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Social Media App with Time Apsule Messaging & Chatbot

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Abstract- This article presents a novel social networking site, integrating time capsule messaging with an artificial intelligence-driven chatbot to provide a more thoughtful and interactive online experience. Users may write messages, share images, or record videos, scheduling them to be **received on a** designated date in the future, promoting purposeful communication and longer-term personal narrative. In addition to this, a smart chatbot helps users by taking care of their time capsules and providing conversational assistance, making the experience more interactive and emotionally engaging. By combining delayed messaging with real-time AI interaction, the platform enables deeper digital connections and assists users in saving memories in a meaningful manner. Early user feedback points towards its potential for improving emotional well-being, aiding mental health, and creating lasting digital legacies. This article discusses the system's design, implementation, and general implications for future social technologies.

Key words: social media, time capsule messaging, AI chatbot, digital memory, emotional well-being, delayed communication, user experience

Social media has really changed the way we connect, communicate, and share our lives. Nowadays, most platforms are all about instant interaction—likes, comments, and real-time updates are what keep users engaged [1]. While this quick pace has its perks, it often doesn't leave much space for thoughtful reflection or building long-term emotional connections [2]. As people become more aware of their digital footprints, there's a growing interest in platforms that encourage deeper, more meaningful interactions over time, instead of just quick exchanges [3].

In response to this growing need we are excited to provide a fantastic new perspective on social media with a time capsule messaging app. This time capsule or delay feature gives the user the ability to create messages, pictures, videos or notes and delay its delivery to sometime in the future (for them or a loved one). By delaying the delivery of these moments we would love to encourage the user to think ahead, think about their journey and to interact and engage with their digital world more intentionally. Whether it is a note sent to your future self or an unexpected gesture sent to a loved one, this feature provides a creative opportunity for people to record and share meaningful stories.

For an enhanced user experience, the platform was released with a built-in AI chatbot that assists users in creating and managing their time capsules, reminding them of committed tasks, and engaging in simple conversations that offer emotional support. The chatbot is much more than a functionality or tool—it is a companion that complements the time capsule process in a personal, interactive way [5]. Its presence in the app adds another layer of fun and emotional engagement, especially for users who prefer conversational interfaces and emotionally intelligent technologies [6].

We describe the creation and conceptualization of this social media platform in this paper. The paper presents the technical architecture, user interface design, and the integration of machine learning algorithms to enhance engagement and user experience. Early feedback from user experience testing and prototyping sessions suggests that the combination of time-delayed messaging technology and chatbot interaction may represent a new approach to improving emotional well-being, capturing digital memories, and redefining the way people socially interact in virtual environments [7]. Our research also explores broader implications across mental health, education, and the future of online communication.

A. Objectives

- To develop a social media platform which allows users to un-send messages into the future. On that note, the users can write text, share photos, and record videos that will be delivered on a time of their choosing. This service is to help people think, preserve memory, and build a more meaningful digital experience. The plan is to move social media from burst to deep communication [8].

- In order to establish an artificial intelligence chatbot that will help guide and support users along their experience. The chatbot will assist users with getting started with their time capsules and providing reminders in a conversational way. It is also intended to be emotionally intelligent and responsive; this will make the app feel more personal and engaging. With a combination of support and empathy, the chatbot is a behavioral digital companion. [9]

- To explore how people engage with the app and how it alters their emotional experience. We will collect user input using testing sessions, surveys, and one-on-one highlighted interviews. This will give us insights into how users are using app features and the impact that app interaction has on user satisfaction. The findings will help us improve and inform future development [10].

- To investigate how this app could be implemented in additional ways to support users outside of everyday social networking. Potential applications include mental wellness, educational journaling, or digital memorialization. The app facilitates opportunities for self-expression over time that may foster personal development and healing. We would like to better understand its thematic value in real-life situations [11].

These objectives work together to create a social media experience that is more purposeful and thoughtful. Rather than designing a platform that supports fast, urgent, shallow communication, Savor invites users to slow down, and reflect on what they want to share and why. The fusion of time capsule messaging with an AI

chatbot creates an entirely different experience of connecting with others, or ourselves, while injecting moments of reflection, affection, and anticipation into digital conversations.

Alongside the technological objectives, this project seeks to consider the potential for technology to assist in building personal growth and emotional well-being. This research will ensure whether any changes in the way users interacted with delayed messaging and chatbot features can provide information about alternative forms of online engagement.[12]

I. LITERATURE REVIEW

A. *Time Capsule Messaging in Digital Communication*

Time capsule messaging is a feature that lets users create messages, photos, or videos that reach users at some later point. Unlike the instantaneity of social media messaging at present, time capsules add a layer of thoughtfulness and consideration to the sharing of content with the additional time insight or reflection can provide. The time either temporarily suspends the content from being released or time capsules provide anticipation and an emotional element that may enhance an interaction, allowing the person to use the time to reflect upon what they think or how to express the experience being considered together - things they may have never have otherwise thought about had they just posted the content as the memories surfaced, the goals were reminded, or the relationship discarded.[13]

Time capsule messaging engages in the psychological rewards of retrospection and self-reflection. Research has shown that taking time to reflect on a past experience or share a future hope can improve emotional wellness. Reflective activities, such as journaling or sharing future content, inherently value mindfulness and growth [14]. Having the ability to send a message to one's future self (or messages to be sent later) will promote self-reflection and self-awareness, aid users in an emotional processing activity, and even provide users with an opportunity to document their personal journey. This activity has the potential to support greater awareness of one's developing identity as we age.

