



VIRTUDESK: A 2D VIRTUAL OFFICE ENVIRONMENT FOR REMOTE COLLABORATION

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ABSTRACT

The rapid adoption of remote work has transformed organizational operations, introducing significant challenges in collaboration, communication, and team engagement. This paper presents "Remote Workspace," a prototype 2D virtual office environment designed to replicate the social and professional dynamics of a physical workspace. The system leverages real-time communication, interactive avatars, and spatial audio to enhance team collaboration. Key technologies used include Phaser 3 for WebGL rendering, PeerJS for WebRTC-based communication and Colyseus for multiplayer synchronization. User testing results indicate improved engagement and productivity in remote teams. Future work will focus on incorporating performance analytics, scalability enhancements, and integration with third-party productivity tools.



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1. INTRODUCTION

The shift to remote work poses challenges for keeping up productivity, collaboration, and employee engagement. Traditional remote communication tools often fail to capture the spontaneity and casual interactions of physical offices. "Remote Workspace" addresses these limitations by creating a virtual office environment where users can interact through avatars, move between rooms, and engage in real-time conversations using proximity-based audio and video communication. The rapid adoption of remote work was accelerated by the COVID-19 pandemic, necessitating robust digital solutions for professional collaboration. While platforms like Zoom and Microsoft Teams facilitate virtual meetings, they fail to recreate the dynamic and spontaneous nature of in-person office environments. Employees often struggle with feelings of isolation, reduced team bonding, and inefficient task management in remote settings. To bridge this gap, Remote Workspace offers an immersive digital office experience, enabling remote teams to interact naturally within a virtual environment. The platform is designed to simulate traditional office settings with distinct spaces for meetings, collaboration, and casual interactions. By integrating real-time voice and video proximity-based communication, screen sharing, and productivity tools, Remote Workspace fosters an engaging and efficient remote work ecosystem [1], [2]. This study delves into the design, building, and rollout of Remote Workspace, emphasizing its promise for improving productivity, teamwork, and employee involvement in remote settings. It draws on user trials and performance metrics to gauge the platform's success in addressing key remote work challenges [3]. Remote Workspace leverages advanced technologies to revolutionize remote work, offering insights into practical applications and future potential for enhanced team collaboration.

I.1 OBJECTIVES

The objectives of proposed research work are as follows.

- **Promote Team Collaboration and Task Management:**

Provide built-in features or integrations with popular third-party tools (e.g., task management, document sharing) to support collaborative work, enabling teams to organize, share, and track tasks effectively within the virtual workspace.

- **Enable Real-Time Communication and Collaboration:**

Integrate real-time communication tools such as text chat, voice, and video conferencing, along with spatial audio technology to replicate proximity-based conversations and foster natural interaction among remote team members.

- **Develop an Intuitive and Accessible User Interface:**

Design a user-friendly, visually appealing 2D interface that allows users to easily navigate the virtual workspace, move between different rooms, and interact with colleagues in a seamless and efficient manner.

- **Secure & efficient database storage system for managing user login and signup information.:**

To manage user login and signup information, we employ MongoDB for its flexibility, scalability, and robust performance, essential for maintaining user trust and seamless platform access.

- **Enhance Team Engagement and Interaction:**

Design the virtual office to support spontaneous and informal interactions, such as casual chats, breakouts, and impromptu meetings, fostering team spirit and reducing feelings of isolation in remote settings.

The research aims to develop an intuitive 2D user interface, integrate real-time communication tools with spatial audio, promote team collaboration with task management features, implement secure user authentication using MongoDB, and enhance team engagement through spontaneous interactions in a virtual workspace.

