor app is offering a rich, immersive experience. This dual approach ensures that while museum owners benefit from a powerful and adaptable content creation tool, visitors enjoy a modern, informative, and engaging way to explore museum exhibits. By integrating these advanced capabilities, our project aims to transform how museums interact with their audiences, making cultural experiences more accessible and captivating.

1. Introduction

The rapid digital transformation in recent times has significantly impacted all aspects of public life, including museums. The information society is forcing museums to rethink how they distribute and grant access to their collections by introducing new and creative ways for visitors to engage with them [Nikolau, 2024].

Since 2009 museums and galleries have started introducing mobile apps in their range of interpretative media and visitor services. As mobile technology continues to develop and permeate all aspects of our life, and the capabilities of smartphones increase while they become more accessible and popular, new possibilities arise for cultural institutions to exploit these tools [Economou and Meintani, 2011]. The creation of mobile apps with museum content is a rapidly expanding area. Museums are continuously exploring new strategies for communicating with potential audiences [Laudazi and Boccaccini, 2022]. However engaging visitors, particularly in the digital age, remains a significant challenge. Traditional museum tours often rely

on static displays, physical guides, or audio guides that may not fully leverage the potential of modern technology. Moreover, the cost and logistical effort associated with creating and maintaining these tours can be prohibitive [Nikolau, 2024]. Current solutions in the market primarily focus on custom-built applications that are made for individual museums or specific tours. Once an exhibit is over, the museum or gallery owners need to reach out to the developer and request them to update the current app. These apps require significant investment in both time and money for their development and maintenance since they lack the flexibility to be easily updated or adapted to new exhibits. Some museums use QR codes or similar technologies to provide information about exhibits, but these methods can be cumbersome and fail to deliver a fully immersive experience [Economou and Meintani, 2011]. While some platforms allow for virtual tours, they generally do not integrate comprehensive Content Management Systems (CMS) that enable easy creation, editing, and distribution of content [Economou and Meintani, 2011].

Our project, developed in collaboration with the Mensch-Edutainment Company, aims to revolutionize the way museums, galleries, and heritage sites engage with visitors. The core product is a robust Content Management System (CMS) that empowers institutions to bring their exhibits to life through an intuitive mobile guide. This system enables museums to produce and manage content directly from their mobile devices, including recording audio, capturing video, taking photographs, entering textual descriptions, and assigning exhibits to tours. The output of this system is a user-friendly app for visitors, providing a rich, interactive experience. The system allows museums to create a predetermined number of tours and exhibits, with options to expand these numbers for an additional fee, ensuring flexibility and cost-efficiency. This solution facilitates easy updates and customization of tours without the need for new applications, making it accessible even to those with limited technical expertise. By offering a comprehensive and adaptable solution, our system stands out in the market. It not only addresses the limitations of current bespoke solutions but also anticipates the evolving needs of cultural institutions. The modern features (interactive multimedia tours through mobile, real-time updates, modern design, etc.) of the system are particularly attractive to younger audiences, encouraging a new generation to explore and appreciate museum exhibits. Museums and galleries will gain a flexible, cost-friendly tool for content creation and

management enabling them to provide a different cultural experience. As a result, the museum visitors will benefit from a richer, more engaging experience, accessing high quality content that enhances their understanding and enjoyment of the exhibits.

2. Background and Related Work

2.1 Museum Visitor Guides

Museums serve as pivotal hubs of cultural life and learning. The International Council of Museums (ICOM) states: “A museum is a nonprofit making, permanent institution in the service of society and of its development, and open to the public, which acquires, conserves, research, communicates and exhibits, for purposes of study, education and enjoyment, material evidence of people and their environment” [Davis, 2020]. Following a new orientation to the work of museums, they not only preserve and exhibit artifacts and artworks from various epochs and regions but also act as spaces where individuals can immerse themselves in a rich tapestry of human civilization, knowledge, enjoyment, reflection and artistic expression. Their role is paramount in fostering understanding, appreciating, and critically engaging with human history and creativity [Wood, 2023].

Several approaches and methods have been proposed that allow visitors to interact with an automatic guide. One proposal was a system for children that uses a sensing board which can rapidly recognise types and locations of multiple objects. It creates an immersive environment by giving audio-visual feedback to the kids. Other approaches are robots that guide users through museums. However, such robots are difficult to adapt to different environments, and they are not appropriate for individual use [H.Bay, B.Fasel and L.Van Gool,2005].Another approach is an interactive, image-based museum guide. The method was implemented on a tablet PC using a conventional USB webcam for image acquisition (see Figure 1). This hand-held device allows the visitor to simply take a picture of an object of interest from any position and is provided, almost immediately, with a detailed description of it.

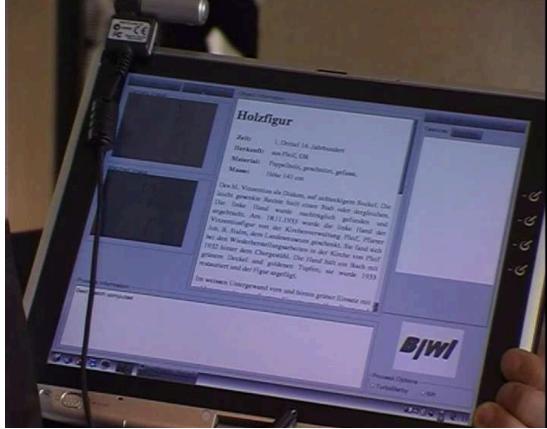


Figure 1: Tablet PC with the USB webcam fixed on the screen. The interface of the object recognition software is operated via a touchscreen [H.Bay, B.Fasel and L.Van Gool,2005].

While the tablet PC with a USB webcam represents an innovative step, it is not without its limitations. This setup requires external devices, which can be cumbersome and inconvenient for both visitors and museum staff. The need to handle additional hardware detracts from the seamless, intuitive experience that modern users expect. Our app eliminates the need for external devices by integrating all necessary functionalities directly into the mobile device. This not only simplifies the user experience but also enhances the portability and convenience of the guide. Our app offers a more robust and flexible solution that addresses the limitations of existing guides. Mobile visitor guides represent a significant advancement in how museums can enhance the visitor experience. By leveraging the capabilities of mobile devices, museums can offer a more interactive, accessible, and personalized experience that engages visitors and enriches their understanding of exhibits. This seamless integration of technology not only improves visitor satisfaction but also helps museums stay relevant in an increasingly digital world.

2.2 AI Technologies in Museums

Artificial Intelligence (AI) technology is revolutionizing the way museums operate and engage with their visitors. By integrating AI, museums can offer enhanced experiences, streamline operations, and unlock new possibilities for curation and preservation. AI can also improve collection management, preserve artifacts with predictive maintenance, and aid in art analysis. In our app, AI Integration will be a

tool that can help the Museum owners to build their tour in an easier, efficient manner.

An example for a museum that uses AI is The Museum of Natural History. The Museum and the Smithsonian Office have collaborated with NVIDIA on a project using AI to digitize the botany specimens, which will likely assist curators to learn from the mass collection data and allow them to focus their time on more sophisticated curatorial works with the extracted information by AI [Smithsonian Insider]. Furthermore, the Smithsonian Institute deployed eight robots (see Figure 2), in three art museums in Washington D.C. encouraging visitors to focus on the exhibits and interact with the artworks as well as other visitors [Smithsonian Insider].

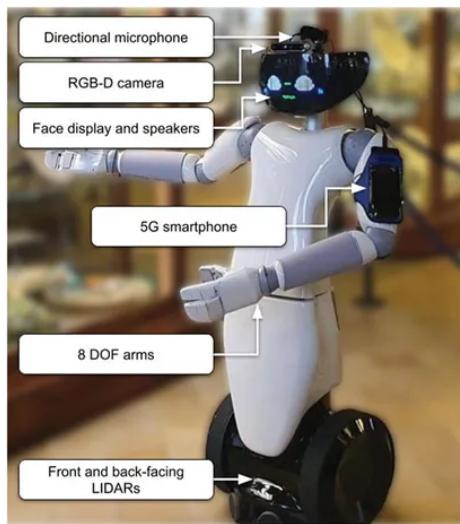


Figure 2: The R1 humanoid robot in the configuration used in the museum trials.

While these robots represent a remarkable integration of technology in museums, they come with certain drawbacks. Robots can be expensive to maintain, may require frequent technical support, and can struggle to adapt to the unique layouts and changing exhibits of different museums. They also may not offer the personalized, interactive experience that visitors increasingly expect in a modern museum setting.