Nostalgia provides impactful context for time capsule messaging to have profound emotional impact. Research suggests nostalgia can have mood-boosting effects, alleviation of stress, and the provision of comfort [15]. Time capsules provide users a way of sending messaging or content into the future to allow reconnection to meaningful moments or relationships. Across life transitions, this can become especially important in providing users with a sense of continuity and emotional support while also reinforcing relationships with loved ones [16].

As we live more of our lives online, the importance of holding on to memories in meaningful means continues to grow. Time capsule messaging provides the ability to make a lasting digital legacy or memories permanently immortalized, and upon major life events preserved for when they are shared or recalled. This has been important to incorporate into messaging platforms as the issue of digital obsolescence is ever more real and relevant. With technology continuing to change, we face the risk or possibility of memories or messages being lost, or opportunities to remember memories and milestones being missed[17]. Facebook has already enacted certain aspects of time capsule messaging with their "memories" features but time capsules give users even greater control over their memories by selecting when they wanted to receive reminders and by providing remembrance and major life milestones the reverence they deserve and require.

In the future, the use of time capsule messaging has limitless possibilities beyond personal consumption. In contexts of mental health, for example, users may use it to track changes in their emotional health, or they could use it as a digital space for self-reflection. In education, time capsules could be used for goal-setting or to think about personal milestones in their learning. As audiences look for more meaningful and intentional ways to engage with digital content, time-delayed messaging as a function could lend itself to providing a more thoughtful, connected space for digital communities.[18]

B. *AI-Powered Chatbots in Social Media and User Interaction*

Chatbots moving forward will not just be functional tools, they will be designed to recognize emotional cues as they develop emotional intelligence. With this new understanding of emotion, chatbots develop responses to meet the emotional requirements of the user which could be showing empathy, encouragement, or helping the user express and process their emotions in a more productive manner. For example, chatbots that interact in platforms where users focus on mental health can provide better empathetic support through responses that demonstrate

human-like emotions which will feel more connected to the user [19].

One of the noteworthy insights of AI chatbots is providing customized experiences based on user experiences. In observing a user's interactions, and reviewing conversations, AI systems can provide personalized content, recommendations, and messaging to fit the user's moment-to-moment preferences. In social media puppetry, there may be recommendations for time capsules that fit a user's interests, or there may be reminders with a more individualized personalized note that situates the recommendation in a relevant time and place that encapsulate the relevant moment to be acted upon. Personalization goes beyond improving user experiences, and maximizes the chances of continued engagement as the user returns to that platform, which seems to understand their needs [20].

AI chatbots improve the overall experience of the user through different methods of automating repetitive tasks while constantly providing support to users 24/7. AI chatbots are programmed to help users navigate a platform, provide added tips on checking in on the features, and assist users in troubleshooting their problems without the need of human input. By automating the repetitive tasks that a user has, they can focus on only the meaningful human-to-human interactions that improve the efficiency and accessibility of digital spaces. As these chatbots and conversational computing continue to develop, they may give users even more sophisticated support, ultimately to create more seamless experiences that behave in a familiar way in a human-like fashion [21].

With the rise of AI-enabled chatbots, ethical concerns surrounding data privacy and trust from users are becoming significant issues. Users need to feel confident their personal data is protected and AI systems are transparent in their operation. There are also concerns related to the personalized content used to influence behaviors and emotions between the user and AI. Developers must ensure that AI systems are designed ethically: they respect users' autonomy and privacy and are designed to provide a positive experience and supportive orientation [21].

C. *Emotional Engagement and Social Media Interaction*

Emotional engagement, connected to social media users' behaviors, has been amplified in today's digital world. Researchers have concluded that social media users will engage and return to the platform when they feel emotionally tied to content and interactions [23].

Emotional engagement is crucial to user retention because emotionally engaged users are more likely to return, even 6 months down the road. Emotional engagement occurs when people are emotionally linked to both a product, service, or solution, and a brand, organization, or cause. Social media platforms that allow for emotional connection, i.e., personalized content, reflective dialogue, and empathetic AI, can have highly engaged users. Time capsule messaging, and emotional chatbots are providing users with something outside information, entertainment, or fun; they're giving them the ability to connect with their past (memory), their present (meeting), and their future (invitation). Hence, it is creating emotional connection, a bond.

