Second Brain: An AI-Driven Knowledge Revolution—

Redefining the Future of Learning and Thought

1. Project Overview

1.1 Project Background

In today's era of knowledge explosion, various forms of information are pouring in. Multiple information carriers such as text, pictures, audio, and video make people dizzy. People are in a massive information environment. How to accurately select valuable learning materials, and organize them efficiently, deeply understand them, and fully master them is a very challenging task.

1.2 Project Vision

The long-term goal is to build an intelligent "second brain" that uses AI technology to assist users in processing information more efficiently and improving cognitive abilities in learning, research and work. By building a visual knowledge graph and intelligent analysis, Second Brain will change the way people manage and use knowledge, making knowledge easier to acquire, understand and apply. Through intelligent dialogue, knowledge graphs and personalized recommendations, it helps users quickly grasp the key points and improve learning efficiency. At the same time, using AI technology to deeply analyze data, Second Brain helps users build a deep understanding of knowledge, not just superficial memory.

1.3 Project Core Concept

1) **Make knowledge "visible".** Through the built-in browser, visual map and flexible resource management, the originally scattered and static learning materials become flexible and easy to use, helping users to focus more on the knowledge itself.

2) **AI simplifies.** With the powerful natural language ability of AI, it automatically extracts key points, gives personalized answers or translations during the learning process, reduces repetitive work, and makes knowledge acquisition and application more efficient.

3) **Data accumulation and wisdom value-added.** Not only storing data, but also encouraging the annotation, induction, summary and expansion of content; over time, the knowledge accumulated by users in Second Brain will continue to increase in value, forming a more complete and deeper cognitive network.

4) **Lifelong learning and personal growth.** Whether you are a student or a working person, you can use Second Brain as a digital "second brain" to record and manage all knowledge from formal courses to spontaneous learning, effectively supporting professional further study and interest expansion

2. Product Overview

Second Brain is a tool based on AI-assisted learning and knowledge management, designed to help users more efficiently collect, organize and deeply apply various learning materials, whether related to academic courses, skill improvement or personal interest exploration. Second Brain not only supports the management and browsing of network and local materials in various formats, but also helps users quickly grasp the key points and build a visual knowledge map through intelligent dialogue and knowledge analysis, truly making knowledge "alive".

2.1 Core Function

1) Multi-data management

Centralized management of multiple types of learning resources such as course PPT, academic reference books, online articles, teaching videos, etc., to create a one-stop resource aggregation platform. Supports hierarchical project/course architecture, and can freely define directories under each project, classify and manage resources, and make search and call more intuitive and efficient.

2) Built-in intelligent dialogue

Integrated Chatbot provides AI-assisted learning, and quickly explains, translates, summarizes and answers questions for selected content. Supports the introduction of external large models (such as ChatGPT, Claude) or local large models, providing high-precision, context-related AI support to meet personalized learning needs.

3) Real-time annotations and notes

Supports word annotations in documents or web pages to record key points and personal insights.

Provides a note function compatible with Markdown and rich text, and can call AI to recommend outlines, refine concepts, and generate review cards to help review and consolidate.

4) Knowledge graphs and flash cards

Intelligently extract data keywords and related relationships, dynamically generate knowledge graphs, and help connect knowledge contexts. Flashcards strengthen memory, with definitions, examples and related links to promote in-depth learning.

5) Translation and subtitle support

Provide accurate real-time translation for multilingual documents or videos, and optimize language expressions based on context. Efficiently extract subtitles from video streams and translate them into multiple languages to improve the learning efficiency of foreign language courses.

6) Social and sharing

Support sharing of personal databases, notes, knowledge graphs, and co-editing and discussion with others. Built-in community or social modules promote the circulation of high-quality materials and the collision of ideas, and

precipitate into wisdom resources for learning communities.

