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Beyond Diary: An AI-Powered Personal Biography Generator

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Abstract: ***A diary helps people hold on to important experiences and see how they have changed, but writing and organizing entries takes time, and that effort discourages many users from keeping it up. Research on story generation, personalized narrative generation, lifelog retrieval, autobiographical memory, and long-term memory for AI systems each addresses part of this problem. We review 20 papers published between 2020 and 2026 and find clear progress in each area, yet these capabilities are treated separately rather than as one continuous storytelling system. To address this gap we present Beyond Diary, an AI-powered personal biography generator. Users record daily experiences by voice or text; the system transcribes speech, extracts events, emotions, and milestones with a large language model, stores them as searchable memories, and writes biography chapters from them. Reminders, streaks, and badges support consistent use. The paper also reports the system's feasibility, requirements, layered architecture, and UML-based design, built on React.js, Node.js, PostgreSQL with pgvector, the Whisper API, and the Groq API running LLaMA 3. The system aims to make keeping a record of one's life light enough to sustain and to turn everyday experiences into a personal biography.***

Keywords: ***artificial intelligence, personal biography, speech-to-text, automatic story generation, personal memory, lifelog retrieval, large language models, gamification.***

I. INTRODUCTION

Biographies are usually written about famous people, yet everyone has a life story made up of memories, achievements, challenges, and lessons learned. Most of it is never written down. A diary is only useful if it is kept up, and keeping it up takes regular effort: writing every day is one cost, and deciding what is worth recording is another. As a result, ordinary days that seem unremarkable at the time are lost, even though some of them turn out to matter later.

People do record their lives in diaries, phone notes, and social media, but these tools mostly store what the user types. Existing diary applications keep entries; they do not turn them into a coherent account of a life. What is needed is a way of recording personal experience that does not itself become a chore, and that does the organizing and narrating on the user's behalf.

Automatic story generation has moved quickly with modern language models. Work in this area has dealt with coherence, consistency, relevance, creativity, and the difficulty of evaluating the output [1]–[8]. Some methods feed event and context information into the generator to keep stories on topic [3], while others rely on structured knowledge to hold a plot together [5]. Nearly all of this work, however, concerns invented or general-purpose stories. It does not address the ongoing, factual experience of one particular person.

A second line of work tries to tie generated text to a specific individual. StorySage gathers a user's memories through conversation, using several cooperating agents, and gradually builds them into an autobiography [9]. MirrorStories personalizes narratives with identity-related information [10], and Kumar et al. adapt generation to an author's writing style [11]. Each makes the output feel more personal, but they differ in which personal information they use and in how, or whether, a person's experiences are kept over long periods.

Lifelogging and personal memory research approaches the problem from the retrieval side. A narrative review covers how data captured in daily digital life can help people find and make sense of past experiences [12], and LifeSeeker supports interactive search over lifelog data through concepts, metadata, and visual content [13]. Separately, language models have been used to score and analyze autobiographical memories [14], [15], and Smart et al. discuss LLMs as a kind of personal memory system [16].

A related question arises for LLM-based agents: what should be kept, and how should it be organized? DeChant discusses both the benefits and the risks of letting agents store past episodes [17]. Other work proposes consolidating memories [18] or writing to memory only when there is supporting evidence [19], so that the store does not fill with redundant or low-value items. These concerns carry over directly to a system meant to hold someone's life story.

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Taken together, the literature covers story generation, personalization, lifelog retrieval, autobiographical analysis, and agent memory reasonably well, but each is studied on its own. Among the 20 papers we reviewed, none takes a user from effortless daily capture through to a continuously updated biography.

In this paper we present Beyond Diary, an AI-powered personal biography generator. Users record experiences by voice or text; the system transcribes speech, extracts events, emotions, and milestones with a language model, stores them as searchable memories, and writes biography chapters from those memories. It is meant to organize and narrate what the user tells it, not to invent experiences for them.

The paper makes three contributions: (i) a review and comparison of 20 studies published between 2020 and 2026; (ii) an identification of the gap between them and a statement of the resulting problem; and (iii) the design of Beyond Diary, covering its feasibility, requirements, methodology, layered architecture, and UML models.

The rest of the paper is organized as follows. Section II reviews the literature and Section III compares the studies. Section IV states the research gap and the problem. Section V gives the motivation, objectives, and scope; Section VI assesses feasibility; and Section VII lists the requirements.

Section VIII describes the methodology, Section IX the key features, and Section X the architecture and design. Section XI discusses benefits, risks, and limitations, and Section XII concludes.

II. LITERATURE REVIEW

We grouped the 20 papers into five areas: story generation, personalized narrative generation, lifelog retrieval, autobiographical memory analysis, and long-term memory for AI systems.

A. Automatic Story Generation

Early work was mostly concerned with what makes automated storytelling hard and which properties of generated stories should be measured. León et al. analyzed quantitative characteristics of human-written short stories and proposed using them as a yardstick for automated storytelling [1], and Alabdulkarim et al. surveyed the approaches and open challenges in automatic story generation [2]. Both are useful background, but both deal with stories in general rather than with personal experience.

Later methods tried to make generated stories more coherent and relevant. EtriCA feeds events and context into the generator and uses cross attention to improve coherence [3]. Ma et al. first build structured knowledge, then plan the plot, and only then generate the story, which gives more logically connected narratives but depends on structured input [5]. GROVE retrieves a forest of evidence to guide complex story generation, at the price of extra retrieval machinery and system complexity [6]. Bae and Kim use several LLM critics that repeatedly refine the story plan and the story itself, which improves creativity, engagement, and coherence but raises computational cost [7].

SEED-Story extends generation to long multimodal stories that interleave text and images [20], again with considerable computational demands.

Evaluation is a problem of its own. Chhun et al. compared human criteria with automatic metrics for judging generated stories and showed how hard it is to capture story quality with metrics alone [4]. A recent survey of text-to-text story generation reviews current models, architectures, datasets, and evaluation methods, and singles out consistency and controllability as unresolved [8]. Together these papers are the foundation for turning personal experiences into structured narratives.