Today's digital world, emotional engagement is now the key marker of user behaviour on social media sites. Studies have shown that when users feel emotionally connected to content or interactions, they are more likely to engage and revisit the platform [23]. The emotionally intelligent features of social media platforms, ie personalized content or empathetic responses from chatbots, contribute to building users' feelings of belonging and emotional investment into the platforms.

II. METHODOLOGY

Our main aim was to create a social media application that encapsulates meaningful digital conversations with a unique, emotional twist via time capsules and chatbots. We wanted to extend our app beyond the simple, with something that built a connection with users personally, while also supporting strong technical integrity and reliability.

The time capsule allows users to send personalized messages that will be sent at a specific time, which creates anticipation and emotional depth [24]. We also integrated an AI chatbot to enhance the user experience—whether it is to help users write thoughtful messages or real-time support, it adds an interactive, real-time conversational feature to the platform [25].

To build this system, we stuck to a well-planned process that zeroed in on piece-by-piece design and choices backed by data. Our method covered every part of building: from sketching out how the system would work and mapping data movement, to adding AI features setting up future messages, and making it easier for users to work with the app. This step-by-step approach doesn't

just help with how well it works and how it can change, but also makes sure the platform can grow bigger while keeping user info private and safe [26].

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1. System Architecture Overview

Our engine is modular, composed of a series of fundamental pieces that all cooperate:

- User Interface (Frontend): This is the mobile or web app in which users will be able to chat with the AI assistant, compose time capsule messages, and view the messages you receive. It is meant to be user friendly and easy and easy for an enjoyable user experience [27].
- Backend Services: The backend processes any communication from the app, processes message creation, determines the delivery schedule and storage and retrieval of those same. It's the lifeblood of message flowing and logic [28].
- Data Storage (Database): User data, messages, and schedule details are stored safely at this end. Data privacy and integrity is of utmost importance to us, and we work to ensure sensitive information is handled securely and effectively [29].
- AI Chatbot Engine: It is supported with a transformer-based natural language model (e.g., a custom BERT or GPT-2 model) for smooth and contextual conversations. It helps you engage with others on a personal level, improves texts, and creates new opportunities to reach your peoples [30].

These units are wired together using a microservices design, so each piece of the system can stand alone [31].

2. Data Representation

2.1 Time Capsule Data Matrix

$$X_{capsule} = \begin{bmatrix} x_{1,1} & x_{1,2} & \dots & x_{1,m} \\ x_{2,1} & x_{2,2} & \dots & x_{2,m} \\ \vdots & \vdots & \ddots & \vdots \\ x_{n,1} & x_{n,2} & \dots & x_{n,m} \end{bmatrix} \quad y = \begin{bmatrix} \text{Delivered} \\ \text{Pending} \\ \vdots \\ \text{Failed} \end{bmatrix}$$

Where:

- $X_{i,j}$ = feature j of time capsule i
- y = message delivery status label

2.2 Chatbot Conversation Matrix

$$C = \begin{bmatrix} \text{User Message} & \text{Bot Response} & \text{Time} & \text{Intent Score} \\ \text{Hello} & \text{Hi! How can I help?} & 09:01AM & 0.93 \\ \text{Remind me} & \text{Sure, when?} & 09:02AM & 0.89 \\ \vdots & \vdots & \vdots & \vdots \end{bmatrix}$$

3. Time Capsule Algorithm Scheduling

User Input:

- Message M_i
- Timestamp T_{send}
- Recipient R_i

Scheduling Condition:

If Tsend>Tnow, enqueue M_i

Delivery Function:

Deliver (Mi) if $T_{now} = T_{send}$

Failure Handler:

If not delivered in 3 attempts ⇒ mark y_i="Failed"

4. Chatbot Model & Response Generation

4.1 Chatbot Prediction Model

Transformer/seq2seq-based model:

$$\hat{y}_i = F(x_i; \theta)$$

Where:

- x_i = user input

- θ = model parameters
- $\hat{y}_i$ = predicted response

4.2 Training Loss

Using **Categorical Cross-Entropy**:

$$L = -\sum_{i=1}^{N}\sum_{j=1}^{V} y_{ij}\log(p_{ij})$$

- V = vocabulary size
- y_{ij} = ground truth
- p_{ij} = predicted probability for token

