StudySpark Component-level Documentation

StudySpark.py — Application Entry Point Responsibility

Key Responsibilities

- Streamlit configuration (title, layout)
- Session state initialization
- Shared state management across pages

Key Dependencies

- streamlit
- services.ai_service
- Pages under pages/

pages/1_Document_Upload.py — Document Upload Page

Key Responsibilities

- Handles PDF upload from the user
- Extracts document text
- Stores processed content in Streamlit session state

Inputs

- PDF file uploaded via Streamlit file uploader

Outputs

- Extracted document text saved to: st.session_state.pdf_text

Key Dependencies

- services.ai_service.ai_process_pdf
- streamlit

pages/2_Summary.py — Document Summary Page

Key Responsibilities

- Generates structured summaries of the uploaded document
- Summary format (e.g., bullet points, paragraph)
- Summary length (short / medium / long)

Inputs

- st.session_state.pdf_text
- User-selected summary parameters

Outputs

- AI-generated summary rendered in the UI

Key Dependencies

- services.ai_service.generate_summary()
- streamlit

pages/3_QA.py — Document Q&A Page

Key Responsibilities

- Provides a conversational interface to query the document

Inputs

- st.session_state.pdf_text
- User question (free text)

Outputs

- Context-aware AI response
- Chat history is stored in st.session_state.chat_history

Key Dependencies

- streamlit
- services.ai_service. question_answer()

pages/4_Quiz.py — Quiz Generation Page

Key Responsibilities

- Generates comprehension quizzes from the document
- Displays questions and validates user answers
- Number of quiz questions

Inputs

- st.session_state.pdf_text
- Quiz configuration (question count)

Outputs

- Multiple-choice or short-answer questions
- Feedback on user responses

Key Dependencies

- streamlit
- services.ai_service.generate_quiz()

services/ai_service.py — AI Integration Layer

Key Responsibilities

- Class responsible for all Gemini API calls
- Abstracts prompt construction and model configuration
- Provides reusable AI functions

- Core Functions generate_summary(...) answer_question(...) generate_quiz(...) extract_text_from_pdf(...)

Key Dependencies

- streamlit (only for api key retrieval when deployed)
- dotenv
- Google.genai
- langfuse

utils/lang_tracing.py — Langfuse Configuration

Key Responsibilities

- Initializes Langfuse tracing
- Wraps AI calls with observability hooks

Behavior

- Activated only when environment variables are present
- Safe no-op if Langfuse is not configured
- Environment Variables Used LANGFUSE_PUBLIC_KEY LANGFUSE_SECRET_KEY LANGFUSE_BASE_URL