B. Personalized and Autobiographical Narrative Generation

When a story is about a real person's life, personalization matters. StorySage is the closest relative of our work: it uses conversational AI and multiple agents to collect personal information and help users write an autobiography [9]. Its focus, however, is the conversation itself rather than a continuous record of daily life. MirrorStories uses LLMs to generate stories tailored to a user's identity and interests [10], but it relies on identity attributes and does not draw on a complete life history. Kumar et al. extract an author's writing characteristics and use them to personalize generated stories [11]; this captures individual style well, though it needs earlier writings from the author and concentrates on style.

All three suggest that personal information improves how relevant a story feels. What differs is how that information is gathered, represented, and carried forward over time, and none of them keeps a growing store of daily experiences from which chapters are written repeatedly.

C. Lifelog Retrieval and Personal Memory

Lifelogging research is about capturing what a person's digital life records and getting it back later. Ribeiro et al. reviewed methods for storing, organizing, and retrieving personal digital data and memories [12]. LifeSeeker lets users search lifelog data interactively through concepts and queries [13], which supports efficient retrieval but stops short of producing a narrative.

Smart et al. explore LLMs as interactive systems for storing, retrieving, and working with personal memories and life narratives [16]; their treatment is largely conceptual and does not provide a diary-to-biography workflow.

One lesson from this area is that storing entries is not enough: without good organization and retrieval, a growing archive is hard to use.

D. Autobiographical Memory Analysis

Natural language processing has also been applied to autobiographical memories. Mistica et al. used a BERT-based model to score autobiographical memory descriptions automatically [14], and Klus et al. used LLMs to score the detail in autobiographical memory narratives [15].

These studies show that language models can pull meaningful information out of personal accounts, which is directly relevant to our setting, where events, achievements, and challenges have to be identified in everyday entries. Both, however, analyze memories; neither generates a biography.

E. Long-Term Memory in AI Systems

A system that keeps information for a long time has to decide what to store. DeChant argues that episodic memory in AI agents brings benefits but also risks that deserve study [17]; the paper is conceptual and does not implement an application. Later work addresses memory quality.

Rapid episodic merging continuously folds fragmented episodic memories into consolidated ones, which supports long-term management but may lose fine detail [18].

Evidence-gated memory writing stores a memory only after checking its usefulness, consistency, and supporting evidence, which reduces unreliable memories but needs extra validation mechanisms [19]. For personal data, selective storage and careful handling matter at least as much as they do in agent settings.

F. Implications for Our Design

The reviewed work shaped several design decisions in Beyond Diary.

1) *Generate from Memories, and Keep the Original:* Coherence and consistency are still open problems in story generation [8], so chapters are written from stored memories rather than from free-form prompts, and the user's raw text is kept next to the refined version so that any output can be checked against it.
2) *Make Memories Retrievable:* The lifelog studies show that an archive is only as useful as its retrieval [12], [13]. Memories are therefore embedded for semantic search instead of being left as a flat list of entries.
3) *Extract Structure with a Language Model:* Autobiographical analysis shows that language models can identify events and details in personal narratives [14], [15]. We use an LLM to extract events, emotions, people, and milestones from each entry.
4) *Store Selectively and Carefully:* The memory literature warns about risks and about redundant or unreliable memories [17]–[19]. Each memory stays linked to its source entry, users can edit what is stored, and merging and evidence checks are left as planned extensions.
5) *Personalize Through Stored Preferences:* StorySage and style-based personalization show that personal information improves relevance [9], [11]. Beyond Diary keeps language and biography-style preferences in the user profile and applies them when chapters are written.

In summary, each area is well developed, yet they sit in separate literatures. A system that lets people record experiences with little effort, organizes them as memories, retrieves them when needed, and turns them into an evolving biography would bring these pieces together.

III. COMPARATIVE ANALYSIS

Table I lists, for each study, its main focus, approach, main strength, and main limitation.

TABLE I
COMPARATIVE ANALYSIS OF THE REVIEWED STUDIES

Ref.	Main Focus	Approach / Method	Major Merit	Major Limitation
[1]	Story characteristics	Quantitative analysis	Measurable storytelling characteristics	Does not focus on personal memories
[2]	Automatic story generation	NLP-based approaches	Identifies major challenges in storytelling	General story generation
[3]	Context-aware story generation	Event-triggered context and cross-attention	Improves contextual relevance	Not designed for personal biography
[4]	Story evaluation	Human criteria and automatic metrics	Highlights evaluation challenges	Evaluation rather than generation
[5]	Coherent story generation	Structured knowledge	Improves narrative coherence	Requires structured information
[6]	Complex story generation	Retrieval-augmented generation	Uses supporting evidence for stories	Focus is general storytelling
[7]	Story quality improvement	Collective critics	Improves generated story quality	Requires multiple evaluation agents
[8]	Story-generation survey	Review of existing approaches	Broad research overview	Identifies challenges rather than solving them
[9]	Autobiographical story generation	Multi-agent framework	Personalized autobiography generation	Mainly conversational autobiography
[10]	Personalized narratives	LLM-based personalized generation	Incorporates personal identity	Personalization scope is limited
[11]	Author-style personalization	Author-style inference	More personalized writing	Focuses mainly on writing style
[12]	Lifelog retrieval	Review of retrieval methods	Shows potential of personal digital data	Mainly focused on retrieval
[13]	Personal memory retrieval	Concept-based interactive retrieval	Helps users find past experiences	Mainly focused on retrieval
[14]	Autobiographical memory analysis	BERT-based language model	Automates memory scoring	Analysis rather than biography generation
[15]	Autobiographical detail analysis	Fine-tuned LLaMA-3	Identifies autobiographical details	No continuous biography generation
[16]	Personal memory with LLMs	LLM-based personal memory	Connects LLMs with personal memory	Long-term practical integration remains challenging
[17]	Episodic AI memory	Memory-based AI agents	Identifies benefits and risks of memory	Not designed for personal biography
[18]	Episodic memory	Memory consolidation	Improves long-term memory organization	Designed for AI agents, not personal biography
[19]	Memory writing	Evidence-gated memory	Selective and reliable memory storage	Memory writing rather than complete storytelling
[20]	Multimodal long-story generation	LLM-based multimodal generation	Supports richer storytelling	Focused on multimodal story generation

Reading across the table, each study is strong at one thing. Story-generation papers improve coherence, relevance, creativity, or evaluation [1]–[8], [20]; personalization papers bring in identity, memories, or writing style [9]–[11]; lifelog and autobiographical papers retrieve or analyze personal experience [12]–[15]; and the memory papers deal with how agents retain and manage information over time [16]–[19]. What the table does not show is any single study combining these. Beyond Diary is meant to do so in one pipeline: experience capture, information extraction, memory storage, memory retrieval, and biography generation.