2.2 Function Details

1) Resource management and organizational design

- **The first-level unit ‘Course/Project’.** Similar to VScode's "workspace" or Zotero's "Collection", users can flexibly create "Courses" or "Projects", which can be subject courses (such as "Mathematical Analysis"), life skills (such as "Cooking"), or domain themes (such as "Portfolio Investment").
- **Multi-level structure.** Under the project, subdirectories and "Items" can be created indefinitely to manage the data in a hierarchical manner. ‘Item’ can be a local file (pdf, word, ppt, md, txt, tex, etc.), a web link (you can directly collect the URL or save a snapshot), and it can also support multimedia such as audio, video, and images.
- **Simple file preview.** It can build in online preview functions for common documents (pdf, md, office documents, etc.), and support word highlighting, annotation, translation, and can also be used for reference in conversation with Chatbot. As demand increases, preview plug-ins or extensions for more file types can be expanded.
- **Chrome plug-in or built-in browser (pending).** The built-in browser can be easily combined with Chatbot to achieve the integration of "web content + AI assistant"; it can also be made into a browser like Zotero, and the plug-in is separated from the main application. If the main application tends to refer to VSCode/Cursor design, it tends to be built-in browser, which can perform comprehensive operations in one interface. If it is more lightweight, an external browser + plug-in combination can be adopted.

2) AI assistance and Chat sidebar

- **Chatbot toolbar.** Refer to the layout of the right extension bar of VSCode or the dialog bar of Cursor, which echoes the resource manager and supports consultation or calling AI functions at any time. Users can select the currently loaded document as the context in Chat, and let AI "read" it to summarize, answer questions, generate notes, etc. (ie RAG technology).
- **Multiple large model interfaces.** Support access to APIs such as ChatGPT and Claude, and also support local large models (such as Ollama), so that it can still be used when the amount of private data is large or there is no network.
- **Knowledge base reference ability.** Chatbot needs to be able to reference global or local knowledge bases, not only limited to the current file, but also to retrieve materials from other "courses/projects". Technically, multi-database retrieval and fusion can be achieved through vector databases or knowledge graphs.
- **Automatic Q&A and generation.** Chatbot can quickly generate document summaries, notes, example explanations, translations, etc. according to the context, making the learning experience more efficient.

3) Note and knowledge point management

- **Various note formats.** Supports Markdown or rich text editors, and later supports block notes similar to Notion. Notes and documents can be linked in both directions. When viewing notes, you can quickly locate

the original document or web page, or quickly jump to the corresponding note in the document/web page.

- **AI-assisted notes.** According to the specific document content, the document outline and key paragraphs are extracted, and mind map notes or key comment annotations are automatically generated. Automatically generate "blank" note templates for users to quickly supplement.
- **Knowledge point flashcards.** Flashcards (definition, usage scenarios, examples, related links, etc.) can be automatically made for knowledge points extracted from notes, in conjunction with SRS (interval review algorithm). Related concepts can be expanded and cross-linked with AI to form a semantic network.

4) Knowledge graph and Graph function

- **Construction of knowledge graph.** AI identifies and associates concepts or terms in each course (project) and automatically constructs concept nodes and relationship edges (GraphRAG). In Chatbot, you can query where a concept appears and which knowledge points it is related to.
- **Intelligent topology and visualization.** Provide visualization tools from root nodes to sub-concepts, such as knowledge brain maps, mind maps, etc., which can be clicked to view detailed content or jump to the original text of the material. For large knowledge graphs, multi-level visualization filtering or folding is required to facilitate user focus.

5) Enhanced learning process

- **Translation and subtitles.** Real-time translation is provided for multilingual documents or videos. Combine context and semantics to improve translation accuracy (such as unifying the translation of similar nouns). Generate real-time subtitles and translations when the video is playing, which is convenient for learning foreign language courses.
- **Annotation and comment collaboration.** You can mark on the document or video timeline, supporting multi-person collaboration or single-person review. When combined with social functions, you can also share annotations or comments with others.
- **Summary and testing.** Chapter test questions or short-answer questions can be automatically generated to test learning results. For incomplete user answers, trigger AI to further answer questions or provide intensive exercises.

6) Social and sharing

- **Resource sharing.** Users can share their own learning materials, reading notes or knowledge graph homepages in the community so that others can learn from or quote them.
- **Co-editing and collaboration.** Like Google Docs/Notion, it provides multi-person collaborative editing or annotation functions, which facilitates project teams or learning groups to accumulate materials and comment on each other.
- **Comments and ratings.** Rate and comment on the notes or knowledge graphs shared by others to create a good community atmosphere; medals and contribution points can also be introduced to encourage sharing.

Technical feasibility and development stack suggestions

2.3 Technical feasibility and development stack recommendations

1) Basic framework

Cross-platform desktop application solutions such as Electron/Tauri imitate the VSCode/Cursor structure (which can provide users with a consistent interactive experience). React or Vue is used as the front-end UI for better scalability.