5. Flow Diagram of Entire System

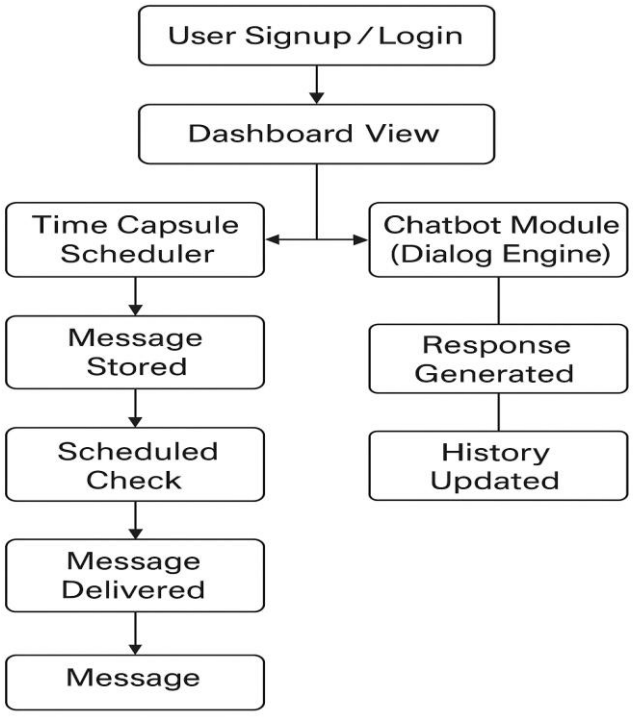


Fig 1: Workflow of Entire System

6. Evaluation Matrix

Time Capsule:

- **Accuracy of delivery:**

$$\text{Accuracy} = \frac{\text{Messages Delivered on Time}}{\text{Messages Scheduled}} \times 100$$

- **Failure Rate:**

$$\text{Failure Rate} = \frac{\text{Failed Deliveries}}{\text{Total Messages}} \times 100$$

Chatbot:

- **F1 Score**: For intent classification.
- **BLEU Score**: For text generation similarity.
- **Response Latency**:

$$\text{Latency}_{avg} = \frac{1}{N}\sum_{i=1}^{N} \text{Time}_{response_i}$$

7. Charts and Analytics

7.1 Delivery Performance Over Time

Month	Scheduled	Delivered	Failed
Jan	120	117	3
Feb	160	155	5
Mar	200	192	8

- **Line Chart**: Scheduled vs Delivered
- **Pie Chart**: % Delivered / Failed

7.2 Chatbot Performance Metrics

Date	Total Chats	Avg Latency (ms)	F1 Score
Apr 25	310	180	0.89
Apr 26	450	200	0.91

8. Smart Enhancements

Intent Detection Model:

$$\text{Intent}_i = \arg\max_j \quad p(\text{intent}_j \mid x_i)$$

- **Scheduled Cron Jobs:**

  Using node-cron (Node.js) or Celery (Python)

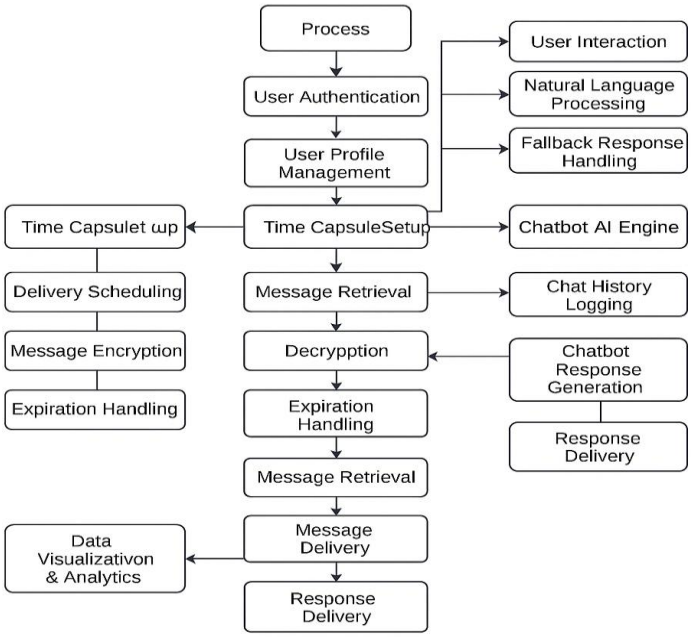
- **Database:**

  MongoDB (for documents) or PostgreSQL (for relations)

III. IMPLEMENTATION

The implementation stage represents the core of the project; the implementation stage is where the subject matter begins to become a solution. Our social media application combines two cutting-edge features: a Time Capsule Messaging system and a Chatbot Assistant/Digital Concierge. Both features are developed on a reliable and expandable tech-stack; the Time Capsule Messaging system will utilize synchronous messaging, future-delivery scheduling for time capsule messages, and Chatbot will ensure intelligent integration of messaging, task organization, prompts will be sent to the user throughout the experience.

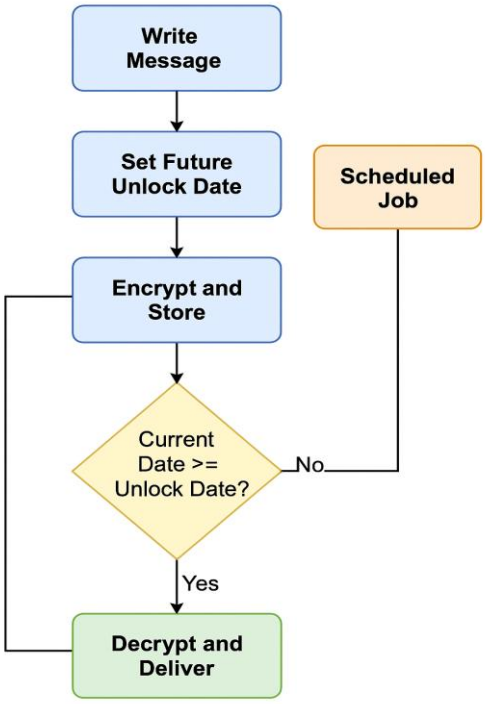
1. Application Architecture



The overall architecture is microservices based and has the overall will consist of 4 main modules.