The limitations column also shows a pattern. Most of the story-generation work is general-purpose, the retrieval and analysis work stops before narration, and the memory work is conceptual or aimed at agents. These are reasonable limits for the studies' own goals, but together they leave the personal biography use case uncovered.

IV. RESEARCH GAP AND PROBLEM STATEMENT

A. *Research Gap*

The story-generation studies concentrate on coherence, relevance, creativity, and evaluation [1]–[8], whereas the lifelog and memory studies deal with retrieving, analyzing, or managing information that has already been recorded [12]–[15], [17]–[19]. A few papers do link personal information to narrative generation [9]–[11], [16], but integrating that with the other capabilities remains open.

The more specific gap is the step from everyday experiences to a biography that keeps evolving. Existing studies tend to cover one stage, whether generation, retrieval, analysis, or memory management, rather than a workflow that starts with low-effort capture and continues through memory organization, retrieval, and personalized biography writing. Features that keep people recording, such as reflection, insights, reminders, and gamification, are also absent from this literature. Our contribution is to integrate existing AI components into such a workflow; we do not propose a new language model.

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B. Problem Statement

Keeping a diary means writing, organizing, and rereading entries regularly, which is hard to sustain. Experiences, achievements, challenges, emotions, and lessons then go unrecorded or become hard to recall later. Existing research offers methods for story generation, memory retrieval, autobiographical analysis, and personalized narration, but these are rarely combined in one continuous system for building a personal biography.

A system is therefore needed that lets users record daily experiences by voice or text, organizes them into personal memories, retrieves earlier experiences when they are relevant, and turns the accumulated memories into coherent, personalized biography chapters over time.

V. MOTIVATION, OBJECTIVES AND SCOPE

A. Motivation

Every individual has a unique life story that deserves to be documented and preserved. Memories, achievements, and lessons fade if they are not recorded, and traditional diary writing demands regular time and manual effort, which makes it difficult for many people to sustain. Recording daily experiences can also help people understand their own growth and reflect on their journey. AI can lighten the work by organizing memories and shaping them into stories, while reminders and gamification can encourage consistent use. The aim of Beyond Diary is therefore to help people record, preserve, understand, and reflect on their life journey.

B. Objectives

The objectives of the project are:

1) to design a simple interface for recording experiences through voice and text;
2) to develop multilingual input and speech-to-text functionality;
3) to develop an AI-powered application for recording daily life experiences;
4) to create an AI system that processes, organizes, and understands personal memories;
5) to identify important events, achievements, challenges, learnings, and milestones; and
6) to implement gamification features such as streaks and badges that encourage consistency.

C. Scope

The project covers the following areas.

1) Daily Experience Recording: entries can be spoken or typed, with multilingual support.
2) AI-Based Processing: the system converts, organizes, and interprets personal experiences.
3) Memory Management: events, emotions, achievements, challenges, and learnings are stored as structured memories.
4) Personal Timeline: memories are arranged chronologically and important milestones are tracked.
5) Biography Generation: accumulated experiences are turned into personalized biography chapters.
6) Engagement *Features:* reminders, streaks, achievements, and badges support regular use.

VI. FEASIBILITY STUDY

Before design began we examined the project from five angles.

1) *Technical Feasibility:* The project relies on mature, widely documented technologies: React.js, Node.js, Express.js, PostgreSQL, the Whisper API, the Groq API with LLaMA 3, MinIO, and pg-boss. Together they cover voice input, AI text processing, data storage, scheduled reminders, and biography generation, so no part of the pipeline depends on unproven components.
2) *Operational Feasibility:* Personal life documentation, memory preservation, self-reflection, and maintaining a digital biography are all clear practical uses. The system is designed to be simple and friendly to use, since a tool that is hard to operate defeats the purpose of reducing diary effort.
3) *Economic Feasibility:* Development cost is low because the stack is open source (React.js, Node.js, Express.js, PostgreSQL) and tools such as VS Code are freely available. The one recurring cost is the usage-based pricing that external AI APIs may carry.
4) *Legal Feasibility:* The project uses third-party APIs and open-source software, so their licenses and terms of use must be followed. User data, personal memories, voice recordings, and generated biographies are sensitive and must be handled with appropriate privacy and security measures.

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5) *Time Feasibility:* Work is divided into research, design, development, testing, and deployment phases. Within the available academic timeline the system can be developed and tested.

VII. REQUIREMENT ANALYSIS

A. Functional Requirements

1) *User Registration and Login:* users can create an account and log in securely.
2) *Daily Experience Recording:* users can record experiences as text or voice.
3) *Speech-to-Text:* voice input is converted into text with the Whisper API.
4) *AI Text Processing:* the system identifies events, emotions, achievements, challenges, learnings, and important moments.
5) *Memory Search:* users can search past experiences with natural-language queries.
6) *Milestone Detection:* the system identifies important life events and milestones.

B. Non-Functional Requirements

1) *Performance:* inputs should be processed and responses generated within a reasonable time.
2) *Usability:* the interface should be simple and user-friendly.
3) *Security:* user accounts and personal memories must be protected.
4) *Privacy:* personal experiences and user data must not be exposed to unauthorized users.
5) *Reliability:* memories must be stored and retrieved reliably.
6) *Scalability:* the system should cope with growing numbers of users and stored memories.

C. Software and Hardware Requirements

The software stack is summarized in Table II and the hardware needed for development and use in Table III.