Chatbots in Museums

A chatbot is a software application designed to simulate conversation with human users, especially over the internet. Chatbots are used in various applications, from customer service to personal assistants, and can interact through text or voice. They utilize artificial intelligence (AI) to understand and respond to user inputs in a natural,

conversational manner. Museums have been experimenting with chatbots for more than a decade (see Figure 3). The first chatbot applications were conversational bots that were interacting with the audience through screens as avatars or through phone or text services [Boiano et al., 2003; Boiano et al., 2018]. Gradually with the rise of new advanced AI technologies and the use of social media, new more advanced chatbot apps were introduced and used in several sectors. Chatbots in museums are providing a new way of increasing visitors engagement by functioning as museum guides or as simple question/answer (QA) info agents [Schaffer et al., 2018; Roussou et al., 2019]. The main challenge of the newly designed museum bots is for the developers and the museum stakeholders to decide whether the bots that they implement will stay simple and predefined or will follow the recent trends, become “smarter” using advanced AI technologies and methods [Thies et al., 2017; Schlesinger et al., 2018; Tzouganatou, 2018].

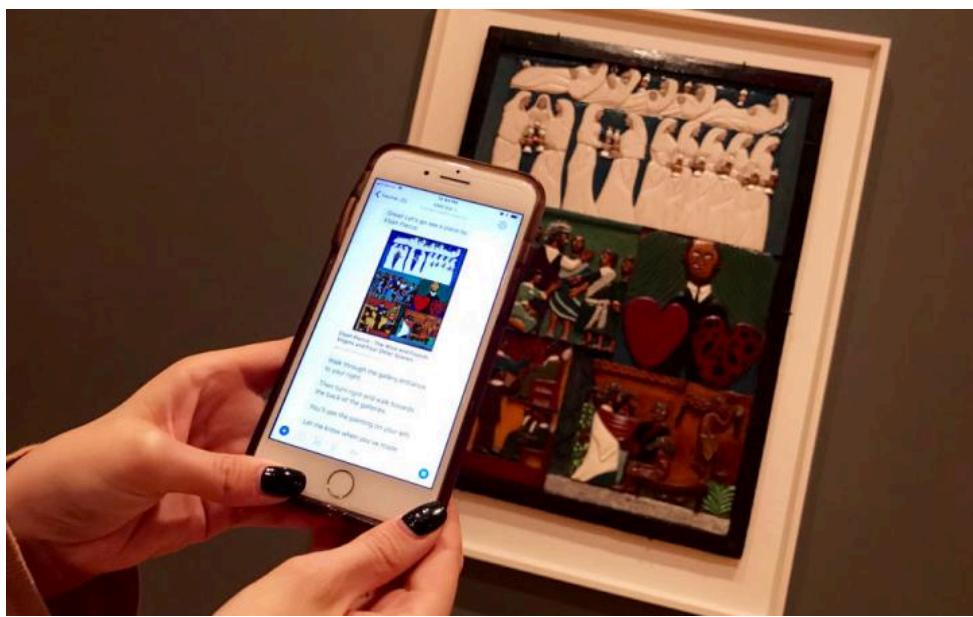


Figure 3: Chatbot in Akron Art Museum

Chatbots can significantly enhance the visitor experience by providing interactive and responsive information, but they also come with notable drawbacks. Maintaining chatbots requires ongoing technical support and reliance on developers to update and manage the database, which can be both time-consuming and costly. This dependency limits the museum's ability to independently manage and customize its content. Our suggested solution, however, offers a comprehensive solution that empowers museum owners to independently manage their content and not rely on external tools or developers. This not only ensures that the content remains current

and relevant but also provides greater flexibility and control over the museum's digital offerings.

2.3 Content Creation and Management (CMS)

A Content Management System (CMS) is a software application designed to facilitate the creation, editing, and publishing of content by multiple users. It stores content in a database and presents it through a set of templates, such as those used for websites¹.

Key components of a CMS are²:

Content Creation Tools - for editing and designing.

- **Text Editors:** Similar to word processors, these editors allow users to write and format text.
- **Media Uploaders:** These tools enable users to upload and insert images, videos, and other multimedia elements.
- **Templates:** Pre-designed layouts and themes that users can apply to their content for a consistent look and feel.

Content Management - for content managing.

- **Storage:** All content is stored in a centralized database.
- **Organization:** Content can be categorized and tagged for easier retrieval and management.
- **Version Control:** Tracks changes to content over time, allowing users to revert to previous versions if needed.

2.4 Existing Solutions of CMS and Apps in Museums

An example of CMS platforms that are being used by museums nowadays is WordPress with museum-specific plugins and Omeka³. WordPress is a versatile and widely used CMS that, when combined with specific plugins, can be tailored to meet the needs of museums³. Omeka is a CMS specifically designed for cultural heritage institutions like museums, libraries, and archives. It is widely used for creating digital collections and online exhibits. The Athenaeum of Philadelphia Featured Collections⁴

¹

²

³<https://whatcms.org/c/Omeka>

⁴ [The Athenaeum of Philadelphia](#)

uses Omeka to create online exhibitions that provide detailed narratives and context for its collection⁵. The Website presents customizable exhibit pages with multimedia integration and flexible theming options for unique presentation styles. The user can enter an online exhibition and scroll through information about the exhibition and each of the artworks that are presented. The online exhibition features only images and text, there is no use of audio or video recordings⁶. While Omeka supports responsive design, its mobile optimization is not advanced. This can affect the user experience for visitors accessing the site on mobile devices⁷.

MOVE TO 2.1

An app that provides virtual tours is The National Gallery of Art⁸. With the app the visitor can discover highlights of the National Gallery of Art collections. It offers personal access to images, text, and audio. The user can explore more than 130 beloved works by artists including Leonardo da Vinci, Rembrandt van Rijn, Johannes Vermeer, Claude Monet, and others. Along with history and conservation notes⁹. The app provides a basic platform for browsing some of the artworks the Gallery has to offer, but it lacks in many aspects. The app provides limited information about each and every artwork including text, picture and a record only. The design is outdated and seems to fail in engaging visitors (see figure 4). Limited to iOS devices, they exclude a significant portion of potential users who use Android or other platforms. Additionally, they often lack current and updated information, diminishing the relevance and accuracy of the content presented to visitors. Crucially, these apps require developer intervention for updates, resulting in delays and additional costs, and hindering the museum's ability to quickly adapt and refresh exhibits.

⁵ [Omeka directory](#)

⁶ [Omeka collection](#)

⁷ [Omeka's bugs](#)

⁸ [National Gallery of Art](#)



Figure 4: Screenshots from The National Gallery of Art presenting highlights and artworks of the application.

Therefore, in our project, we wish to offer a richer multimedia experience with detailed textual descriptions, and audio-visual content, all presented through a modern, intuitive interface designed to captivate and engage users. Our app ensures compatibility across all major operating systems and incorporates real-time updates to keep information current. It empowers museum staff with a robust CMS, allowing them to independently create, edit, and update content directly from their mobile devices. Leveraging advanced technologies such as AI for description generation. This modern, engaging approach not only sets a new standard in the museum technology landscape but also provides a cost-effective, scalable solution that enables museums to maintain dynamic and relevant exhibits effortlessly.

2.5 Desired Usage of CMS in Museums

One of the standouts features of the desired CMS is its mobile accessibility, meaning that museum staff will be able to create and manage content directly from their mobile devices. This means they can:

- **Record Audio:** Capture detailed audio descriptions of exhibits, interviews with curators, or background information.
- **Capture Video:** Shoot and upload videos showcasing exhibits, behind-the-scenes footage, or interactive content.
- **Take Photographs:** Quickly snap high-quality images of exhibits and artifacts to add visual appeal to the tours.
- **Enter Textual Descriptions:** Input detailed descriptions, historical contexts, and interesting facts directly into the system.

- **Assign Exhibits to Tours:** Organize exhibits on specific tours, making it easy for visitors to navigate and learn.

Content Management Flexibility

The CMS should be designed to be highly flexible, allowing museums to manage a predetermined number of tours and exhibits. However, it should also offer scalability:

- **Expandable Content Limits:** Museums can opt to expand the number of tours and exhibits for an additional fee. This pay-as-you-go model ensures that museums of all sizes can benefit from the CMS without unnecessary financial burden.
- **Customization and Updates:** The flexibility of the CMS means that museums can easily update and customize their tours. Whether adding new exhibits or reconfiguring existing tours, the process is straightforward and does not require developing a new application.

User-Friendly Interface

The application should be designed to be intuitive and easy to use, ensuring accessibility even for users with limited technical expertise:

- **Simple Navigation:** A clean and organized interface helps users find the tools they need quickly.
- **Guided Processes:** Step-by-step guides and prompts assist users in creating and managing content effectively.
- **Support and Resources:** Access to tutorials, customer support, and documentation helps users overcome any challenges they might face.

Some of the benefits of utilizing a CMS will include saving both time and money. There will be minimal development costs, reduced management and maintenance expenses, and museums will have the ability to scale their content management needs according to their specific requirements and budget. By using such a system, museums can ensure they remain dynamic, engaging, and relevant in the digital age.

