

Anonymous Chat Room

Christopher Allen

Michael Hamilton

University of Arkansas Little Rock (UALR)

CPSC 3384-9S1 Computer Networks

Dr. Francesco Cavarretta

March 15, 2025

Abstract

This project focuses on developing an Anonymous Chat Room, a real-time communication platform designed to enhance accessibility while ensuring user anonymity. Research indicates that highlighting key text elements improves readability and memory retention for individuals with ADHD. To address this, our chat system will highlight usernames and attributes in distinct colors, making conversations easier to follow. Additionally, an autocorrect feature will assist with spelling errors, promoting clearer communication. From a networking perspective, the system follows a client-server model using Python with Socket.IO, which enables real-time bidirectional communication. Socket.IO's event-driven architecture efficiently manages multiple concurrent connections without manual thread handling. Messages will be broadcasted to all active users, ensuring smooth and responsive interactions. The initial prototype will be tested locally via localhost, with future expansion planned for LAN/WAN deployment and TLS encryption for security. Maintaining user anonymity fosters an inclusive and safe environment, particularly for marginalized communities. This project integrates computer networking fundamentals with accessibility-focused design, demonstrating an interdisciplinary approach to solving real-world communication challenges.

Description

The Anonymous Chat Room will be a real-time messaging application designed to support neurodivergent users while maintaining user anonymity. The platform will allow users to communicate without creating an account, ensuring privacy, which aligns with research on anonymous communication and privacy protection (He et al., 2020). It will highlight important text elements such as names and attributes to help users with ADHD process information easily, as research suggests that text formatting and specialized fonts improve readability (Asiry et al., 2018; NeuroLaunch Editorial Team, 2024a). An autocorrect system will assist with spelling errors, making conversations clearer, similar to tools designed to enhance reading comprehension for ADHD users (NeuroLaunch Editorial Team, 2024b). By keeping all users anonymous, the chat room will provide a safe space for open discussions, particularly for marginalized groups (Sannon & Forte, 2022). The chat will rely on a client-server model where a central server handles connections and message distribution among users.

Intended users include individuals with ADHD who require improved text readability, users who prefer anonymous communication for privacy reasons, students and developers studying networking, and general users looking for a simple chat experience. The project will initially be limited to local testing, with messages transmitted as plain text, meaning no encryption for security. Additionally, only text-based messaging will be supported in the first version, with multimedia options as a potential future upgrade.

Methodology

This project will be implemented using Python with Socket.IO, which enables real-time bidirectional communication (Python Software Foundation, 2025; Rauch, 2024). The chat room will follow a client-server model, where a central server manages connections and broadcasts messages to all active users. Socket.IO's event-driven architecture ensures efficient multi-user interaction without requiring manual thread management. The implementation consists of five main steps: developing the server to handle client connections, creating the client interface for messaging, integrating syntax highlighting and autocorrect features, optimizing for multiple users, and conducting testing. Initial testing will be conducted on a local network, with potential expansion for LAN/WAN deployment.

Relevance to the Course

This project directly applies networking principles, using client-server communication, message broadcasting, and real-time data transmission, similar to existing Python-based chat applications (Srivatsav, 2022). Socket.IO's event-driven architecture ensures stable message delivery and efficient multi-user management. Additionally, by integrating psychology-based accessibility features, the project demonstrates interdisciplinary problem-solving, making it highly relevant to computer networking coursework and real-world applications.

Additional Considerations

Potential future improvements include LAN/WAN support, TLS encryption, and optional authentication, which are essential for securing real-time communication protocols (Dierks & Rescorla, 2008). AI-powered text summarization may enhance usability. Socket.IO's event-driven model efficiently handles multiple users, ensuring low-latency messaging. Security challenges such as anonymity vs. abuse could be managed with content filtering tools. By integrating networking fundamentals with accessibility features, this project demonstrates real-world applications of computer networking.

Team Members

Christopher Allen
Michael Hamilton

References

- Asiry, O., Shen, H., Wyeld, T., & Balkhy, S. (2018). Extending attention span for children with ADHD using an attentive visual interface. *Proceedings of the 22nd International Conference on Information Visualisation (IV)*, 188–193. Fisciano, Italy. <https://doi.org/10.1109/IV.2018.00041>
- Dierks, T., & Rescorla, E. (2008). The Transport Layer Security (TLS) Protocol Version 1.2. *RFC 5246*. <https://doi.org/10.17487/RFC5246>
- He, Y., Zhang, M., Yang, X., Luo, J., & Chen, Y. (2020). A survey of privacy protection and network security in user on-demand anonymous communication. *IEEE Access*, 8, 54856–54871. <https://doi.org/10.1109/ACCESS.2020.2981517>
- NeuroLaunch Editorial Team. (2024a, August 4). *ADHD Fonts: Enhancing Readability and Focus for Individuals with Attention Deficit Hyperactivity Disorder*. NeuroLaunch. <https://neurolaunch.com/adhd-font/>
- NeuroLaunch Editorial Team. (2024b, August 4). *ADHD Reading Tools: Innovative Solutions to Enhance Focus and Comprehension*. NeuroLaunch. <https://neurolaunch.com/adhd-reading-tools/>
- Python Software Foundation. (2025). *Python* (Version 3.13.2) [Computer software]. <https://www.python.org/>
- Rauch, G. (2024). *Socket.IO* (Version 4.8.1) [Computer software]. Automattic. <https://socket.io/>
- Sannon, S., & Forte, A. (2022). Privacy research with marginalized groups: What we know, what's needed, and what's next. *Proceedings of the ACM on Human-Computer Interaction*, 6(CSCW2), Article 455. <https://doi.org/10.1145/3555556>
- Srivatsav, D. (2022, February 19). *Simple chat room using Python*. GeeksforGeeks. <https://www.geeksforgeeks.org/simple-chat-room-using-python/>