TABLE II
SOFTWARE REQUIREMENTS

Component	**Technology**
Frontend	React.js
Backend	Node.js, Express.js
Database	PostgreSQL + pgvector
Security	JWT
AI services	Whisper API, Groq API (LLaMA 3)
File storage	MinIO
Jobs and email	pg-boss, Nodemailer, Gmail SMTP, MailHog
Deployment	Render

TABLE III
HARDWARE REQUIREMENTS

Component	**Requirement**
Processor	Intel Core i5 or equivalent
RAM	Minimum 8 GB
Storage	Minimum 256 GB
Microphone	Required for voice input
Camera	Optional, for multimedia memories
Device	Smartphone or computer
Internet	Required for AI APIs and cloud services

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VIII. PROPOSED METHODOLOGY

Beyond Diary converts a user's daily experiences into structured memories and, from those, into biography chapters. Fig. 1 shows the seven stages.

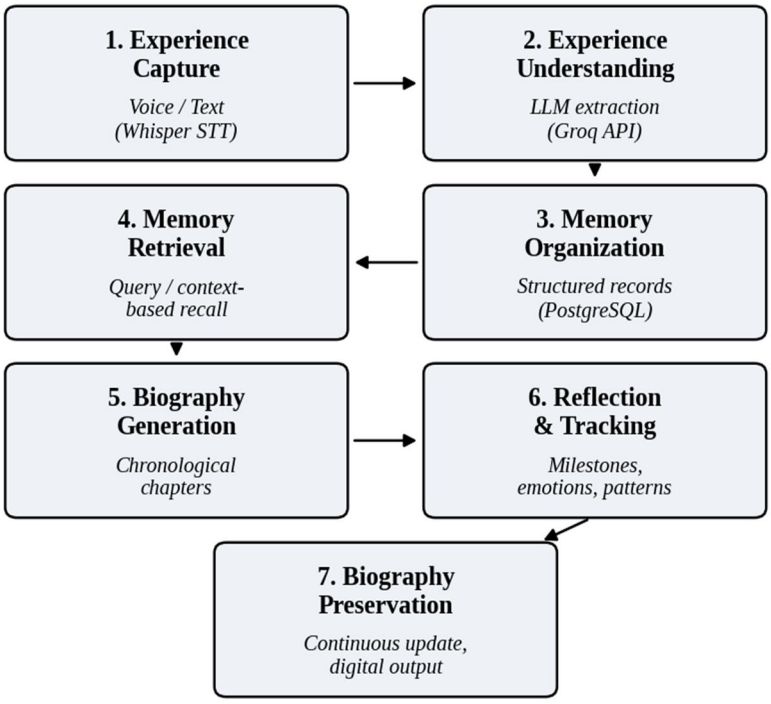


Fig. 1 Overall workflow of the proposed Beyond Diary system

1) *Experience Capture:* The user speaks or types an entry in the web or mobile interface. Spoken entries, in any of the supported languages, are transcribed with the Whisper speech-to-text service.
2) *Experience Understanding:* The text is cleaned and normalized, with noise removed, and then passed to a large language model (LLaMA 3 through the Groq API). The model identifies events, activities, emotions, people, locations, goals, and personal learnings, and flags entries that look like milestones.
3) *Memory Organization:* The extracted items become structured memory records. An embedding is generated for each memory and stored with it, alongside the original text, so that nothing the user said is lost. Records live in PostgreSQL with the pgvector extension, together with user profiles, milestones, chapters, and metadata such as time and tags. New records can be linked to earlier ones so that the story stays continuous.
4) *Memory Retrieval:* When the user asks a question, or when a chapter is being written, the query is embedded in the same way and relevant memories are found by vector similarity. Results can be filtered by user, date, or category. Earlier entries are thus reused instead of every entry being treated in isolation.
5) *Biography Generation:* A context-selection step retrieves relevant memories, orders them by time and theme, and picks key events and milestones. The language model then writes coherent chapters from them, keeping to the facts and context the user supplied, and adapts tone and style to the user's stored preferences.
6) *Reflection and Tracking:* From the accumulated entries the system picks out milestones, achievements, emotions, and recurring patterns, and produces insights that help users see how they have changed.
7) *Biography Preservation:* The biography is updated as new entries arrive. Users can read and edit chapters and export the biography, for example as a PDF, for safekeeping.

Every component in this pipeline is an existing technology (speech recognition, natural language processing, databases, and generative AI); the contribution lies in how they are combined. The goal is to make recording one's life light enough that people keep doing it.

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IX. KEY FEATURES

1) *Voice and Text Input:* Speaking is faster than typing for most people, and a spoken entry takes little effort at the end of a day. Text input remains available for quiet settings or longer reflections. The multilingual option lets users record in the language they think in.
2) *Memory Search:* Because memories are embedded, users can ask in ordinary language, for instance about a past job interview, and receive related entries rather than relying on exact keywords. This is the retrieval capability that the lifelog literature found essential [12], [13].
3) *Timeline and Milestones:* Entries are arranged chronologically, and entries that mark important events are flagged as milestones and shown on a personal timeline. Entries can also be bookmarked.
4) *Insights and Reflection:* The system generates insights from accumulated entries, covering emotions, personal growth, and trends, so that the diary becomes something users learn from and not only something they write in.
5) *Reminders and Gamification:* Users choose a reminder time, and scheduled jobs (pg-boss) send reminders by email. Streaks, experience points, and badges reward regular recording. These features target the main weakness of traditional diaries, which is that people stop writing.
6) *Editing, Personalization, and Export:* Users can edit entries and chapters, choose a biography style (for example, storytelling), and export the result. Language and style preferences are stored with the user profile.

X. SYSTEM ARCHITECTURE AND DESIGN

A. System Architecture

Beyond Diary uses a layered architecture, shown in Fig. 2. The user interface layer (React.js) accepts voice and text and runs in a web or mobile browser. The input processing layer converts speech to text with Whisper, preprocesses the text, and extracts information. The AI processing layer analyzes the entry with LLaMA 3 via Groq, structures it into memories, and generates embeddings. The data storage layer holds everything in PostgreSQL with pgvector, and the memory retrieval layer provides semantic search over it. The biography generation layer selects context, generates the narrative, and personalizes it. Finally, the output layer presents daily summaries, memories and milestones, biography chapters, and insights. External services (Groq, Whisper, and MinIO for attachments and media) sit outside the application server and are reached through its API.