Our suggested solution, developed in collaboration with Mensch-Edutainment, stands out in the museum technology offering museums the tools they need to create, manage, and present content dynamically, ensuring both staff and visitors have an enriched experience.

3. Expected Achievements

Our project aims to transform the interaction between museums and their visitors by providing an advanced, flexible, and user-friendly mobile guide integrated with robust content management capabilities. By leveraging the latest in mobile and AI technologies, our solution will not only enhance visitor engagement but also streamline the content creation and management process for cultural institutions.

The suggested system will have a user-friendly interface designed for simple navigation and guided processes, making it accessible even for any user and any device. Each museum owner will be able to purchase the app and create his own custom guided tour with it. He will then release it to the visitors and will be able to control each and every aspect of it. The owner will have the ability to edit, record, write, take pictures and make any changes in his tours, making him 100% independent without the need to rely on external companies or developers. The visitors will be able to access the virtual tour through their mobile (for a limited time).

The main expected achievements of this project include:

Streamlined Content Management:

Enabling museums to easily create, edit, and manage exhibit content directly from their mobile devices. Providing a flexible content management system that allows for quick updates and customization without the need for new application development. Incorporating AI tools to enhance content quality, accessibility, and translation, thereby broadening the reach to a global audience.

Cost-Effective Solution:

Reducing the need for significant financial and logistical investments associated with bespoke application development and maintenance. Offering an adaptable platform that can be expanded with additional tours and exhibits for a nominal fee. Eliminating the cumbersome process associated with using QR codes and other less immersive technologies.

3.1 Success Criteria

To measure the success of our project, we have established the following criteria:

User Satisfaction - High levels of visitor interaction with the app and good feedback.

Content Management Efficiency - Enable museums to independently create and update most of the exhibit content without external developer assistance. We aim to reduce the time required for content updates compared to previous methods.

Moreover, we aspire to achieve a high satisfaction rate from museum staff regarding the ease of use.

Cost Efficiency - Low ongoing maintenance costs due to the app's robust design and user-friendly content management system.

Technological Performance - High reliability, functioning without significant downtime or technical issues, ensuring a seamless experience for users. It exhibits fast loading times across all features, including media-rich content, which is crucial for maintaining user engagement and satisfaction. Furthermore, the app is designed for broad compatibility, working smoothly across a variety of devices and operating systems

4. Engineering Process

4.1 Engineering Process

The project began when we received an offer from Menachem, whose role is to provide technical solutions to museums. He was seeking a comprehensive content management system, and we were looking for a final project, leading to the creation of this idea in collaboration. The process began with a thorough initial research and analysis phase. This involved conducting comprehensive market research to analyze existing mobile apps and CMS solutions used by museums, galleries, and heritage sites. The goal was to understand the current landscape, identify gaps, and determine user needs and preferences. This was complemented by an extensive literature review, which involved examining academic and industry publications to gather insights on the challenges and opportunities associated with digital transformation in museums. Additionally, we conducted follow-up interviews with Menachem to gather requirements, identify pain points with current systems, and validate our initial concept.

Following this, we moved into the requirement gathering and specification phase. Here, we created detailed user stories and scenarios to capture both the functional and non-functional requirements of the suggested system (see sections 4.1.1 and 4.1.2). This step ensured that we had a clear understanding of the user's needs and expectations. We also defined the technical requirements for the app, including platform compatibility, performance benchmarks, security standards, and scalability needs. This comprehensive requirement analysis laid a solid foundation for the subsequent design and development phases.

During the design and prototyping phase, we created wireframes and mockups for the suggested system (CMS and the app) to emphasize an intuitive and user-friendly design and to validate our design choices and obtain more specific feedback, ensuring the design aligns with user expectations and requirements. We then met with Menachem to present him these visual representations that envision the final product, collected early feedback from him and received his final approval to move forward with the development process.

4.1.1 Functional Requirements

Admin (Menachem):

1. The system allows the admin to activate or cancel a museum.
2. The system allows the admin to receive up-to-date information on existing customers and their status (paid / didn't pay, Subscription expiration...).
3. The system allows the admin to update and change the product cost and pricing

Museum Owner:

1. The system allows the museum owner to assign specific employees or curators with permissions to upload and edit exhibitions.
2. The system allows museums to expand the number of tours and exhibits they can manage by purchasing additional capacity.
3. The system allows the museum owner to submit a request to open an exhibition

Curator:

1. The system allows curators to manage and update exhibit content directly from their mobile devices, ensuring easy and flexible content management
2. The system allows the curators to record audio descriptions of exhibits directly from their mobile devices.
3. Allows the curators to film/picture
4. The system allows museum staff to take and upload high-quality photographs of exhibits and artifacts.
5. The system allows museum staff to enter and edit textual descriptions, historical contexts, and interesting facts about exhibits.
6. The system allows curators to edit and create content through the integration of AI.
7. System's outcome will be a mobile visitor's guide

Visitor:

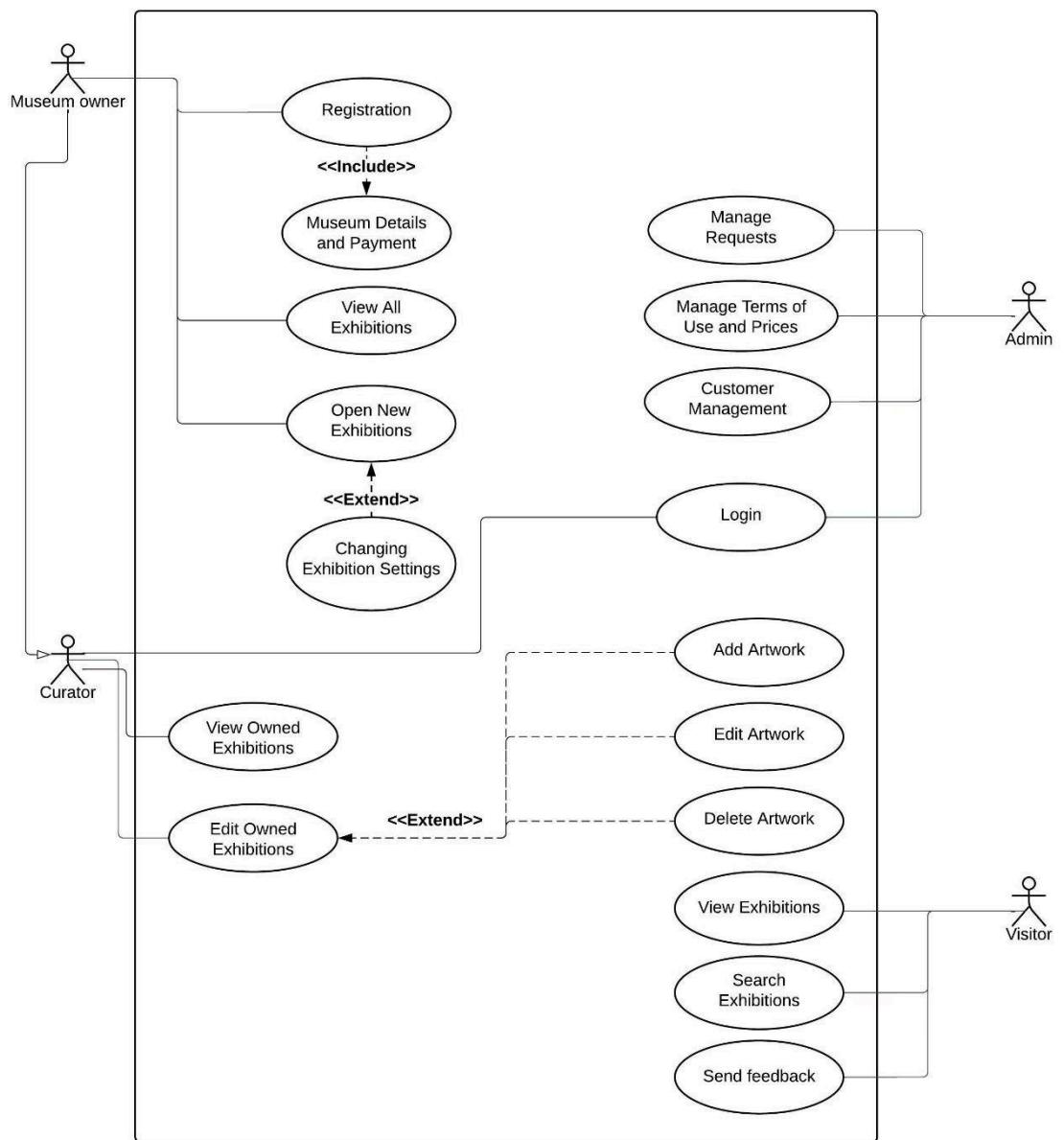
1. The mobile visitor's guide allows museum visitors to access high-quality multimedia content, including audio, video, and images, enhancing their understanding and enjoyment of the exhibits.
2. The mobile visitor's guide allows museum visitors to interact with exhibits through a user-friendly mobile app, providing an immersive and engaging experience.