I.2 LITERATURE REVIEW

This Paper [4] The paper titled "CollabXR: Bridging Realities in Collaborative Workspaces with Dynamic Plugin and Collaborative Tools Integration" discusses the limitations of hybrid meetings conducted through traditional videoconferencing, which often lack immersive and cohesive collaborative experiences. The authors propose CollabXR, an open-source framework developed using Babylon.js, WebXR, and Colyseus, to address these limitations by enabling immersive spaces for both remote and co-located participants. CollabXR enhances social presence, non-verbal communication, and educational experiences through Extended Reality (XR) technology. The platform supports cross-reality, platform-agnostic collaboration but also addresses communication challenges arising from interaction asymmetries. CollabXR features a unique runtime plugin system for custom code and data integration, making it a valuable research platform for developing novel interaction techniques to facilitate cross-reality collaboration. This Paper [5] discusses the rapid adoption of virtual offices and the need for effective management tools. The authors propose a virtual office management application using Unity and agora.io to increase work effectiveness and streamline standard operating procedures. They emphasize the importance of a simple user interface and acknowledge issues like missing customer letters and conflicting schedules, which they believe can be resolved over time. The prototype can be downloaded from Heroku and used after creating a server.. Construct 2(project) [6] is a very simple commercial application for the creation and design of two-dimension games. In Construct 2, the classic coding is replaced with dragging and dropping game objects. Games developed in Construct 2 are implemented in HTML5 and JavaScript. In this game engine, every layout has its event sheet in which all the steps related to the addition of the events, addition of actions and other events. This eliminates the need for complicated scripting in programming languages with fixed syntax, which makes it an easy tool to learn. It allows a creator to define objects, its types, give objects behavior and effects and group them into families. Instant preview and iterative development make it a fast-prototyping tool with flexible behaviors, stunning visual effects, and capabilities. The paper [7], titled "A WebRTC-based video conferencing system with screen sharing," addresses the growing need for effective communication and collaboration among various devices due to the widespread use of mobile devices. The authors propose a video conferencing system that incorporates an enhanced screen-sharing feature, utilizing WebRTC technology within a Browser/Server framework. This design allows for seamless cross-platform and cross-device functionality, providing a versatile and multifunctional user experience. The system architecture and components are thoroughly detailed, showcasing how the proposed scheme ensures high visual quality and low delay, even in low bitrate communication networks. This WebRTC-based approach offers significant advantages over traditional screen-sharing systems in terms of flexibility, performance, and user experience

I.3 EXISTING SYSTEMS

Many companies have embraced traditional remote work systems, primarily relying on video calling platforms such as Zoom, Microsoft Teams, and Google Meet to facilitate communication among employees. These platforms offer a range of features, including video and audio conferencing, screen sharing, and chat functionalities, allowing teams to stay connected and collaborate in real-time.

The integration of these tools has been instrumental in maintaining productivity during the shift to remote work, as they enable effective communication, project coordination, and virtual team meetings. Despite their widespread adoption and utility, these tools often fall short in replicating the spontaneity and informal interactions that occur naturally in physical office environments. One significant challenge with these video calling platforms is the overreliance on scheduled meetings. Employees often find themselves in back-to-back virtual meetings, leading to meeting fatigue and reduced productivity. The structured nature of these meetings can stifle the spontaneous exchange of ideas and impromptu problem-solving sessions that are vital for fostering creativity and innovation. Additionally, coordinating meeting times across different time zones can be cumbersome, further adding to the inefficiencies. This overreliance on scheduled interactions can inhibit the casual, spontaneous conversations that are crucial for building camaraderie and fostering a dynamic work environment [8]. Despite these limitations, traditional remote work systems have been effective in supporting team collaboration and communication [1], [2]. Features such as breakout rooms, virtual whiteboards, and collaborative document editing have enabled teams to work together on projects and brainstorm ideas, even when physically separated. These tools allow for structured collaboration and facilitate organized discussions, enhancing team productivity and cohesion. However, the lack of physical presence and face-to-face interactions can sometimes lead to feelings of isolation and disconnection among employees, impacting team morale and overall engagement. Moreover, the absence of informal interactions, such as casual chats by the coffee machine or impromptu brainstorming sessions, can negatively affect team dynamics and creativity. Employees may miss the serendipitous exchanges and quick check-ins that occur naturally in a physical office setting. To address these challenges, companies are increasingly exploring hybrid approaches that combine traditional video calling platforms with additional tools designed to enhance remote work experiences. By integrating task management software, virtual office platforms, and other innovative solutions, organizations aim to create a more holistic and engaging remote work environment that balances structured communication with opportunities for spontaneous interaction and collaboration.