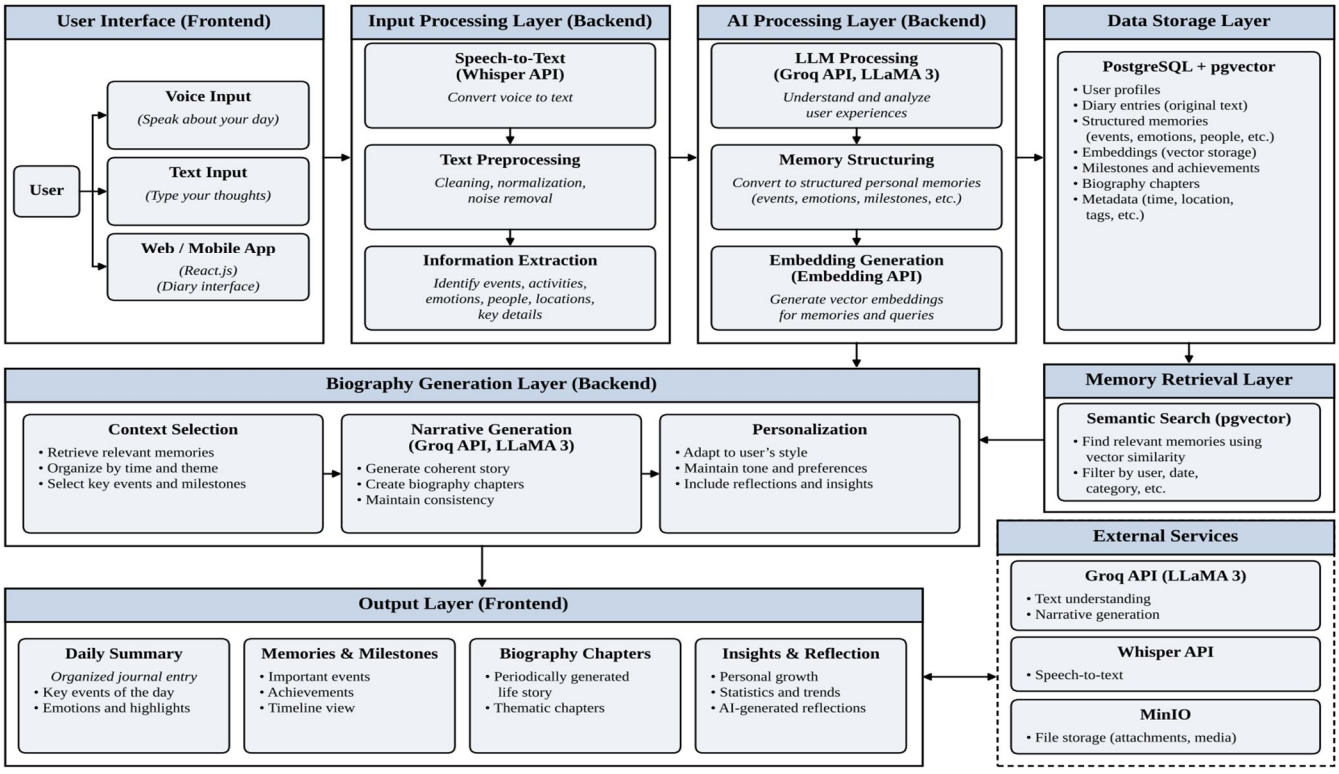


Fig. 2 Layered system architecture of Beyond Diary

B. Data Flow

The data flow diagrams in Fig. 3 describe the same system at two levels. At level 0 the user sends voice or text entries and searches to Beyond Diary and receives a timeline, biography, and insights in return; the system exchanges audio, text, transcripts, and memories with the external AI services. Level 1 splits the system into five processes. P1 handles login and authentication; P2 records and transcribes entries; P3 sends the entry for AI analysis; P4 generates the biography and insights; and P5 serves the timeline, search, and reminders. The PostgreSQL database, D1, sits between analysis and generation.

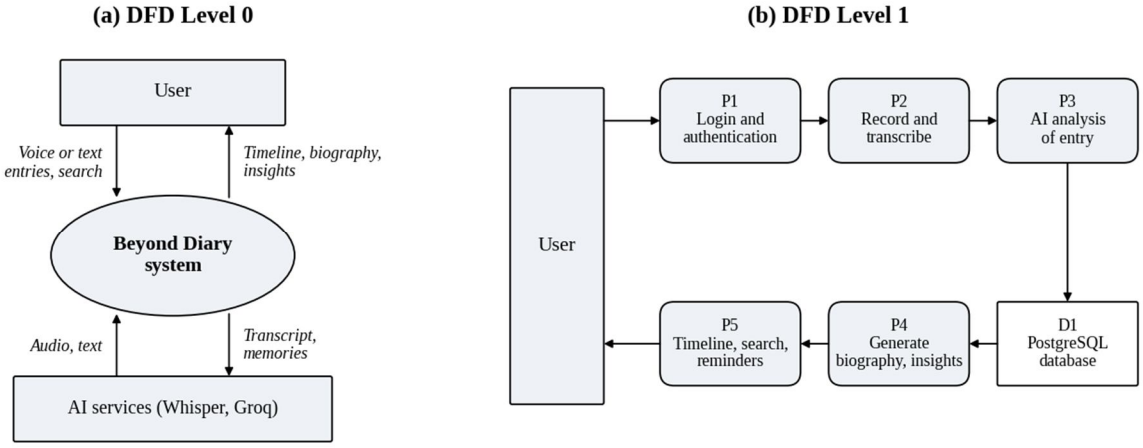


Fig. 3 Data flow diagrams of Beyond Diary: (a) level 0 and (b) level 1

C. Use Cases

Fig. 4 shows what the user can do. Registration and login come first. The main use case, recording an experience, includes converting speech to text and organizing the memory with AI. Users can view their timeline and daily entries, search memories, and request insights, which includes generating them. Reading, editing, and exporting the biography includes generating chapters, and exporting to PDF is an optional extension. Users can also view their streaks, badges, and reminders.