4.1.2 Non-Functional Requirements

1. **Scalability:** The system must be able to handle an increasing number of users, exhibits, and tours without performance degradation.
2. **Usability:** The system should provide an intuitive and user-friendly interface for all user roles, ensuring ease of use and minimal training requirements.
3. **Accessibility:** The system should include accessibility features to accommodate users with disabilities, such as screen readers and adjustable text sizes.
4. **Maintainability and Documentation:** The system must be designed for easy maintenance, with clear documentation and modular code to facilitate updates and troubleshooting.

5. **Performance:** The system must support real-time updates and synchronization of exhibit content across multiple devices.
6. **Backup:** Backups must be made on the system throughout the project
7. **Adaptability:** The system should be adaptable to different devices and different screen sizes.
8. **Flexibility:** The system architecture should support the addition of new features and modules with minimal impact on existing functionality.
9. **Payment Processing:** The system must integrate with secure and reliable payment gateways to handle transactions for purchasing and submitting exhibition requests.

4.1.3 Use-Case Diagram



Use case	Login
Description	The process by which a user logs into the system.
Actors	Museum Owner, Curator, Admin
Triggers	“Login” icon has been pressed.
Successful Scenario	<ol style="list-style-type: none"> 1. The system opens the login page. 2. The user enters valid credentials (username and password). 3. The system authenticates the user and grants access.
Alternative Scenario	<ol style="list-style-type: none"> 1. The user enters invalid credentials. <ol style="list-style-type: none"> 1.1. The system displays an error message and prompts for re-entry. 2. The user does not have an account (new user). <ol style="list-style-type: none"> 2.1. The system prompts the user to register.

Use case	Registration
Description	The process by which a new user (museum owner) creates an account in the system.
Actors	Museum owner
Triggers	“Registration” icon has been pressed.
Successful Scenario	<ol style="list-style-type: none"> 1. The system opens the registration page. 2. The museum owner fills in the required details (name, email, password, etc.).

	<ol style="list-style-type: none"> 3. The system validates the information and creates a new user account. 4. The system sends a confirmation email to the museum owner.
Alternative Scenario	-

Use case	View All Exhibitions
Description	Allows users to view all available exhibitions.
Actors	Museum owner
Triggers	“View Exhibitions” has been pressed.
Successful Scenario	<ol style="list-style-type: none"> 1. The system opens the exhibitions page. 2. The system displays a list of all the exhibitions. 3. The user navigates between the exhibitions
Alternative Scenario	The system displays a message indicating no exhibitions are found.

Use case	Open New Exhibitions
Description	Allows a museum owner to open a new exhibition.
Actors	Museum owner
Triggers	“Create new Exhibition” has been pressed.
Successful Scenario	<ol style="list-style-type: none"> 1. The system opens the new exhibition page. 2. The museum owner fills in the exhibition details.

	<ol style="list-style-type: none"> 3. The museum owner pays for the service. 4. The system saves and creates the new exhibition.
Alternative Scenario	<ol style="list-style-type: none"> 3. The museum owner decides not to pay for the service at this time. 4. The owner of the museum decides to leave the site.

Use case	Changing Exhibition Settings
Description	Allows a museum owner to modify the settings of an existing exhibition.
Actors	Museum owner
Triggers	“Changing Exhibition Settings” has been pressed for specific exhibitions.
Successful Scenario	<ol style="list-style-type: none"> 1. The museum owner selects an existing exhibition. 2. The system opens the relevant screen. 3. The museum owner updates the necessary settings. 4. The system saves the changes and updates the exhibition.
Alternative Scenario	-

Use case	View Owned Exhibits
Description	Allows a curator to view all exhibits they manage.
Actors	Curator
Triggers	“View Owned Exhibits” has been pressed.
Successful Scenario	<ol style="list-style-type: none"> 1. The system opens the owned exhibits page. 2. The system displays a list of all exhibits managed by the curator. 3. The curator navigates between the exhibits
Alternative Scenario	<ol style="list-style-type: none"> 1. No exhibits are managed by the curator. 2. The system displays a message indicating no exhibits are found.

Use case	Edit Owned Exhibits
Description	Allows a curator to make changes to the details of exhibits they manage.
Actors	Curator
Triggers	“Edit Owned Exhibits” has been pressed.
Successful Scenario	<ol style="list-style-type: none"> 1. The system opens the edit exhibits page. 2. The system displays a list of all exhibits managed by the curator. 3. The curator selects an exhibit to edit. 4. The system displays the exhibit details for

	<p>editing.</p> <ol style="list-style-type: none"> 5. The curator makes the necessary changes. 6. The curator saves the changes. 7. The system updates the exhibit with the new details.
Alternative Scenario	<ol style="list-style-type: none"> 1. No exhibits are managed by the curator. 2. The system displays a message indicating no exhibits are found.

Use case	View Exhibitions
Description	Allows visitors to view exhibitions.
Actors	Visitor
Triggers	User entered the link / QR of the exhibition
Successful Scenario	<ol style="list-style-type: none"> 1. The system opens the exhibitions page. 2. The system displays a list of all exhibitions.
Alternative Scenario	<ol style="list-style-type: none"> 1. The visitor is not interested in using the application. 2. The visitor tours the exhibition and uses the static information (e.g., physical signs, brochures, and labels) present in the exhibition to learn about the exhibits.

4.1.4 Technology Requirements

Operating Systems

The web application will be compatible with the latest versions of major web browsers, including Chrome, Firefox, Safari, and Edge. The server will run on Windows Server, depending on the specific deployment environment.

Development Tools

The development environment will utilize Visual Studio Code as the development environments (IDEs). The programming languages and frameworks used will include JavaScript (React for the frontend, Node.js for the backend), ensuring a modern, efficient, and scalable development process.

Backend Development

The backend of the application will be built using Node.js with Express.js to handle server-side logic, API requests, and interactions with the database.

Hardware Requirements

<u>Category</u>	<u>Details</u>
Server Infrastructure	High-performance servers for backend operations, cloud-based hosting (AWS, Azure, Google Cloud)
User Devices	Smartphones, tablets, and desktops with modern web browsers (Firefox, Chrome, Safari etc.)
External devices	External microphones, cameras for capturing high-quality media

Database Management

MongoDB and Firebase for unstructured data storage and real-time data synchronization.

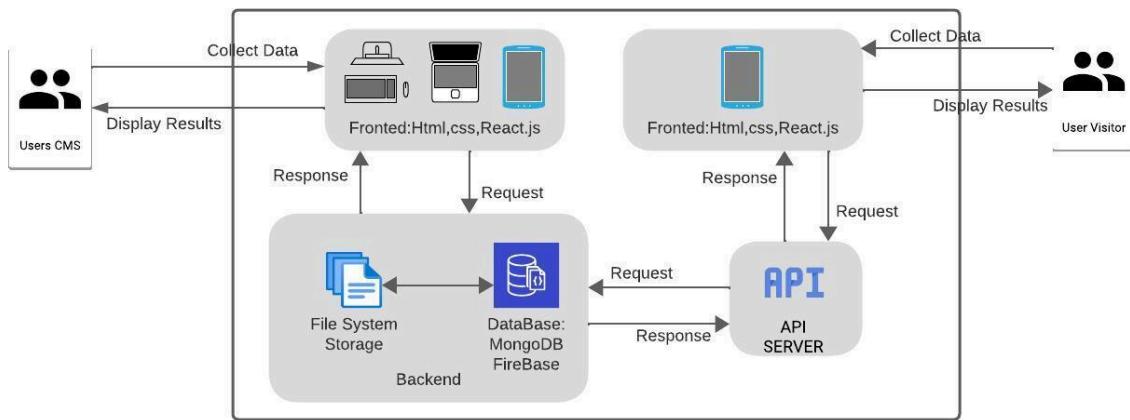
User Interface

The web application will employ a responsive design utilizing HTML5, CSS3, and JavaScript frameworks such as React.js. This approach will ensure accessibility and usability across a wide range of devices.

APIs and Integrations

The application will connect seamlessly with multiple APIs, utilizing Axios for efficient API request handling. By employing modern web technologies, the goal is to enhance functionality and deliver a robust user experience, ensuring consistent performance and compatibility across various platforms.