2) Built-in browser

If Electron is used, it has a built-in Chromium kernel, so it is more convenient to directly provide a built-in browser. If the mode is lightweight, consider collaborating with traditional browsers to develop plug-ins.

3) AI module

The back-end functions can be implemented with Python/Node.js, and Chatbot can be implemented through commercial APIs such as OpenAI/Anthropic or local large model inference environments (LLM + GPU/CPU). It is necessary to build embryo databases and vector databases (such as Milvus, Faiss, Pinecone, etc.) for RAG retrieval.

4) Knowledge Graph

Combined with Neo4j or similar graph databases, or through the traditional RDF + SPARQL solution, plus AI to build the ontology. Provide front-end visualization components to display the knowledge network and support interactive queries with Chatbot.

5) Document Management

Data can be stored in various cloud or local databases (SQLite, PostgreSQL, etc.), and then managed with the file system. Note that OCR or semantic analysis is required for PDF and other files in order to index the content.

2.4 Development Iteration Plan

Overall rhythm

- Iteration cycle: one Sprint every 2 weeks, about 10 iterations (5 months).
- Basic process: analysis & design → development → testing & acceptance → review & planning.

1) Phase 1 (Month 1) - Minimum Viable Product (MVP)

- **Requirements & Prototype:** Clarify core functions, UI/UX prototypes, database and file structure.
- **Project construction:** Electron/Tauri + React/Vue, configure warehouse, CI/CD, package and release process.
- **Resource management & preview:** Implement hierarchical management of courses/projects, support PDF/Markdown simple preview.
- **Basic AI chat:** Access public large model API (such as OpenAI) to implement preliminary dialogue functions.

Milestone: Able to open "Second Brain" in desktop environment, preview files, and call AI chat.

2) Phase 2 (Month 2) - AI deep integration & note function

- **RAG preliminary:** Establish vector database/local index, let AI perform summary, translation, Q&A based on document context.
- **Notes/Annotations:** Provide Markdown/rich text editor, which can mark, highlight and annotate documents.
- **File management expansion:** Support preview/external call of multiple document types.
- **Built-in browser/plug-in research:** Preliminary integration of browser window or exploration of plug-in solutions.

Milestone: PDFs can be annotated, AI can understand context and generate notes/summaries.

3) Phase 3 (Month 3) - Knowledge Graph & Functional Expansion

- **Knowledge Graph Prototype:** Establish concept nodes and associations based on indexed documents/notes, which can be searched in Chatbot.
- **Document-Note Interlinking:** Automatically identify keywords in notes to link to documents; support reverse jump from documents to notes.
- **Flashcards/Self-Test:** Automatically generate Q&A/multiple-choice questions, and do interval review management.
- **Performance & Security Optimization:** Speed up the indexing and opening of large files, and build basic permission management or encryption mechanisms.

Milestone: Visual knowledge graph and self-test functions are launched.

4) Phase 4 (Month 4) - Social and Collaboration

- **Sharing and Collaboration:** Link sharing, multi-person collaborative editing and conflict handling.
- **Community functions (optional):** Public notes, likes, comments and other community interactions.
- **Knowledge Graph Advanced:** Dynamic update and optimized visualization.
- **AI Function Expansion:** Connect to more large models or local models to strengthen cross-document/cross-project retrieval.

Milestone: Collaborative Beta, support for multi-person editing, basic community function prototype online.

5) Phase 5 (5th month) - polishing and official release

- **UI/UX unification:** overall visual style, menus, settings, themes, document guidance, etc. optimization.
- **Stability & cross-platform:** comprehensive compatibility testing, performance and resource usage monitoring.
- **Deployment and upgrade:** ensure automatic/manual update mechanism, improve the help center.

- **Review & next stage planning:** summarize the results, consider the subsequent directions such as plug-in ecology or open API.

Milestone: Release the official version 1.0, which can run stably in the mainstream desktop environment

3. Business Model

3.1 Business Model: to B + to C

1) To Consumer

- **Free Basic Edition**

Provides basic functions of Second Brain, such as data management, simple knowledge graph construction, and basic AI-assisted reading. This version is designed to attract users to try and increase the user base. (The quota for free trial of paid functions is provided to users every day, and the quota is refreshed at 0:00 every day)

- **Paid Premium Edition**

Users can unlock more advanced functions by subscribing to the membership system, such as deep AI analysis, unlimited knowledge graph construction, personalized learning path recommendation, advanced note-taking and annotation tools, etc.; or directly purchase the quota for designated functions.