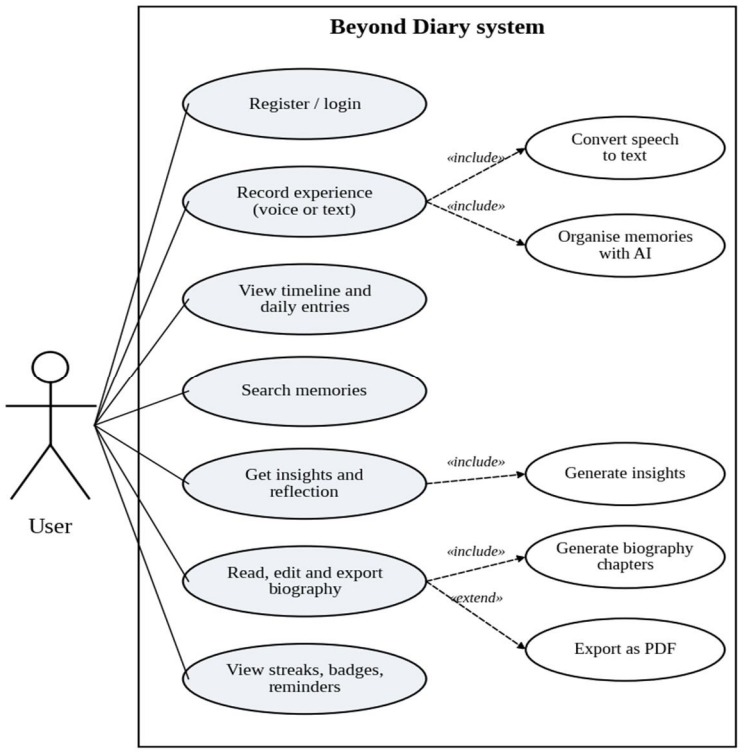


Fig. 4 Use case diagram of Beyond Diary

D. Class Structure

The class diagram in Fig. 5 captures the main entities. A User has a Preference object (reminder time, biography style, language), a Gamification object (streak and experience points) that earns Badges, and any number of Reminders. A User writes many Experiences, each of which stores the raw text and a refined version, the input type, the event type, the emotion, and flags for milestones and bookmarks. Experiences may carry MediaFiles and may be marked by Milestones. The User owns a Biography, which is composed of Chapters. The AIProcessor extracts information, refines entries, and generates chapters and insights; the SpeechService transcribes audio.

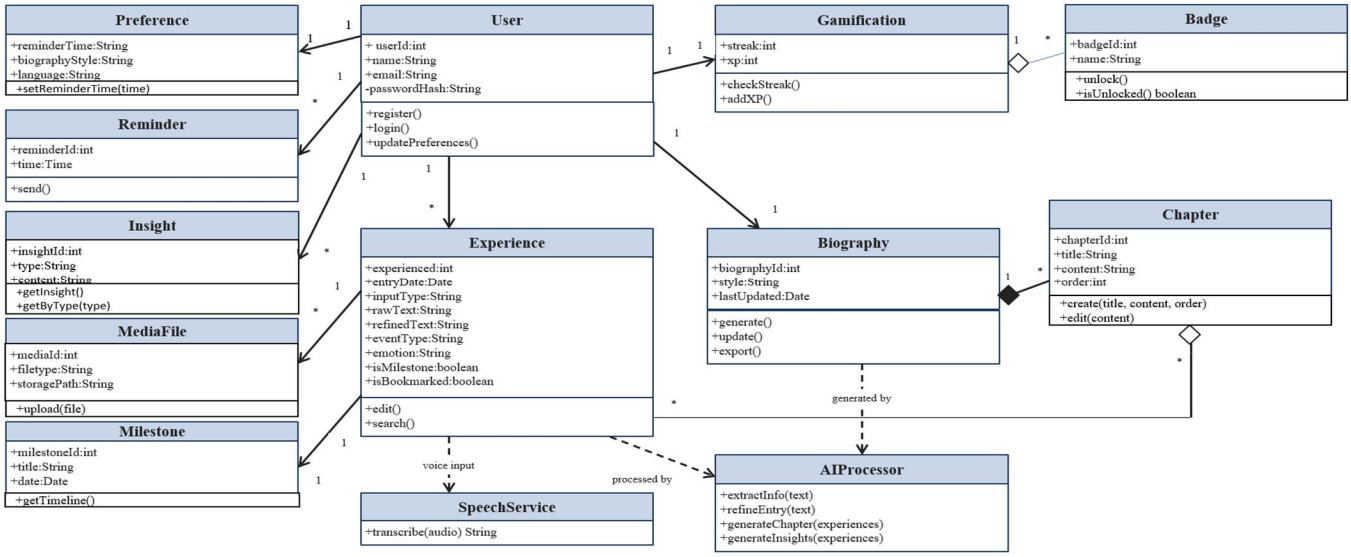


Fig. 5 Class diagram of Beyond Diary

Keeping rawText and refinedText as separate fields is a deliberate design decision: the original statement is never overwritten, so every generated sentence can be checked against what the user actually said.

E. Activity Flow

Fig. 6 traces one recording session. After login the user chooses between voice and text. Voice entries are transcribed, text entries are typed in directly, and both then reach the AI analysis step, which finds events, emotions, and milestones. The entry and memories are saved, the streak and badges are updated, biography chapters are updated, and finally the timeline, search, and insights are shown.