4.1.5 System's Architecture



The system's architecture is designed to ensure scalability, reliability, and ease of use for both museum staff and visitors. It comprises several key components:

FRONT-Side

Two distinct frontends, built using React, address the needs of different user groups and are designed to be mobile-responsive and easy to use:

1. **CMS Frontend:** This interface is developed for museum staff, including administrators, museum owners, and curators. It supports data collection, content management, and other administrative functions. The design prioritizes user-friendliness and effective management of museum content, ensuring that it is accessible and easy to navigate on both desktop and mobile devices.
2. **Visitor Frontend:** This interface offers an engaging and intuitive experience for exploring museum exhibits and accessing information. It is fully optimized for responsiveness, providing a seamless user experience on a wide range of devices, including smartphones and tablets, ensuring accessibility and ease of use.

The web application, developed using React for the frontend, will ensure responsiveness and accessibility across devices. The user interface will be intuitive and designed with modern principles to enhance user experience.

BACK-Side

The backend setup includes a web server built with Node.js and Express, which handles HTTP requests and serves both the CMS and visitor frontends. Additionally, there is an API server that manages business logic, processes API requests, and interfaces with the database. To ensure secure access, the system will implement robust authentication mechanisms, such as token-based authentication (using JWT), to verify user identities and control access to different parts of the application. This will safeguard sensitive information and ensure that only authorized users can perform certain actions or access specific content.

Database Server

The database server will utilize NoSQL databases, specifically MongoDB and Firebase, for their scalability and flexibility in handling unstructured data. MongoDB will manage the bulk of data storage and retrieval, ensuring efficient handling of large datasets. Firebase will facilitate real-time data synchronization, providing a seamless experience for collaborative content creation and management. Additionally, a file system storage solution will be implemented to handle multimedia files and other large assets, supporting the storage and retrieval of images, videos, and documents efficiently. This combination ensures robust data management capabilities across different types of content.

Communication Protocols

Client-server interactions will be managed using RESTful APIs, ensuring efficient handling of CRUD operations. For real-time capabilities and dynamic updates, advanced techniques will be employed to provide timely information and enhance user engagement, offering a responsive and interactive experience.

4.2 Product

In the project, several algorithms, models, and data structures will be utilized to provide an efficient and user-friendly experience for both museum staff and visitors. Below is a detailed description of these components.

CRUD Operations: Create, Read, Update, and Delete operations will be the fundamental operations performed on the content within the CMS. These operations will be optimized using indexing and caching strategies to enhance performance.

NoSQL Databases: MongoDB and Firebase will be used for their scalability and flexibility in handling unstructured data. MongoDB will manage bulk data storage with collections and documents, while Firebase will provide real-time synchronization

Data Models:

User Data: Will be stored in collections with fields for user information, preferences, interaction history, and roles.

Content Data: Will contain collections for exhibits, tours, multimedia files, and metadata. Each document will include fields like title, description, media URLs, tags, and version history.

In-Memory Data Structures:

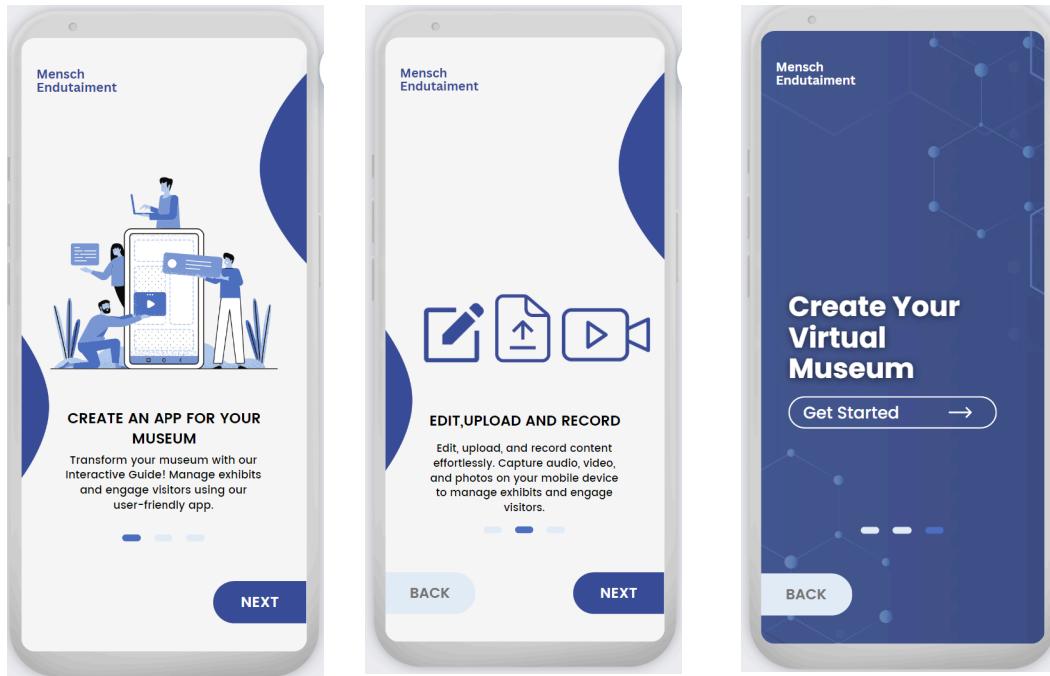
- **Hash Tables and maps:** Will be used for fast lookup of content and user data, facilitating quick access to frequently requested items.
- **Linked Lists:** Will be employed in version control to manage the history of content changes.
- **Queues and Stacks:** Will be utilized in task management and processing workflows within the CMS.

4.2.1 GUI Prototype

Below is the suggested system's GUI prototype.

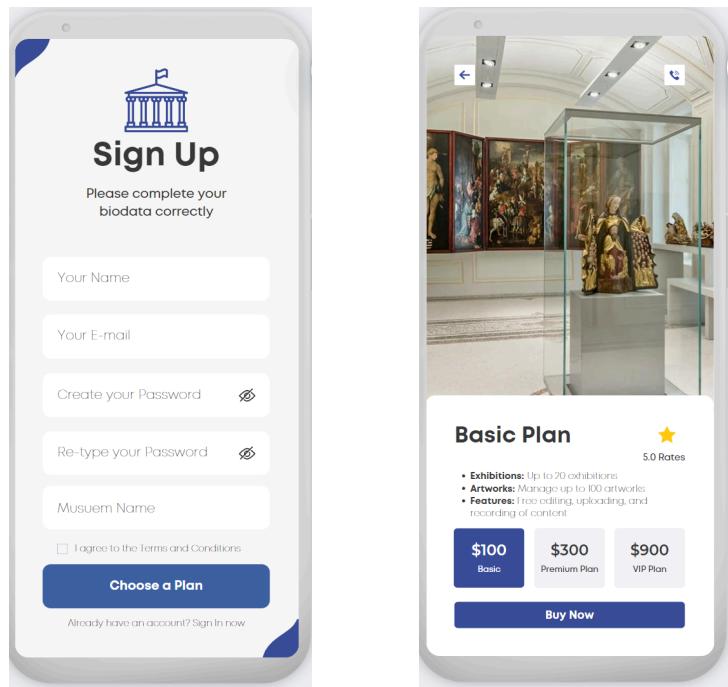
Museum Owner view

First landing page:



The initial screen that a museum owner encounters upon opening the app. This page provides a welcome message and the option to register as a new user.

Register:



The registration page where new users can create an account by entering their personal details such as name, email, and password. This ensures secure access to the app's features (like choosing a plan and more).

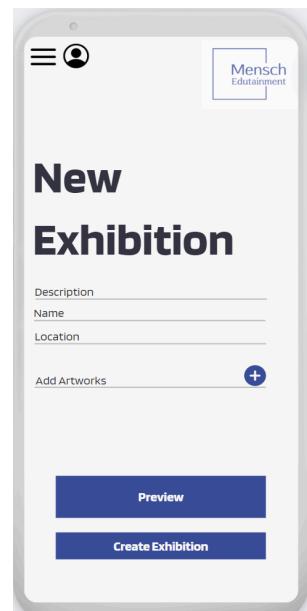
Login page:



View Exhibitions page:



Add New Exhibition:



The login interface for returning users. Museum owners can enter their credentials (email and password) to access their dashboard and manage exhibitions.

The user can navigate to a form for creating a new exhibition. Owners can enter details such as the exhibition title, description, and upload related artworks.