- **Value-added Services**

Plug-ins and Extensions: Provide additional paid plug-ins and extensions, such as advanced speech-to-text, professional-level translation services, knowledge graph templates for specific fields, etc. **Personalized Consultation:** Provide users with personalized learning consultation and optimization suggestions, which may include expert consulting services.

- **Advertising and Cooperation**

Display advertisements for relevant educational content and learning tools in the free version, and cooperate with advertisers to generate revenue from them. Work with online course providers, book and textbook publishers to promote their products and earn a share of the revenue.

2) To enterprises

- **Enterprise subscription service**

Customized solutions: Provide customized Second Brain solutions for enterprises, including enterprise knowledge management, team collaboration and training tools. Enterprise account management: Provide enterprise account management functions, including user management, permission control and enterprise-level data analysis.

- **Data analysis service**

Enterprise data report: Provide enterprises with data analysis reports on employee learning trends, knowledge management efficiency and team collaboration effects.

- **Enterprise in-house training and education**

Customized in-house training courses: Cooperate with enterprises to develop customized in-house training courses, using Second Brain as a learning platform. Employee learning and development: Provide employee learning and development solutions to help enterprises improve employee skills and knowledge levels.

3.2 Main Sources of Income

- **Subscription income.** Regular subscription fees from individual and corporate users are the main source of income for Second Brain
- **Sales of value-added services.** By expanding and personalizing consulting services, Second Brain can generate additional income.
- **Advertising and cooperation revenue.** By displaying advertisements in the free version and cooperating with educational content providers, Second Brain can obtain advertising fees and sales revenue.
- **Enterprise solution sales.** Selling customized Second Brain solutions to corporate customers is an important B2B revenue source.
- **Data analysis and reporting services.** Providing enterprise-level data analysis and reporting services to provide value to corporate customers and generate revenue from them.

3.3 Consumer Portrait

1) 2C Market Consumer Portrait

- **Student group**

Age range: 18-30 years old, covering high school, college and overseas students, etc. **Education needs:** need to manage a large amount of learning materials, including courseware, videos, papers, etc., as well as conduct academic research and course learning. **Technical proficiency:** familiar with digital tools and online learning platforms, and open to emerging technologies. **Personal interests:** have a strong interest in personal development, interest expansion and emerging technologies. **Use scenarios:** organize learning materials, time management, exam preparation, academic research and team project collaboration.

- **Self-learners**

Age range: no limit, mainly adults, especially working people and lifelong learners. **Occupational background:** including freelancers, entrepreneurs, employees, etc., who need to improve themselves and learn new skills. **Technical proficiency:** open to new tools and resources, like to explore online courses and self-study resources. **Learning needs:** need flexible learning resources to adapt to the pace of self-study and track learning progress. **Personal interests:** have a pursuit of personal development and interest expansion, and hope to improve professional competitiveness through learning.

2) 2B Market Consumer Portrait

- **Corporate customers**

Industry fields: covering multiple industries, especially those companies that focus on employee training, knowledge management and team collaboration. **Corporate needs:** need to improve employee skills and

knowledge level, improve team collaboration efficiency, promote knowledge sharing and innovation capabilities. **Technical proficiency:** familiar with enterprise-level learning management systems and online training tools, and open to integrated solutions. **Usage scenarios:** provide employees with customized learning paths, track learning results, share knowledge resources with the team, and manage project documents.

- **Innovation department**

Corporate role: responsible for the company's innovation projects and R&D, and need to access and integrate a large amount of industry data and research materials. **Technical proficiency:** advanced tools are needed to promote knowledge sharing, improve R&D efficiency and innovation capabilities. **Corporate needs:** promote cross-departmental collaboration, track the latest industry research, and manage complex project documents.