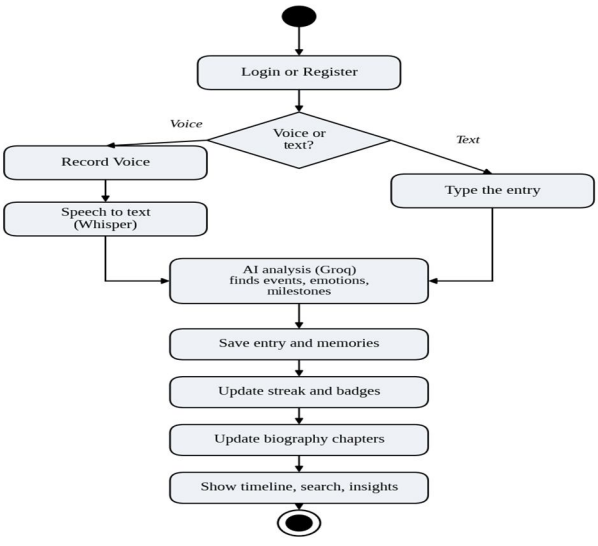


Fig. 6 Activity diagram of a recording session

F. Interaction Sequence

The sequence in Fig. 7 shows how the components cooperate. The user speaks or types an entry in the React app, which sends it to the Express API together with a JWT. The API forwards audio to Whisper and receives the transcript, then sends the text to Groq for analysis and receives events and milestones. The result is saved to PostgreSQL, the streak is updated, and the saved entry and any new badge are shown to the user.

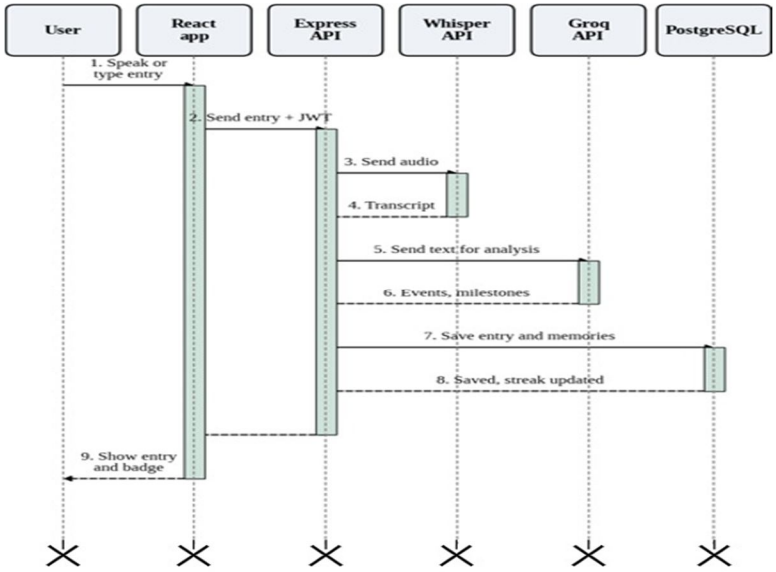


Fig. 7 Sequence diagram of entry recording and analysis

G. Data Storage

All persistent data lives in PostgreSQL. The tables mirror the classes in Fig. 5: users and their preferences, experiences (original and refined text, input type, event type, emotion, and milestone and bookmark flags), structured memories with their embeddings, milestones, biographies and chapters, insights, and the gamification state with unlocked badges. The pgvector extension keeps the embeddings in the same database, so memories and their vectors stay consistent and a similarity query can be combined with ordinary filters such as user, date, and category. Audio and other media are kept as files in MinIO, and the database stores only their paths. Scheduled work such as reminders runs as background jobs queued in pg-boss, which uses the same PostgreSQL instance.

H. Security Considerations

Security is handled at several points. Users register with an email and a password, and the class model stores only a password hash. After login, each request to the API carries a JWT, as shown in Fig. 7, and the API uses it to identify the user. Retrieval and generation are scoped to the requesting user, so one person's memories are never used to answer another person's query. Third-party services receive only the text or audio needed for transcription and analysis. These measures address the privacy and security requirements in Section VII, although a full threat analysis remains future work.

I. Deployment and Development Environment

The application is deployed on Render. During development, outgoing mail is tested with MailHog, a local mail catcher, while the deployed system sends reminders through Nodemailer over Gmail SMTP. The frontend, the API, and the database are separate components, so each can be scaled independently as the number of users and stored memories grows, in line with the scalability requirement.

J. Illustrative Instance

A small example makes the model concrete. A user, Riya (userId 101), records a voice entry on 05 October 2026 and the system labels the emotion as confident. The entry is marked as a milestone titled "First interview." Her gamification record shows a seven-day streak and 350 experience points. Her biography, in the storytelling style and last updated on 06 October 2026, contains a first chapter titled "Starting my career," in which the interview milestone appears. This instance is illustrative and is not drawn from a user study.

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XI. DISCUSSION

A. *Expected Benefits*

The main benefit we expect is lower effort. Speaking an entry takes far less time than writing and organizing one, and the AI does the sorting that a diary writer would otherwise do by hand. Because memories are structured and searchable, an old entry can be found when it becomes relevant, and because chapters are generated from stored memories, the biography grows without a separate writing project. Reminders and streaks add gentle pressure to keep going, and insights give users a reason to look back.
Table IV contrasts Beyond Diary with a typical diary application along the dimensions that matter for sustained use.

TABLE IV
TYPICAL DIARY APPLICATION VERSUS BEYOND DIARY

Aspect	**Typical diary application**	**Beyond Diary**
Input	Typed text, written regularly	Voice or text, with multilingual support
Organization	Done manually by the user	AI extracts events, emotions, and milestones
Retrieval	Browsing stored entries	Natural-language semantic search
Output	Stored entries	Timeline, insights, and biography chapters
Consistency	Depends on self-discipline	Reminders, streaks, and badges

B. *Privacy, Security, and Responsible Use*

A personal biography is among the most sensitive data a system can hold. Accounts are protected with JWT-based authentication, and personal memories must not be exposed to other users. Voice recordings and generated biographies fall under the same obligation. The memory literature adds a further warning: persistent episodic memory brings risks as well as benefits [17], and careless writing to memory produces redundant or unreliable records [18], [19]. We therefore treat the user's original text as the source of truth, keep generated text editable, and plan to give users control over what is stored. External APIs also see the text sent to them, so their terms of use and data handling need to be reviewed.