Add New Artwork:



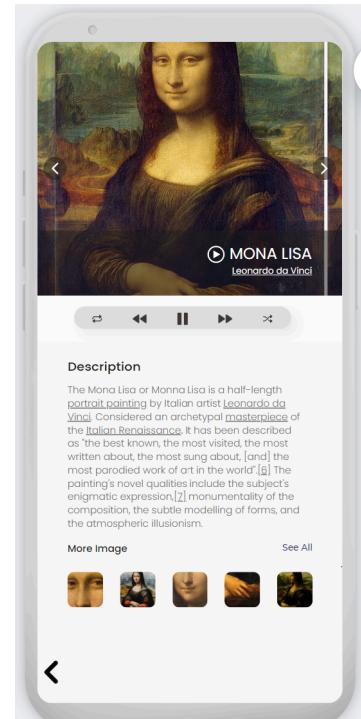
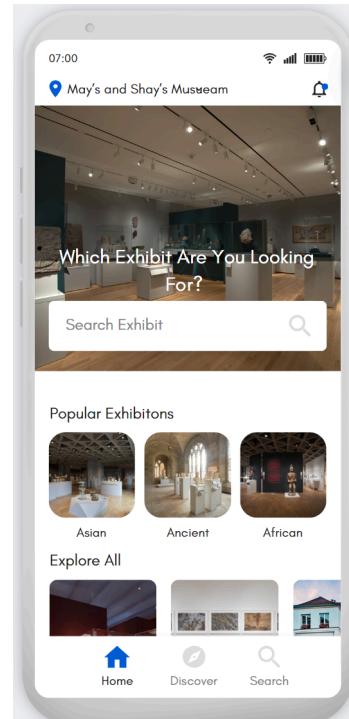
This page is used to add new artworks to an existing exhibition. Owners can insert artwork details, upload images, record videos and add serial numbers. Once added, it is shown in the exhibition dashboard.

Visitor view

Landing page:



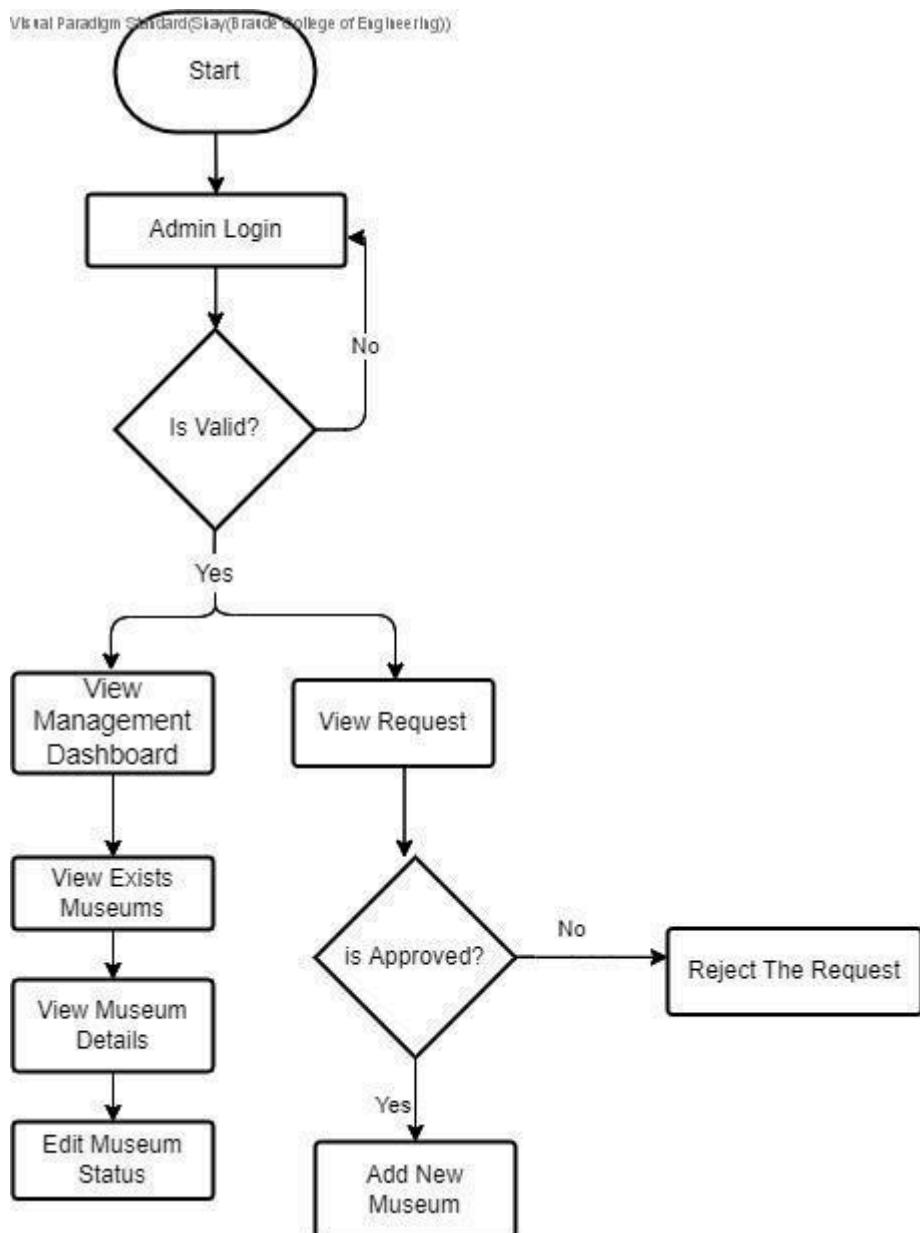
Museum homepage:



The main page that visitors see upon opening the app. It provides options to explore exhibitions, search for specific exhibits, and view featured collections.

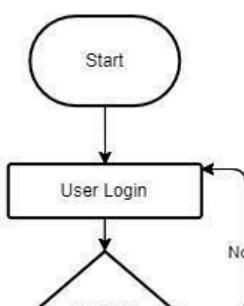
The visitor is led to the homepage for a specific museum, showcasing current exhibitions, upcoming events, and highlighted artifacts. Visitors can navigate to different sections to learn more about each exhibit.

Admin Flow:



Curator flow:

Virtual Paradigm Standard(Slay(Brands College of Engineering))



4.3 Constraints Affecting the Development Process

User Constraints

User constraints pertain to the diverse needs and technical proficiencies of our target audience, including museum staff and visitors. The app must be user-friendly and accessible to individuals with varying levels of technical expertise. This includes providing support for multiple languages and ensuring compatibility with assistive technologies for users with disabilities. To address these constraints, we are conducting user testing and feedback sessions throughout the development process. This user-centered design approach helps us create an intuitive and inclusive app interface.

Technical Constraints

Technical constraints encompass the limitations and challenges related to the technology stack, development tools, and platforms we are using. Ensuring compatibility across various devices and operating systems, such as IOS and Android, requires extensive testing and optimization. Additionally, integrating advanced technologies like AI involves dealing with complexities related to performance, accuracy, and reliability. Technical limitations of mobile devices, such as processing power and battery life, also pose constraints. To address these, we are employing a modular development approach, allowing us to iterate and improve individual components as needed.

Time Constraints

Time is a critical factor affecting our development process due to the fact that we have a couple of months to complete the project. Meeting project deadlines and

milestones requires efficient project management and resource allocation. Delays in any phase of the development process. We have established a detailed project timeline with clearly defined milestones to ensure that we stay on track. We have adopted a strategic approach to maximize productivity and ensure steady progress. We have divided the work between us based on our individual strengths and expertise, allowing us to tackle different aspects of the project concurrently. However, recognizing the importance of collaboration and synergy, we also work closely together to achieve small, incremental milestones. This collaborative approach helps us maintain a continuous flow of progress and keeps us motivated.

Overcoming the various constraints in our development process requires a multifaceted approach. For technical constraints, we are employing a modular development approach to iteratively improve individual components and ensure compatibility across devices and operating systems. To manage time constraints, we have strategically divided the work between the two of us based on our strengths, while maintaining regular collaboration to achieve incremental milestones and ensure continuous progress. We use agile methodologies to adapt quickly to changes and deliver improvements within shorter timeframes. To comply with regulatory and compliance constraints, we are incorporating privacy-by-design principles and conducting regular security audits. We address user constraints by conducting extensive user testing and feedback sessions, ensuring the app is intuitive and accessible to a diverse audience. This comprehensive strategy enables us to tackle each constraint effectively and stay aligned with our project goals.

5. Evaluation / Verification Plan

Evaluation of Menachem

An integral part of our testing and evaluation process is the ongoing feedback and approval from Menachem, our client. Menachem's role is crucial in ensuring that the system aligns with the needs and expectations of museum staff and visitors. Throughout the development process, we will engage in regular meetings and review sessions with Menachem to gather his insights and approval at key stages.

Test Plan

This test plan outlines the strategy for testing the Interactive Museum Guide and Content Creation System developed for Mensch Edutainment. The purpose of this test plan is to ensure that the system meets its requirements and performs as expected. The plan includes a detailed description of the testing phases, the testing environment, and specific test cases.

This test plan outlines the strategy for testing the Interactive Museum Guide and Content Creation System developed for Mensch Edutainment. The purpose of this test plan is to ensure that the system meets its requirements and performs as expected. The plan includes a detailed description of the testing phases, the testing environment, and specific test cases.