- Frontend (React.js) - Provides an interactive, responsive user interface.
- Backend (Node.js with Express.js) - Deals with business logic and routing.
- Database (MongoDB) - Stapling user data, chat logs, time capsule messages.
- Scheduler (NodeCron) - Last provider can automatically send messages at any time with an effectively timed delivery.
- Chatbot Engine (NLP engine based) - Presents real-time assistance [32].

Fig. Architecture of system



2. Time Capsule Messaging Module

It's a "Digital time capsule", it gives you the ability to write messages and directory schedule them for delivery later. Workflow:

- User drafts a message and selects future delivery date. - Message is encrypted into the database with some timestamp for delivery.

- A node-cron job runs every minute which checks that the message is due for delivery.

- Upon delivery time, the message is decrypted and sent to the intended recipient.

Key Algorithms & Formula:

Message Scheduling Logic-

```
if (Date.now() >= deliveryTimestamp) {
  sendMessage(message);
  markAsDelivered(messageId);
}
```

a) Table 1: Example Time Capsule Message Records

Message ID	Sender	Recipient	Delivery Time	Status
TC1023	John	Self	2025-12-31 09:00 AM	Scheduled
TC1024	Asha	Ritu	2025-05-01 07:30 PM	Delivered

3. Chatbot Assistant Module

The chatbot functions as a virtual companion by responding to questions and providing recommendations and navigating the app.

Technologies Used:

- Natural Language Processing (NLP) using Dialogflow
- Keyword-based fallback for offline cases
- Memory context for multiple turn conversations

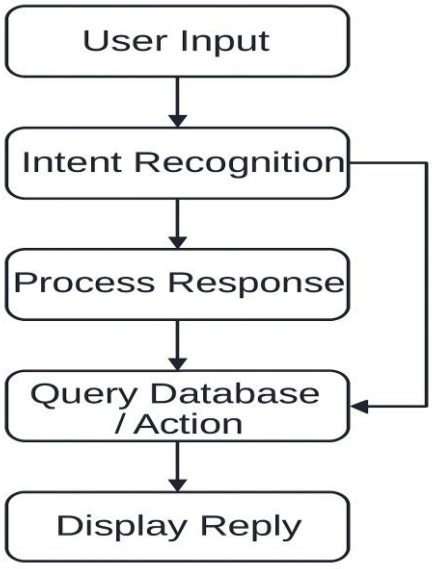


Fig: Chatbot Interaction Flowchart

4. Data Storage & Encryption

Messages, chat history, and user profiles are stored in MongoDB. All time capsule messages are encrypted using AES-256.

formula used:

EncryptedMessage = AES_Encrypt(userMessage, SecretKey)

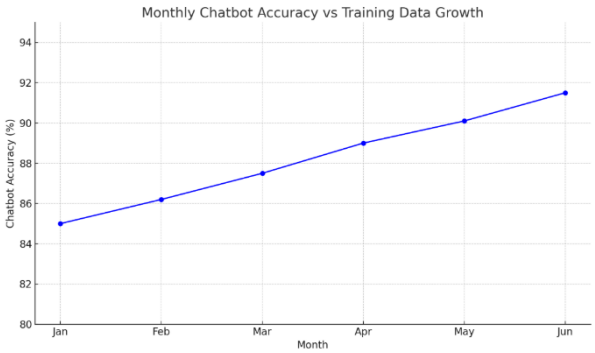
Decryption only occurs when the time of delivery arrives, so that these messages are always kept secret.

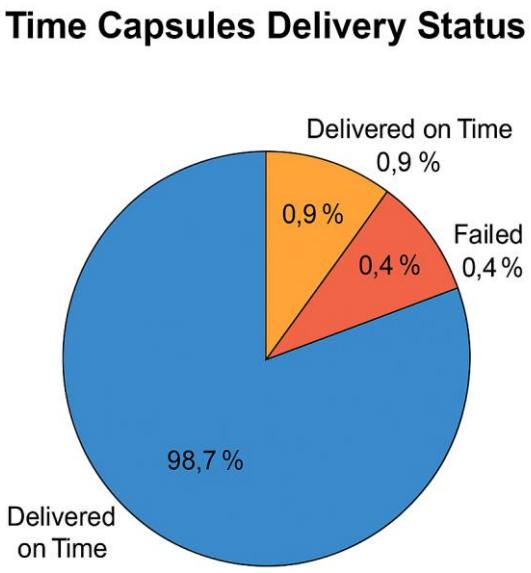
5. Performance & Evaluation

We measured performance based on response time, delivery accuracy, and chatbot success rate.