C. *Limitations*

Several limitations should be stated plainly. First, Beyond Diary is under development, and this paper reports its design rather than an empirical evaluation; we have not yet measured transcription accuracy, the faithfulness of generated chapters, or user satisfaction. Second, language models can misstate or embellish facts, so generated chapters must stay anchored to the stored memories and remain open to correction by the user. Third, the system depends on external AI services, which introduces usage costs, latency, and dependence on third-party availability. Fourth, emotion and milestone labels come from a language model and may not match how the user sees their own life. Finally, speech recognition errors, especially in noisy settings or for less common languages, can carry through the pipeline.

D. *Planned Evaluation*

Because no results exist yet, we outline how the system will be evaluated. Speech-to-text quality can be measured as word error rate on recorded entries in each supported language. Information extraction can be checked against entries that people have labeled by hand, using precision and recall for events, emotions, and milestones. Retrieval can be judged by whether the memories returned for a set of natural-language queries are relevant. For generated chapters, the key question is faithfulness: reviewers can compare each chapter with the raw entries behind it and count statements that are unsupported or wrong, and also rate coherence and readability. Finally, a user study can compare how consistently people record entries with and without reminders and gamification, for example through entries per week and streak length. We expect these measurements to show where the pipeline is weakest before the system is used for anything beyond a prototype.

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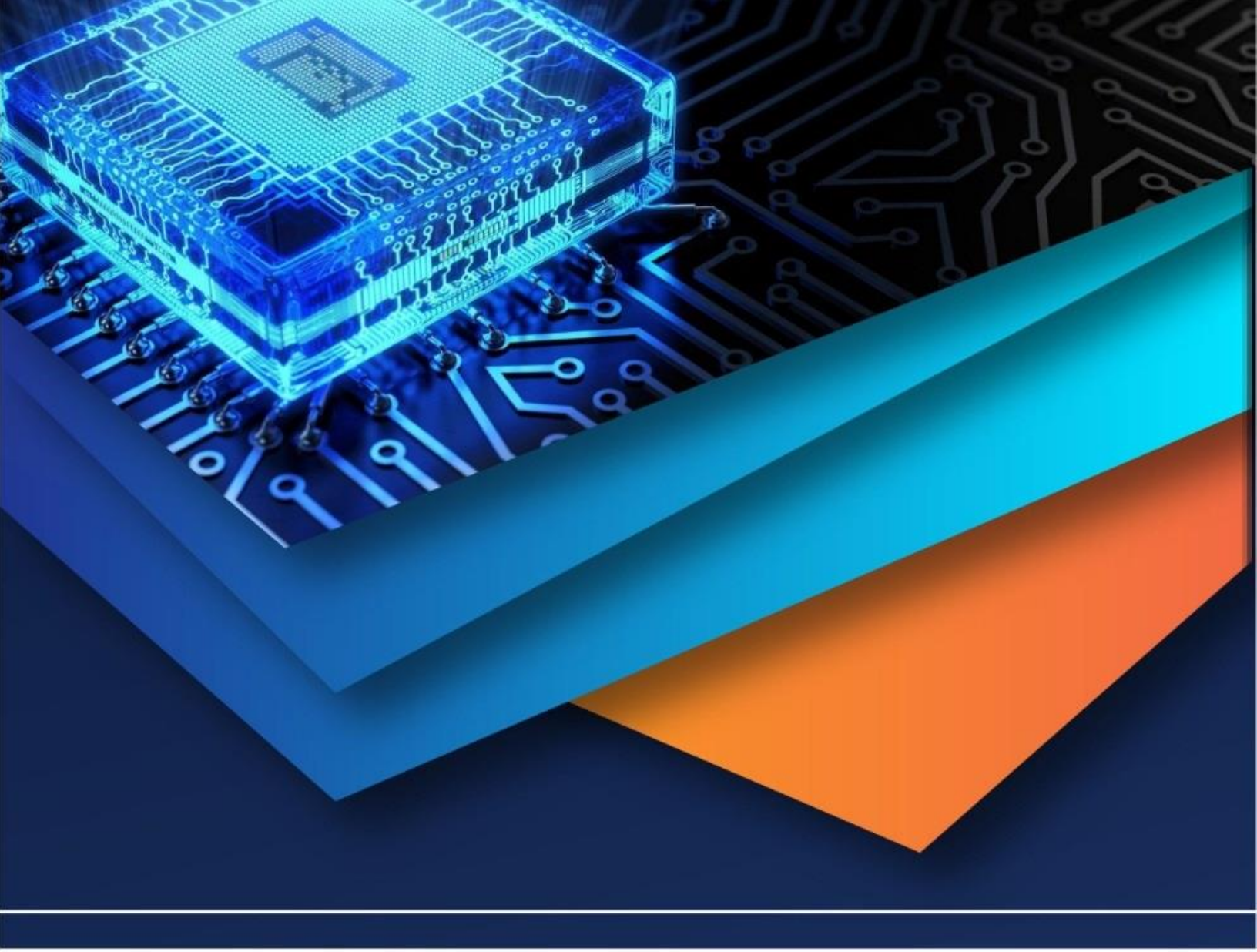
XII. CONCLUSION AND FUTURE WORK

We reviewed 20 studies on story generation, personalized narrative generation, lifelog retrieval, autobiographical memory analysis, and long-term AI memory. Each area has advanced, but the work is spread across separate components, and none of the reviewed studies offers a continuous personal storytelling system. To address this gap we presented Beyond Diary, which combines voice and text capture, AI-based information extraction, memory organization, semantic retrieval, and personalized biography generation, together with reminders and gamification that support regular use. We described its feasibility, requirements, methodology, layered architecture, and UML models.

The system does not replace the user's experiences with generated content; it organizes, retrieves, and narrates what the user provides. We see it as a practical base for a digital biography that grows over time and supports reflection and preservation. Future work will complete the implementation and evaluate it with users, measuring transcription accuracy, the faithfulness of generated chapters to the underlying memories, and the effect of reminders and gamification on consistency. We also plan to explore memory consolidation and evidence-gated writing [18], [19], support for multimedia memories, and stronger privacy controls.

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