The testing environment is designed to closely simulate the production environment. It includes:

- **Hardware:** Smartphones, tablets, and desktops with varying specifications to test compatibility.
- **Operating Systems:** Latest versions of iOS, Android, Windows, and macOS.
- **Software:** Web browsers (Chrome, Firefox, Safari, Edge) and necessary development tools (Visual Studio Code, Node.js, React, MongoDB, Firebase).
- **Network:** Stable internet connection to test online functionalities and API integrations.

Test Cases for UC1 – Content Creation

Pre-Conditions: User has appropriate permissions to create, edit, and delete content.

Test ID	Description	Expected Results	Comments
Create_AudioContent	Record and save an audio description for an exhibit.	Audio content saved and associated with exhibit.	Verify the audio quality and association with the correct exhibit.
Create_VideoContent	Capture and upload a video for an exhibit.	Video content saved and associated with exhibit.	Ensure the video format is supported and playback is smooth.
Create_TextualContent	Enter and save textual description for an exhibit.	Textual content saved and associated with exhibit.	Check for any text formatting issues and proper saving mechanism.
Create_ImageContent	Capture and upload an image for an exhibit.	Image content saved and associated with exhibit.	Confirm image resolution and correct display in the app.
Edit_AudioContent	Edit existing audio content for an exhibit.	Edited audio content saved and updated for exhibit.	Validate that the updated audio replaces the old content correctly.

Performance

Item to be Verified	Performance
Verification Method	Performance Testing
Acceptance Criteria	System responds within acceptable time limits under various loads.
Comments	Include tests for different user loads and data volumes to ensure the system can

	handle peak usage times.
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Cross-Device Compatibility

Item to be Verified	Performance
Verification Method	Compatibility Testing
Acceptance Criteria	System functions correctly on various devices and browsers.
Comments	Test on multiple operating systems, screen sizes, and browsers to ensure a consistent user experience.

This verification plan ensures comprehensive testing of all critical aspects of the Interactive Museum Guide and Content Creation System, providing confidence in its reliability, performance, and user satisfaction.

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7. Appendix

7.1 Interview with Menachem.

דובר 3 (1:11):

"כמו שאמרתי לכם, מנחם ואני עבדנו יחד בעבר בחברת אספרו אקוסטיג'יד, שהתמחתה בייצור מכשירים למבקרים במוזיאונים. אז, שנינו כבר לא עובדים שם, אבל אנחנו עדיין משתפים פעולה. ביום, למןכם יש חברה משלו המתמחה במתן פתרונות טכנולוגיים למוזיאונים בארץ ובעולם. הוא ביקש מאייתנו לבנות עבורו מערכת, ואני חשבתי שכך א' שנעשה אליו שיתוף פעולה. מדובר בחברה רצינית. מה ששלחת להם בעבר היה בנוגע למערכת שמאפשרת עבודה דרך המוביל. המערכת כוללת אפשרות להקליד, לצלם, להזין טקסטים וכותרות ולשייר אותם במספר קטגוריות. דיברנו גם על אפשרות לשלב פונקציות שמאפשרות למשתמש לשימוש את התוכן, לעורר כל אחד ממרכיבי התוכן וגם למחוק תכנים. בנוסף, דיברנו על כך שתהיה גרסת אפליקציה מוגבלת לפני עלייה לאויר כדי שנוכל לבדוק את השימוש בה.

בנוסף, דיברנו על כך שיש לנו אפשרות לבחור תוכנות מיוחדות נוספות אם יהיה זמן. תוכנות אלה יכולות לכלול כל' לעריכת אודיו, אפשרות לתרגום, כל' לעריכת תמונות, או אפילו יצירת סרטון על בסיס טקסט".

דובר 2 (3:11):

"נכון!"

דובר 3 (3:13):

"אנחנו מכוונים שנוכל לשלב לפחות אחת מהאפשרויות האלה. התכנון הוא להתחיל עם אפליקציה שתאפשר לך לבצע את הדברים הבסיסיים שאתה רוצה, ואם ישאר זמן, נוכל לשלב תוכנות נוספות. אנחנו רוצים להשאיר מקום לשיפורים בפרויקטים עתידיים, אולי עם סטודנטים אחרים".

דובר 2 (3:38):

"עכשוו, יש לי שני דברים להגיד רק כדי לשים את הכל בפרספקטיבה".

דובר 3 (3:43):

"אני רק רוצה להוסיף משפט אחרון לפני שאתה ממשיר. המטרה של הפגישה הזאת היא לוודא שכולנו מדברים באותה שפה, אנחנו מבינים את הצריכים שלך. יש לנו אולי כמה שאלות לשאול אותך, אך אתה יכול להמשיך".

דובר 2 (3:58):

"טוב, אז כמו שאמרנו, אנחנו מדברים על אפליקציות מסווג *webApp*, נכון? זה מהهو

שהגדכנו פה. אנחנו מתחזקים באפליקציה למוציאונים, המיעודות גם למבקרים וגם לאוצרים. האפליקציה צריכה לאפשר לבוחר לבוחר סיור או מוצג, לשמעו תוכן, לראות תוכן – זה יכול להיות כל דבר. הדוגמה של סוכנות הידיעות בלומברג היא דוגמה טובה, הם פיתחו אפליקציה למוציאונים וזה עובד נהדר. האפליקציה היא בסיסית, וזה בסדר גמור. אנחנו לא צריכים יותר מדי דברים מסובכים.

לפני עידן הסמארטפונים, מוציאונים היו משתמשים במכשירים פיזיים מיוחדים, ואולי גם אתם נתקלתם בהם. במוסדות מסוימים היו מכשירים פיזיים שניתנים לבקרים כדי שיוכלו לשמעו הסברים על התערכות. זה עדין קיים, ויש לזה יתרונות מסוימים. עם זאת, כניסה הטכנולוגיה הסולוירית אפשרה להרחב את מגל המשתמשים. בעצם, כל מוציאון, גם אם הוא קטן, יכול להרשות לעצמו טכנולוגיה צזו, כי אין צורך בהשקה גדולה במכשירים פיזיים".

דובר 2 (5:44):

"זה אפשר למוציאונים קטנים להצטרף לשוק, מה שהיא כמעט בלתי אפשרי בעבר בגלל העליות הגבוהות. הבעיה העיקרית שנשארת היא עליות הפקת התוכן. לא משנה אם מדובר במוציאון גדול או קטן, יכולים צריכים להפיק תוכן אינטטידי למשוך מבקרים. העלות של הפקת תוכן נשאה גבוהה, וזה מה שנחנו מנסים לפרט. אנחנו רוצים ליצור כל' שמאפשר לאוצרים להפיק תוכן בקלות ובמהירות, בלי להיכנס לעליות גבוהות".

דובר 3 (6:47):

"נכוון. אנחנו מכוונים במיוחד למוציאונים שעדיין לא הטרפו לעידן הדיגיטלי בגלל העליות הגבוהות של הפקת התוכן. אנחנו רוצים לספק להם כל' שיאכל לשמש אותם בצורה פשוטה ויעילה, בלי להכביר על התקציב שלהם".

דובר 2 (7:46):

"זה בדיק מה שנחנו רוצים להציג. אנחנו רוצים כל' שאינו, בתור אוצר או מנהל מוציאון, אוכל להשתמש בו בקלות. אני יכול להקליט את עצמו, לתת לאמן להקליט את עצמו, להוסיף וידאו, או כל סוג אחר של מדיה שאינו רוצה. המטרה היא שהכל יהיה פשוט לשימוש, כך שכל אוצר יוכל לבנות את התערכותה שלו בעצמו, בלי צורך במומחים חיצוניים".

דובר 3 (8:02):

"אתה מתכוון שכל מבקר יוכל להשתמש בכל' זהה?"

דובר 2 (8:04):

"לא, לא. הכל' מיועד לאוצרים ולמנהל מוציאון. המבקרים יכולים רק לצפות בתוכן שנוצר. הכל' הוא ליצור התוכן ולא לצריכתו".

דובר 1 (8:06):

"אם כך, המבקרים יגיעו רק לשלב הסופי, לצפות ולהאזין לתוכן שנוצר".

דבר 2 (8:07):

"בדיקה. מבחינת המבקר, לא משנה לו איך נוצר התוכן. הם רואים את התוצאה הסופית באפליקציה שלהם, זהה. אני חשב שהיום יש את כל הכלים שאנו צריכים כדי לעשות את זה. יש לנו טכנולוגיה סולרית, יש לנו תוכנות עריכה פשוטות. בעצם רק צריך להביא את הכל יחד".

דבר 2 (8:55):

"אני לא חשב המודיאונים הגדולים כמו מוזיאון ישראל או מוזיאון תל אביב יצרו את זה, כי יש להם את המשאבים שלהם. אנחנו מכוונים למודיאונים הקטנים יותר, שהם רוב השוק. יש מאות אלפיים מהם שיכולים להרוויח מהפתרונות הזה".