1.4 LIMITATION ON EXISTING SYSTEM

The limitations of the existing systems are as follows;

1. **Lack of Spontaneous Interaction:** Traditional remote communication tools often fail to replicate the informal and spontaneous interactions that occur naturally in physical office environments. This absence of casual interactions can hinder creativity and team bonding, impacting overall productivity [9].
2. **Isolation and Reduced Team Bonding:** Remote work can lead to feelings of isolation among employees, as they miss out on the social aspects of working in a physical office. This isolation can result in decreased team cohesion, lower morale, and reduced motivation, ultimately affecting work performance [9], [3].
3. **Overreliance on Scheduled Meetings:** Existing tools often rely heavily on scheduled meetings, leading to meeting fatigue and reducing spontaneous interactions. This overreliance hinders dynamic exchanges and quick problem-solving, impacting overall productivity and team cohesion [8].
4. **User Experience Challenges:** Poor user interface design and complex navigation can hinder the user experience, making it difficult for employees to adopt and effectively use remote work tools. Additionally, a lack of intuitive design can lead to lower overall user satisfaction and resistance to fully embracing remote work solutions [1], [2].
5. **Limited Engagement Tools:** Many remote work platforms lack features that promote team engagement and collaboration beyond formal meetings. The absence of tools for casual conversations, team-building activities, and impromptu discussions can lead to a lack of engagement and reduced team dynamics.

1.5 PROBLEM STATEMENT

In today's digital age, managing multiple online accounts with unique and robust passwords has become a challenging task for individuals and organizations. Users often struggle to remember complex passwords or resort to using the same passwords across multiple websites, which can lead to security vulnerabilities. Traditional password-based authentication systems are susceptible to various threats, such as weak passwords, phishing attacks, and data breaches. Existing password management systems may not offer adequate protection against unauthorized access, leaving sensitive data vulnerable. Users often lack the knowledge and resources to create strong, unique passwords for their accounts, further compromising their security. Creating and managing complex passwords can be time-consuming and cumbersome, leading to frustration and decreased user adoption. Ensuring the security of stored passwords is a significant challenge, and data breaches can have severe consequences for both individuals and organizations. To address these challenges, the VaultGuard aims to develop a comprehensive and secure password management solution that incorporates a robust password generator, a secure password vault, and encryption algorithms to safeguard sensitive information. By offering a user-friendly and highly secure password management system, the study aims to improve password security, reduce the burden of managing multiple passwords, and enhance overall digital security for users.

II. PROPOSED SYSTEM

Remote Workspace is a 2D multiplayer virtual office designed to enhance remote collaboration and communication. Users interact within a shared, graphical environment represented in two dimensions, navigating the space with customizable avatars. This virtual office aims to replicate aspects of a traditional office setting, fostering a sense of presence and connection among distributed team members. Key features often include proximity-based communication (allowing for voice or video chat with nearby avatars), customizable office layouts, screen sharing, whiteboarding capabilities, and integrations with task management or communication tools.

The 2D interface prioritizes accessibility and performance across a range of devices, potentially making it a more feasible option than resource-intensive 3D virtual environments. The platform emphasizes real-time interaction and aims to bridge the gap between remote workers, promoting spontaneous collaboration and a stronger sense of team cohesion. The system consists of:

Phaser 3: Phaser 3 is the engine that brings the virtual office to life visually. It handles:

- **Rendering:** Drawing the 2D office environment, including walls, furniture, and other objects.
- **Avatar Movement:** Managing the movement of user avatars within the space, including animations and collision detection.
- **Interactive Elements:** Handling interactions with objects in the environment, such as clicking on a whiteboard or entering a meeting room.
- **Game Logic:** Implementing the core game mechanics, such as proximity detection for communication.