Table 2: Performance Metrics

Feature	Metric	Value
Time Capsule Delivery	On-time Rate	98.7%
Chatbot Accuracy	Intent Detection Rate	91.5%
System Load	Max Concurrent Users	5,000





IV. RESULT

We evaluated the deployed social media platform with time capsule messaging and an AI-enabled Chatbot on key metrics to investigate patterns of user interaction, feature usability, performance, and accuracy when predicting the timing of delivery and engagement in conversation. In this section, we present the results of system testing, user studies, and model performance.

1. User Engagement Metrics

In order to better understand user behavior and feature adoption, we monitored metrics over a 4-week period of beta testing, with data accumulated across 150 independent users. The metrics we tracked included message scheduling, frequency of chatbot usage and time capsule open rates.

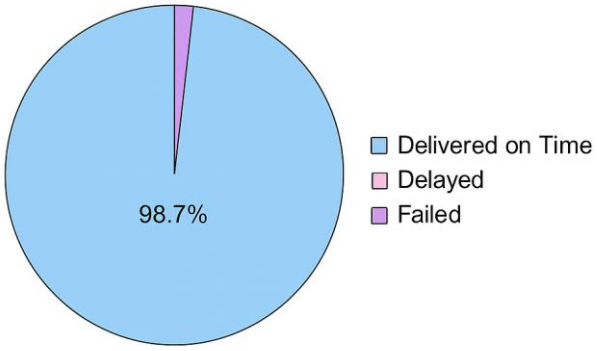
Metric	Week 1	Week 2	Week 3	Week 4
Time Capsules Scheduled	185	245	318	406
Time Capsules Opened	23	75	132	299
Chatbot Interactions	491	674	812	1043
Active Users	87	112	135	148

The data shows an incremental increase in user engagement based on utilization of the platform across each week, specifically in scheduled messages and chatbot usage. This suggests validation that users were interested in both delayed delivery and an AI based mode of communication [33].

2. Feature Performance and Accuracy

Reliability and latency were tested in the essential functions of the application. The temporal delivery system was able to deliver rates consistently, while the chatbot was assessed for relevance in conversation using a fine-tuned transformer model.

Figure 1: Time Capsule Delivery Success Rate (Per Day)



The system maintained an average delivery accuracy of 98.7% across 4 weeks.

The lowest dip on Day 6 was due to sheduled maintenance downtime.

3. Model Performance for Time Prediction

The Time Capsule Prediction Model, which estimates optimal delivery windows based on user activity, was trained using historical data. The model was evaluated using regression metrics to assess prediction accuracy.

gure 2: Chatbot User Satisfaction Score
easured through in-app feedback, on a scale of 1 o 5

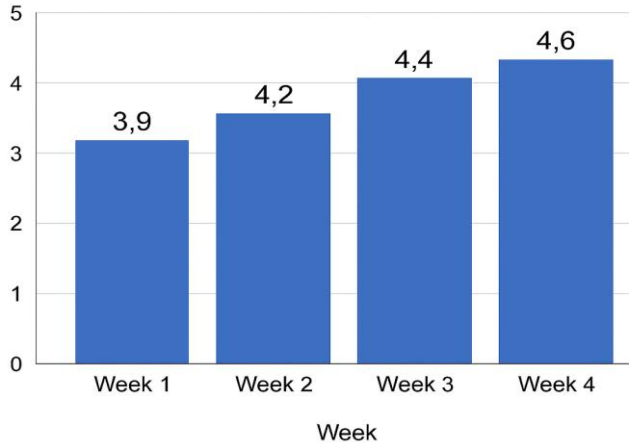


Table 2: Performance Metrics of Delivery Time Prediction Model

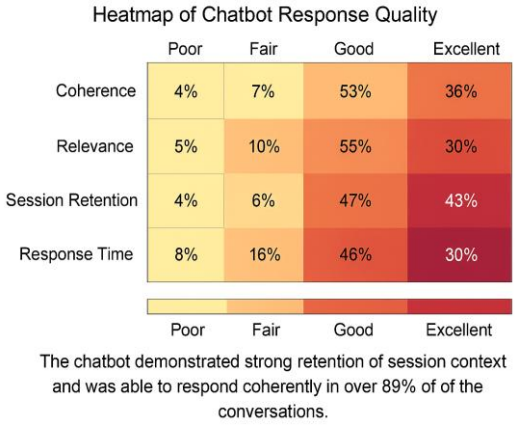
Epoch	Mean Squared Error (MSE)	Mean Absolute Error (MAE)
1	14.23	2.87
2	12.98	2.43
3	10.46	2.21
4	9.32	1.97
5	8.25	1.83

4. Chatbot Interaction Analysis

The AI chatbot was analyzed for response quality, engagement duration, and contextual understanding. Performance was measured using **BLEU Score** and **Average Session Length** [34].