דבר 3 (9:30):

" אנחנו צריכים מערכת ניהול תוכן (CMS) שדרכה האוצרים יכולים ליצור את האפליקציה, והtoutאה תהיה אפליקציה עבור המבקרים. זו מערכת שיש לה שני חלקים: ה-CMS והאפליקציה עצמה".

דבר 2 (10:00):

"נכון. אנחנו מדברים על פיתוח של מערכת קלה לשימוש, שיכולה לשלב כלים כמו GPT או אם אנחנו צריכים על יצירת סרטון לדוגמה, אנחנו רוצים שזה יהיה בrama של טיקטוק – קל ופשוט לשימוש. לא צריך לחשב על הפקת סרט קולנוע, אלא משחו מהיר ונגיש".

דבר 3 (11:03):

"המטרה היא שהתוכן יהיה קצר וקל".

דבר 2 (11:07):

"בדיקה. גם מבחינת טכנית, אנחנו לא מתחשים איך שידור לקולנוע. זה יכול להיות בrama פודקאסט או סופטיפי, זה מספיק".

דבר 4 (11:32):

"יש לנו כמה שאלות שעלו לנו בנוגע לזה. דבר ראשון, יש לנו משתמשים שיכולים לצפות בתוכן. האם יש גם אוצרים שיכולים ליצור את התוכן, וגם משתמשים בrama אדמיניסטרטיבית שיכולים לשלוט על התعروכות?"

דבר 1 (12:08):

" אנחנו צריכים להגדיר מישו שאפשר לפנות אליו לצורך עדכון או הורדה של תعروכה".

דבר 2 (12:16):

"כן, צריך להיות מישו בrama האדמיניסטרטיבית שיוכל לשלוט על הכל. הוא יכול להוסיף או להסיר תعروכות, לשלוט על ההגדירות ו לנשלט את כל התכנים במערכת. למעשה, אנחנו מדברים על שכבת ניהול שתוכל לשלוט על כל המערכת".

דברר 3 (13:23):

"אנחנו מדברים על המבקרים הרגילים שלא ישתמשו במערכת הזאת ליצירת תוכן. הם רק יצרו את התוכן בתערוכה".

דברר 2 (13:35):

"כון, המבקרים לא ישתמשו במערכת היצירה, רק יצפו בתכנים שIALIZEDים להם".

דברר 4 (13:48):

"מה לגבי האוצר שייצור את התערוכה? האם הוא מקבל גישה לכלי שיוכל ליצור תערוכה עם כל הפיצ'רים שדיברנו עליהם?"

דברר 2 (14:27):

"כן, אנחנו צריכים לחשוב על איך זה יבוצע בפועל. אנחנו מדברים על מערכת שתאפשר לאוצר לייצור סיור ולשלוט בתכנים, אבל אנחנו צריכים להגדיר את כל הגישה למערכת. אם למשל, מישו מקבל גישה לניהול תכנים במודיאון חיפה, הוא יוכל לראות רק את התכנים הקשורים לאותו מוזיאון".

דברר 3 (15:46):

"אנחנו יכולים לרשום את זה כהערה. זה נייסתו הב, אבל לא חובה".

דברר 4 (15:56):

"נראה שאנו נכנסים פה לעומק. האם אנחנו יודעים אם תהיה אפשרות לתשלום חודשי או חד-פעמי עבור השימוש במערכת?"

דברר 2 (16:13):

"מדובר על מודל תשלום חודשי. יכול להיות גם מודל מבוסס תשלום חד פעמי, אבל אנחנו מעדיפים את המודל החודשי המאפשר גמישות רבה יותר".

דברר 3 (16:26):

"מה לגבי מספר הסירות הבסיסי שיינתן למוזיאונים?"

דברר 2 (16:42):

"כעיקרון, הכל יהיה בתשלום. אנחנו צריכים להגדיר את זה בצורה מסודרת. יכול להיות שהמודיאון יקבל סיור אחד בחינם כדי להתנסות, ולאחר מכן יצטרך לשלם עבור תוספת סיורים או תכנים נוספים".

דברר 3 (17:52):

"יש לך שרת שהם יכולים להעלות אליו תכנים?"

דברר 2 (17:57):

"כן, יש לנו שרת. אני אשלח לכם את הפרטים בהמשך".

דברר 3 (18:09):

"תרשמו לעצמכם שלמנחים יש שרת והוא יתן לכם פרטים בהמשך".

דברר 4 (18:27):

"עכשו מהו שאני עדין לא מבינה – איך בפועל הסיוור זהה יעבד? אם אוצר יוצר סיוור, איך המבקר ידע לאיזה יצירה ללבת?"

דברר 2 (18:49):

"הפרויקט הזה מורכב משני חלקים: CMS ליצירת התכנים אפליקציה לצפיה. המבקר מקבל גישה לאפליקציה באמצעות קוד QR שיסרוק או לינק שיביל אותו ישירות לתוכן."

דברר 3 (19:45):

"צריך להבדיל בין סוגים משתמשים – יש את המבקר ויש את האוצר. אנחנו לא רוצים שהמוני 'משתמש' יבלבל אותנו. על מי מדברים?"

דברר 2 (20:10):

" אנחנו מדברים על המבקר, זה שmagiu לטעוכה."

דברר 3 (20:12):

" רק רציתי לוודא שאנחנו מדברים על אותו דבר."

דברר 2 (20:17):

" כן, למבקר תהיה גישה לבחירת מספר או צפיה בתמונה קטנה שתוביל לתוכן הרצוי. זה צריך להיות פשוט וינטואיטיבי."

דברר 3 (20:38):

" נכון. אם יש רשימה של מוצגים, הכי פשוט להציג אותם כгалריה. כך המבקר יוכל לבחור מה מעניין אותו."

דברר 2 (21:30):

" נכון, המטרה היא לפשט את חווית המשתמש. אולי בעתיד נוסיף פיצרים כמו זיהוי תמונה, אבל כרגע אנחנו מתמקדים ביכולת הבסיסית של האפליקציה."

דברר 3 (22:20):

" מה שחשוב הוא שיהיה כל' פשוט לאוצר שיאפשר לו ליצור טעוכה בקלות. השימוש על ידי המבקר הוא חשוב, אבל כרגע נתמקד בبنית הכל' לאוצרים."

דברר 2 (23:08):

" נכון, הכל' לאוצר הוא הליבה של הפרויקט. אנחנו צריכים לוודא שהאפליקציה הבסיסית תעבור בצורה חלקה, ורק אחר כך נחשוב על שדרוגים."

דברר 1 (24:05):

" השאלה היא איך מבקר מקבל גישה לאפליקציה. הוא מגיע למודיאון, מקבל לינק או קוד QR, ואין צורך להתחבר או להירשם."

דברר 3 (24:26):

" נכון, זה צריך להיות קל ופשוט. כמו הקישור ששלחנו לך."

דברר 2 (24:49):

"אם התוכן לא זמין, צריך לציין שהתערכות הסטיימה או שהתוכן כבר לא קיים."

דברר 3 (25:25):

"זה חשוב למשתמש שיראה הودעה מסודרת ולא ישאר עם מסך ריק."

דברר 2 (26:14):

"ונכל גם להציג שהאפליקציה תאפשר למבקרים להמשיך לצפות בתכנים מהבית בזמן מוגבל."

דברר 3 (26:43):

"המודיאון כבר שלם על האפליקציה, אז למה לא לאפשר גישה לתוכנים?"

דברר 2 (27:20):

"ונכל להכין מוגבלת זמן לשימוש בתכנים, כדי למנוע עומס על השרת."

דברר 3 (27:33):

"זה רעיון טוב. צריך לחשב על זה ולתכנן את הגישה בהתאם."

דברר 4 (28:32):

"מה לגבי העיצוב? יש לך בקשות מיוחדות?"

דברר 2 (28:51):

"אני מאמין בעיצוב פשוט אינטואיטיבי. כמו שאמרנו, כמה שפחות מסכים לעבור וכמה שיותר ברור."

דברר 3 (30:22):

"זה נכון, חשוב שהשימוש באפליקציה יהיה כמו שיותר נוח."

דברר 2 (32:15):

"יש לכם חופש יצירתי בעיצוב. תעשו מה שנראה לכם נכון ויעיל."

דברר 1 (33:11):

"אנחנו צריכים לוודא שהמידע ישמר בצורה מסודרת, ושתהיה לנו גישה אליו."

דברר 2 (33:29):

"כל אינפורמציה שתצטרכו תהיה זמינה. אפשר לפנות אליו בכל שאלה."

דברר 3 (34:16):

"הכי חשוב שהמבר במודיאון יהיה מחויה אינטואיטיבית ונוחה. זה תמיד צריך להיות בראש שלנו כשאנו מפתחים את האפליקציה."