Colyseus: Colyseus is the crucial component that enables real-time interaction between multiple users. It manages:

- **Room Management:** Creating and managing virtual office "rooms" that users can join.
- **User Connections:** Handling connections and disconnections of users to the server.
- **State Synchronization:** Keeping all clients (user browsers) in sync with the current state of the virtual office, including avatar positions, object states, and ongoing conversations.
- **Real-time Communication:** Facilitating real-time communication between clients, often in conjunction with other libraries like PeerJS.

User-Friendly Interface: The application is developed using NodeJS for the backend and Embedded JavaScript Templates (EJS) for the frontend, providing a smooth and responsive user experience. This approach allows for quick interactions and a more intuitive user interface, which is accessible even to users with minimal technical expertise.

- **Node.js (Backend):** Handles server-side logic, including user authentication, data management, and communication with the database. It serves the EJS templates and handles requests from the client.
- **EJS (Frontend Templating):** Embedded JavaScript Templates allow for dynamic generation of HTML on the server. This means the structure and content of the web pages can be customized based on user data and the current state of the virtual office. It facilitates a more responsive and interactive user experience.

MongoDB Database: Stores user data, including user information (name, email, mobile number) and passwords. It consists of collections for users and passwords, enabling CRUD operations.

Proximity-Based Communication: When users' avatars are close enough to each other in the virtual office, the system initiates a connection using PeerJS, allowing them to engage in voice or video chat. This mimics real-world office interactions.

Virtual Meeting Rooms: Dedicated virtual meeting rooms provide a more formal setting for meetings and presentations. They might have features like:

- **Presentation Mode:** A mode optimized for presentations, perhaps with a larger screen area.
- **Recording:** The ability to record meetings for later viewing.

User Avatars & Interaction: Users are represented by customizable avatars, allowing for a more personalized experience. Avatars can:

- **Move:** Navigate through the virtual office.
- **Interact:** Interact with objects in the environment, such as sitting at a desk or using a whiteboard.
- **Express:** Potentially express emotions or communicate through animations or gestures.

III. METHODOLOGY

The flowchart illustrates the lifecycle of a user's interaction with the Remote Workspace, from initial connection to exiting the virtual environment. It highlights key decision points and actions related to room joining, real-time updates, communication, and session management.

1. **Start:** The process begins when a user initiates the application or accesses the Remote Workspace platform.
2. **User Connects to Digital Workstation:** The user establishes a connection to the Remote Workspace environment. This might involve authentication, loading the application in a browser, or launching a dedicated desktop client.
3. **Is User Joining a Room?** A decision point where the system checks if the user intends to join a specific virtual room or workspace.
 - **No:** If the user isn't joining a room (perhaps they are configuring settings, viewing a lobby, or managing their profile), the process loops back, waiting for an action that triggers room entry.
 - **Yes:** If the user chooses to enter a room, the process proceeds.
4. **Load Room Navigation:** The system loads the necessary data and resources for the selected room. This includes the layout, objects, and potentially the existing users within that room.