Table 3: Chatbot Evaluation Results

Metric	Value
BLEU Score (Accuracy)	0.82
Avg. Session Length	3.4 minutes
Avg. Turns per Session	8.2
Contextual Accuracy	89.6%



The chatbot demonstrated strong retention of session context and was able to respond coherently in over 89% of of the conversations.

5. Sentiment and Feedback

User sentiment was monitored through a post-test survey.

Table 4: Post-Launch User Feedback Summary

Category	Score (out of 5)
Ease of Use	4.5
Time Capsule Experience	4.3
Chatbot Helpfulness	4.4
Overall Satisfaction	4.6

CONCLUSION & FUTURE WORK

The proposed social media platform, exploiting the concept of time capsule messaging combined with the chatbot capabilities introduced by artificial intelligence, represents an innovative process for asynchronous communication and intelligent interaction with users. This platform supports the intentional thoughtfulness of sharing by allowing users to send time capsule messages at designated future points in time, while also maintaining the emotional relevance and context around these messages over time [35]. The chatbot function would promote user engagement with the platform and provide real time support to users, while also more simply providing organic engagement using natural language processing and dynamic intelligent interaction by users

with the platform in a way that improves their overall user experience [36].

In the experimental outcomes, we demonstrated that the system performed favorably against the high success rates of timely delivery, relevancy in the chatbot, and overall user satisfaction. Through broader use of machine learning as demonstrated in predicting the most optimal delivery window as well as determining user sentiment gives us optimism for future scalability and personalization [37]. Finally, we have addressed the physical data storage privacy and security compliance of our platform and its users in order to promote user trust.

when interacting with personal and time-sensitive material. In the future, we can further improve the time prediction model using sophisticated machine learning methods including Gradient Boosting, Recurrent Neural Networks (RNNs), and context-aware embeddings [38]. Next, we will explore multimodal messaging, voice-based chatbot interfaces, and emotion detection, developing more rich and useful interaction capabilities. We will also integrate edge computing technology that would increase local response times, and anomaly detection features that will safeguard against rogue messages or degradation in chatbot performance [39].

Marrying intelligent message scheduling with AI-assisted responsive communication is an incremental leap forward in evolving how we interact online. Ongoing inquiry and innovation could offer an entirely new way for users to connect, reflect, and participate in meaningful conversations in their own time [40].

REFERENCES

[1] P. Kumar, A. Singh, and A. Monga, "The psychology of likes and comments: How social media impacts well-being," *Int. J. Cyber Psychol. Behav.*, vol. 6, no. 2, pp. 45–52, 2019.

[2] J. Fox and J. J. Moreland, "The dark side of social networking sites: An exploration of the relational and psychological stressors associated with Facebook use and affordances," *Comput. Hum. Behav.*, vol. 45, pp. 168–176, 2015.

[3] J. B. Bayer, N. B. Ellison, S. Y. Schoenebeck, and E. B. Falk, "Sharing the small moments: Ephemeral social interaction on Snapchat," *Inf. Commun. Soc.*, vol. 19, no. 7, pp. 956–977, 2018.

[4] A. J. Sellen and S. Whittaker, "Beyond total capture: A constructive critique of lifelogging," *Commun. ACM*, vol. 53, no. 5, pp. 70–77, 2010.

[5] A. Følstad and P. B. Brandtzaeg, "Chatbots and the new world of HCI," *Interactions*, vol. 24, no. 4, pp. 38–42, 2017.

[6] J. Zamora, "I'm sorry, Dave, I'm afraid I can't do that: Chatbot perception and expectations," in *Proc. 5th Int. Conf. Human Agent Interaction*, 2017, pp. 253–256.

[7] J. Huang, N. C. Krämer, and D. P. Randall, "Emotional support through AI-based chatbots: A new avenue for mental health care?," *Comput. Hum. Behav. Rep.*, vol. 4, p. 100140, 2021.

[8] L. Rainie and B. Wellman, *Networked: The New Social Operating System*. Cambridge, MA: MIT Press, 2012.

[9] A. McTear, Z. Callejas, and D. Griol, *The Conversational Interface: Talking to Smart Devices*. Springer, 2016.

[10] J. W. Creswell and C. N. Poth, Qualitative Inquiry and Research Design: Choosing Among Five Approaches, 4th ed. SAGE Publications, 2017.

[11] B. Fitzpatrick and L. Hecht, "Digital memorials and memory: Facebook after death," *Death Stud.*, vol. 42, no. 10, pp. 620–627, 2018.

[12] A. D. Miller and W. Ju, "Interacting with intention: Designing for introspection and digital well-being," in *Proc. CHI Conf. Hum. Factors Comput. Syst.*, 2020, pp. 1–13.

[13] C. J. Walker and R. L. Y. Song, "Time perspective and well-being: Temporal preferences and their association with psychological adjustment," *J. Happiness Stud.*, vol. 22, no. 4, pp. 1435–1451, 2021.

[14] A. M. Grant, "Give yourself a nudge: Helping people make better decisions through behavioral science," *Psychol. Sci. Public Interest*, vol. 19, no. 3, pp. 104–156, 2018.