4. Execution plan

4.1 Project Timeline and Milestones

Time Frame	Task/Phase	Milestone	Key Tasks Description
Dec 3, 2024-Jan 3, 2025	Project Initiation and Proposal Writing	Project Proposal Completed	1. Define project goals and functional requirements; 2. Complete project proposal and communicate with the team.
Jan 11, 2025-Jan 24, 2025	Project Planning and Resource Allocation	Project Plan Completed	1. Determine development tools and technology stack (e.g., Vue, React); 2. Define development environment and resource allocation; 3. Develop detailed development plan.
Jan 25, 2025-Feb 10, 2025	Website Setup and Initial Front-End Development	Website Framework Completed	1. Set up basic website architecture; 2. Implement basic UI design; 3. Integrate basic pages and navigation features.
Feb 11, 2025-Feb 28, 2025	MVP Development and Initial Testing	MVP Demo Features Online	1. Develop MVP features including file management, AI chat function, and rich text editor; 2. Perform initial functionality testing and bug fixing.
Mar 1, 2025-Mar 15, 2025	Knowledge Graph and Feature Expansion	Knowledge Graph Prototype Online	1. Design and implement basic knowledge graph model; 2. Integrate Q&A answering system and flashcard features.
Mar 16, 2025-Mar 31, 2025	Social and Collaboration Features Development	Collaboration Beta Released	1. Implement project/note sharing and community interaction features (e.g., comments, likes, badges); 2. Complete collaboration feature testing.

Time Frame	Task/Phase	Milestone	Key Tasks Description
Apr 1, 2025-Apr 15, 2025	AI Feature Expansion and Performance Optimization	Knowledge Graph Upgrade, AI Assistance Enhanced	1. Integrate multi-language support or local AI model; 2. Optimize performance to improve document indexing and loading speed; 3. Enhance security and permissions management.
Apr 16, 2025-Apr 30, 2025	User Experience Optimization and UI Adjustments	UI/UX Adjustments Completed	1. Refine user interface and unify design style; 2. Improve menus, settings, and theme switching features.
May 1,2025-May 15, 2025	Cross-Platform Compatibility Testing and Optimization	Cross-Platform Compatibility Testing Complete	1. Test and optimize compatibility on Windows, macOS, Linux, and other platforms; 2. Address memory usage and performance issues.
May 16, 2025-May 31, 2025	Final Version Development and Deployment	1.0 Official Version Released	1. Finalize all core features and prepare for full platform release; 2. Ensure auto-update mechanism; 3. Begin documentation and help center deployment.
Jun 1, 2025-Jun 15, 2025	Summary and Future Planning	Project Summary and Future Plans Completed	1. Summarize project development and implementation process; 2. Define future feature expansion, plugin ecosystem, and API release plans.
Jun 16, 2025-Jul 1, 2025	Final Report Submission and Defense Preparation	Final Report Submitted and Defense Completed	1. Complete project final report and organize project documentation; 2. Prepare defense materials and conduct rehearsals.

4.2 Task Assignment

Li Conghao: Responsible for organizing the team, formulating detailed project plans, and coordinating task allocation among team members to ensure that the project is advanced on time and with quality. Lead the front-end development work, develop user interfaces that adapt to multiple platforms, and ensure the consistency and usability of the product on different devices and operating systems. Undertake the development of core functions, including key modules such as data expansion and summary, built-in intelligent dialogue, real-time annotations and notes, and knowledge visualization. Responsible for unit testing and integration testing of functional modules to ensure that system functions are fully available and improve system stability.

Xu Zongsi: Responsible for back-end development, building and optimizing server-side architecture to ensure that the system can support efficient data processing and stable operation. Build and maintain databases, handle data storage and related technical issues. Develop core functions, covering modules such as multi-data management, translation and subtitle support, social and sharing, and enhance the core capabilities of the product. Focus on

system performance optimization to ensure that the system can cope with high concurrency and complex operation scenarios and improve user experience.

Chen Yi: Develop the business model of the project and clarify the user group and market positioning. Plan the main sources of income, including subscriptions, advertising and enterprise solutions. Describe user portraits, analyze the behavioral characteristics and needs of target users, and guide product optimization.

Zhang Jingxuan: Analyze user needs, define the core functional modules of the product, and ensure that the functions meet market and user needs. Develop product iteration plans, and continuously optimize feature priorities and user experience based on user feedback. Coordinate product design and development to ensure that the team is consistent in design and implementation.

Liu Yao： Financial and market strategy. Develop product pricing strategies and sales plans, and clarify the direction and methods of market promotion. Conduct financial forecasts and be responsible for fund raising, use and management. Analyze the costs, expenses and benefits of the project, prepare various financial statements, and ensure the economic feasibility of the project. Provide long-term financial strategic support to help the sustainable development of the project.

4.3 Budget

Budget Category	Budget proportion
Development tools and frameworks:	10%-15%
AI services and models:	20%-25%
Cloud storage and hosting	15%-20%
Test software and service fees	10%-15%
Market research and financial operations	5%-10%