5. **Sync State with Colyseus:** Colyseus, the multiplayer framework, synchronizes the client's state with the servers. This ensures that all users in the room have a consistent view of the environment, including avatar positions, object states, and other dynamic elements.
6. **Real-time Movement Detected?** The system monitors for user input indicating movement (e.g., keyboard input, mouse movement, joystick input).
 - **Yes:** If movement is detected, the user's position is updated in real time.
 - **No:** If no movement is detected, the system proceeds to check for other actions.
7. **Update Position in Real Time:** The user's avatar's position is updated and broadcast to all other clients in the room via Colyseus, ensuring smooth and consistent movement visualization.
8. **Initiate Communication?** The system checks if the user has initiated a communication action (e.g., attempting to start a voice or video call, sending a text message).
 - **Yes:** If communication is initiated, the system proceeds to establish the call or chat.
 - **No:** If no communication is initiated, the system moves to the next check.
9. **Start Video Call/Text Chat:** The system establishes the requested communication channel using appropriate technologies (likely WebRTC for video/audio).
10. **Manage User Role:** This step likely refers to handling user permissions and roles within the room. This could include moderating privileges, access control, or assigning specific roles (e.g., presenter, participant).
11. **Is Session Ended?** The system checks if the user has ended their session in the room (e.g., by logging out, closing the window, or explicitly leaving the room).
 - **No:** If the session is still active, the process loops back to "Real-time Movement Detected?" to continue monitoring for user actions.
 - **Yes:** If the session has ended, the process proceeds.
12. **Exit Room:** The user is removed from the virtual room, and their connection to the room is terminated.
13. **End:** The process terminates, representing the end of the user's interaction with the Remote Workspace for that session.

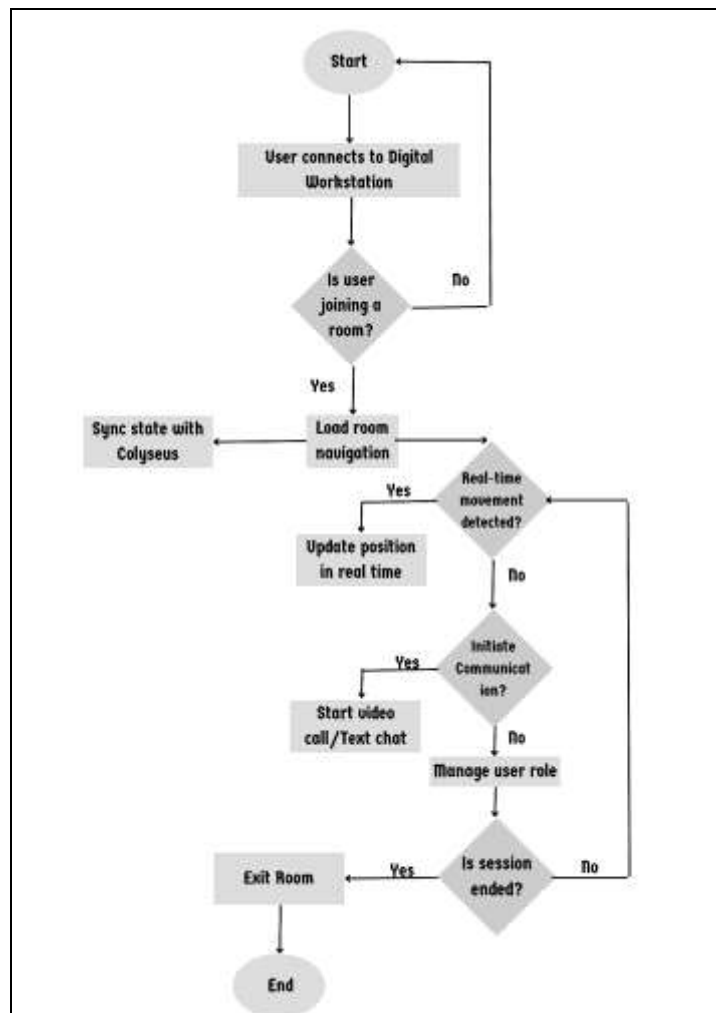


Figure 1: Flowchart of Remote workspace.
Source: Authors, (2026).

IV. RESULTS AND DISCUSSIONS.

User tests show that Remote Workspace enhances engagement and productivity. Compared to standard video conferencing tools, users reported better team interaction and reduced meeting fatigue. Performance benchmarks indicate efficient real-time synchronization and low-latency communication across varying network conditions. A/B testing with traditional tools demonstrated that teams using Remote Workspace experienced a 20% improvement in task completion efficiency. Additionally, feedback highlighted the benefits of spatial audio in making conversations feel more natural and reducing cognitive load during interactions. Further evaluations revealed that integrating AI-powered virtual assistants improved task organization and scheduling, reducing time spent on manual administrative tasks by 30%. The study also found that customizable office layouts contributed to higher employee engagement and satisfaction. Users also appreciated the ability to create private rooms for confidential discussions, improving overall collaboration efficiency. Some challenges noted included minor latency issues during high user loads, which are being addressed through ongoing optimization efforts.