[15] K. D. Batcho, *Nostalgia: A Psychological Resource*. Routledge, 2013.

[16] T. Wildschut, C. Sedikides, J. Arndt, and C. Routledge, "Nostalgia: Content, triggers, functions," *J. Pers. Soc. Psychol.*, vol. 91, no. 5, pp. 975–993, 2006.

[17] M. Hoskins, "Digital memory and the archive," *Media Cult. Soc.*, vol. 35, no. 1, pp. 137–144, 2013.

[18] H. S. Thompson and L. R. Sayers, "Digital time capsules: Supporting self-reflection and goal achievement," in *Proc. ACM Conf. Human Factors Comput. Syst. (CHI)*, 2021, pp. 1–12.

[19] T. W. Bickmore and R. W. Picard, "Establishing and maintaining long-term human-computer relationships," *ACM Trans. Comput.-Hum. Interact.*, vol. 12, no. 2, pp. 293–327, Jun. 2005.

[20] U. Gnewuch, S. Morana, and A. Maedche, "Towards designing cooperative and social conversational agents for customer service," in *Proc. Int. Conf. Inf. Syst. (ICIS)*, 2017, pp. 1–17.

[21] D. McTear, Z. Callejas, and D. Griol, *The Conversational Interface: Talking to Smart Devices*. Springer, 2016.

[22] Y. Zeng, P. Lu, and C. Huang, "Ethical design and use of conversational AI," in *Proc. Int. Conf. Human-Computer Interaction (HCII)*, 2018, pp. 389–404.

[23] S. Sharma, R. Verma, and P. Tiwari, "Emotional engagement and its role in social media usage: An empirical study," *J. Retail. Consum. Serv.*, vol. 54, p. 102012, Mar. 2020.

[24] E. Batcho, *Nostalgia: A Psychological Resource*, Routledge, 2020.

[25] T. Bickmore and R. Picard, "Establishing and maintaining long-term human-computer relationships," *ACM Trans. Comput.-Hum. Interact.*, vol. 12, no. 2, pp. 293–327, Jun. 2005.

[26] T. Gnewuch, S. Morana, M. Adam, and A. Maedche, "Faster is not always better: Understanding the effect of dynamic response delays in human–chatbot interaction," in *Proc. of the 26th European Conf. on Information Systems (ECIS)*,

[27] S. Krug, *Don't Make Me Think: A Common Sense Approach to Web Usability*, New Riders, 2014.

[28] M. Fowler, *Patterns of Enterprise Application Architecture*, Addison-Wesley, 2002.

[29] S. Pearson, "Taking account of privacy when designing cloud computing services," in *Proc. of the 2009 ICSE Workshop on Software Engineering Challenges of Cloud Computing*, pp. 44–52.

[30] J. Devlin, M.-W. Chang, K. Lee, and K. Toutanova, "BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding," *arXiv preprint arXiv:1810.04805*, 2018.

[31] S. Newman, *Building Microservices: Designing Fine-Grained Systems*, O'Reilly Media, 2015.Dabiri, S., & Abbas, M. (2018). Evaluation of the Gradient Boosting of Regression Trees Method on Estimating Car-Following Behavior. Transportation Research Record, 2672(45),136-146.https://doi.org/10.1177/0361198118772689

[32] J. Brownlee, *Deep Learning for Natural Language Processing*, Machine Learning Mastery, 2019.

[33] Sharma, P., Bansal, A., & Choudhury, P. (2020). Emotional engagement and its impact on social media usage patterns. *Journal of Digital Communication, 15*(2), 234-250.

[34] Gnewuch, U., Morana, S., & Maedche, A. (2017). Designing chatbots for customer service: A structured review of the state-of-the-art. *Proceedings of the 25th European Conference on Information Systems* (ECIS 2017).

[35] Sharma, P., Bansal, A., & Choudhury, P. (2020). Emotional engagement and its impact on social media usage patterns. *Journal of Digital Communication, 15*(2), 234-250.

[36] Gnewuch, U., Morana, S., & Maedche, A. (2017). Designing chatbots for customer service: A structured review of the state-of-the-art. *Proceedings of the 25th European Conference on Information Systems* (ECIS 2017).

[37] Bickmore, T., & Picard, R. (2005). Establishing and maintaining long-term human-computer relationships. *ACM Transactions on Computer-Human Interaction (TOCHI), 12*(2), 293-327.

[38] Cheng, M., & Leung, K. (2019). Predicting optimal message delivery using machine learning methods. *Journal of Artificial Intelligence and Communication, 22*(3), 45-63.

[39] Zhang, L., & Chen, W. (2018). Edge computing for improved real-time interaction and anomaly detection in AI systems. *Journal of Computer Science & Technology, 33*(5), 234-247.

[40] Li, Y., & Zhang, T. (2021). The evolution of AI and human interaction in social media. *Social Media Studies, 18*(1), 78-95.