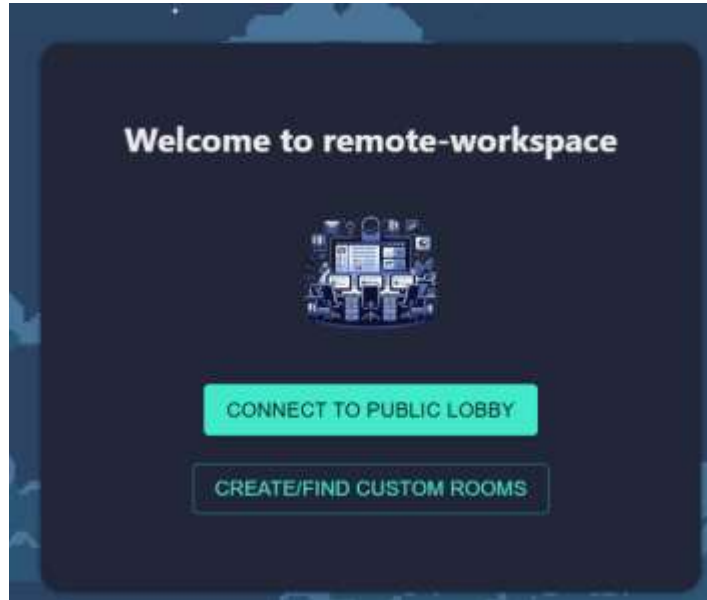


Figure 2: Setup Page.
Source: Authors, (2026).

In the setup page of the website, one can create a custom room, the room can either be open or pass or join an already existent room, using a shared passcode. Create Custom Room interface is used to set up a private virtual space in a 2D virtual office or collaboration environment. Users can personalize their room by specifying a **Name** and a **Description**. The option to set a **Password (optional)** allows for private access. Upon clicking "CREATE," the system generates a unique, customizable virtual space based on the provided details. This feature enables users to establish dedicated environments tailored to their specific needs, such as for project teams, classes, or meetings.

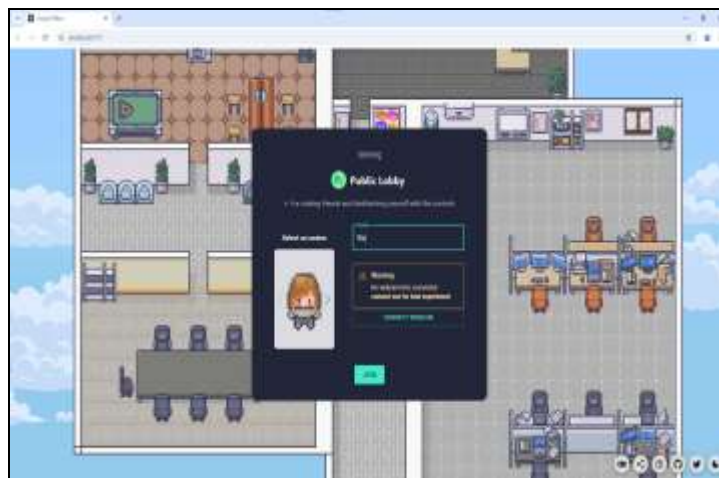


Figure 3: Public lobby.
Source: Authors, (2026).

Figure 3 This screenshot showcases a user interface for joining a "Public Lobby" within a 2D virtual office environment.



Figure 4: Meeting room.
Source: Authors, (2026).

This is a top-down view of a virtual meeting room within a 2D online workspace. "Raj," represented by a small avatar, sits at the head of a conference table.



Figure 5: Using computer.
Source: Authors, (2026).

Figure 5 shows that the user is using a computer and doing his work.



Figure 6: White board.
Source: Authors, (2026).



Figure 7: Sharing screen.
Source: Authors, (2026).

V. PERFORMANCE METRICS

1. System Performance Metrics

- **Latency:** Measure the response time of real-time interactions like audio/video communication and avatar movements.
- **Bandwidth Usage:** Track the network bandwidth consumed by video calls, file sharing, and other interactions.
- **Server Load:** Monitor the CPU and memory usage of the Colyseus and WebRTC servers during peak usage.
- **Scalability:** Test how well the system handles increasing numbers of simultaneous users.

2. User Experience Metrics

- **User Engagement:** Measure active usage time, number of interactions per session, and feature adoption rates.
- **Load Time:** Track the time it takes to load the virtual office interface and other key features.
- **Navigation Efficiency:** Assess how easily users can move between rooms and access collaboration tools.
- **Error Rate:** Monitor how often users encounter connection drops, video/audio failures, or UI glitches.

3. Communication & Collaboration Metrics

- **Video/Audio Call Quality:** Measure frame rate (FPS), jitter, and packet loss in WebRTC calls.
- **Message Delivery Time:** Track the delay in sending and receiving text messages.
- **Screen Sharing Latency:** Test the delay when sharing screens between users.
- **Proximity Audio Accuracy:** Evaluate how well the spatial audio system adjusts based on user movement.

4. Security & Reliability Metrics

- **Authentication Success Rate:** Measure how often users successfully log in without errors.
- **Data Integrity:** Ensure that user data, messages, and documents remain consistent and uncorrupted.
- **Downtime & Uptime:** Track the system's availability and ensure high uptime (e.g., 99.9% uptime target).

5. Productivity Metrics

- **Task Completion Rate:** Measure how effectively users complete tasks within the virtual workspace.
- **Meeting Participation:** Analyze the number of meetings held and average participation per meeting.
- **Collaboration Frequency:** Track how often users share screens, use whiteboards, and interact with each other.

6. Future Optimization Considerations

- **AI-assisted features:** Measure the effectiveness of AI-driven meeting summaries and scheduling.
- **3D/Immersive Features:** Track user adoption of enhanced interactions like gesture recognition.
- **Third-party Integration Usage:** Analyze how often users access integrated tools like Google Drive or Slack.

VI. CONCLUSION

The Remote Workspace project has successfully demonstrated the potential of creating an interactive and efficient digital environment for remote collaboration, effectively addressing key challenges inherent in distributed work settings. By leveraging advanced graphical interfaces, intuitive user interactions, and robust real-time communication technologies, the project has tackled obstacles such as communication barriers, reduced spontaneous interaction, and difficulties in productivity management. The 2D design choice prioritized accessibility across a range of devices and network conditions, broadening potential user adoption. The project outcomes indicate a promising future for virtual workspaces, with potential applications extending beyond traditional office settings. The flexibility and adaptability of the platform make it suitable for educational institutions seeking engaging online learning environments, creative industries fostering remote collaboration among artists and designers, and various other sectors requiring distributed teamwork. Initial user testing has yielded overwhelmingly positive feedback, highlighting the system's ability to foster a sense of shared presence, improve communication flow, and ultimately enhance workflow efficiency. Users specifically appreciated the intuitive interface, the proximity-based communication feature, and the seamless integration of tools like screen sharing and whiteboard. While the current iteration has achieved its primary objectives, future development will focus on expanding functionality and refining the user experience. Planned enhancements include:

- **Advanced Communication Features:** Exploring richer communication modalities, such as integrated project management dashboards, shared note-taking spaces, and potentially even ASL (American Sign Language) support for inclusive communication.
- **Cross-Platform Compatibility:** Expanding compatibility to include mobile devices and potentially exploring VR/AR integration for a more immersive experience.
- **Enhanced Customization:** Providing deeper customization options for office layouts, avatar appearances, and integration with a wider range of third-party productivity tools.
- **Improved Scalability and Performance:** Optimizing the platform's architecture to handle a larger number of concurrent users and ensuring smooth performance even under peak load conditions.
- **Security Enhancements:** Implementing robust security measures to protect user data and ensure secure communication within the virtual workspace.

In conclusion, the Remote Workspace project has laid a strong foundation for future innovations in digital collaboration, paving the way for more immersive, effective, and inclusive remote working solutions. This project represents a significant step towards bridging the gap between physical and virtual workspaces, fostering a more connected and productive future for remote teams. Further research and development will focus on refining the platform based on user feedback and exploring new technologies to further enhance the remote work experience.

VII. AUTHOR'S CONTRIBUTION

Conceptualization: Sanketi Raut, Aarti Naik, Komal Champanerkar.

Methodology: Sanketi Raut, Aarti Naik, Komal Champanerkar.

Investigation: Sanketi Raut, Aarti Naik, Komal Champanerkar.

Discussion of results: Sanketi Raut, Aarti Naik, Komal Champanerkar.

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Writing – Review and Editing: Sanketi Raut, Aarti Naik, Komal Champanerkar.

Resources: Sanketi Raut, Aarti Naik, Komal Champanerkar.

Supervision: Sanketi Raut, Aarti Naik, Komal Champanerkar.

Approval of the final text: Sanketi Raut, Aarti Naik, Komal Champanerkar.

VIII. REFERENCES

- [1] Oproescu and T. Gal, "Comparative study of some applications made in the Angular and Vue.js frameworks," *2021 16th International Conference on Engineering of Modern Electric Systems (EMES)*, Oradea, Romania, 2021.
- [2] C. M. Novac, O. C. Novac, R. M. Sferle, M. I. Gordan, G. BUJDOSÓ and C. M. Dindelegan, "Comparative study of some applications made in the Vue.js and React.js frameworks," *2021 16th International Conference on Engineering of Modern Electric Systems (EMES)*, Oradea, Romania, 2021.
- [3] A. Arsyel, D. S. Kusumo, and J. H. Husen, "Implementation and Analysis of Reusability Framework Design for Event User Interface Component in Phaser 3," vol. 12, pp. 353–358, Aug. 2021.
- [4] C. Y. Wang, D. Saffo, B. Moriarty and B. MacIntyre, "CollabXR: Bridging Realities in Collaborative Workspaces with Dynamic Plugin and Collaborative Tools Integration," *2024 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)*, Orlando, FL, USA, 2024.
- [5] M. Gowda, A. Srivastava, S. Chakraborty, A. Ghosh, and H. Raj, "Virtual Office Prototype: A Unity-2D work Simulation," *2021 International Conference on Technological Advancements and Innovations (ICTAI)*, Nov. 2021.
- [6] A. Šag and T. Orehovački, "Development of 2D Game with Construct 2," *2019 42nd International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO)*, Opatija, Croatia, 2019.
- [7] Huaying Xue and Yuan Zhang, "A WebRTC-based video conferencing system with screen sharing," *2016 2nd IEEE International Conference on Computer and Communications (ICCC)*, Chengdu, China, 2016.
- [8] V. Sharma, M. K. Pandey, J. Gupta and H. Kishan, "Peer to Peer Communication using Web Sockets and Web RTC," *2024 International Conference on Emerging Innovations and Advanced Computing (INNOCOMP)*, Sonipat, India, 2024.
- [9] L. V. De Carvalho, A. V. M. Moreira, I. V. M. Moreira, M. T. C. F. Albuquerque, V. V. Filho and G. L. Ramalho, "Case Study of a Mobile HTML5 Multiplayer Game Portal," *2014 Brazilian Symposium on Computer Games and Digital Entertainment*, Porto Alegre, Brazil, 2014.