

LLM-Based Web Application for SQAG Documents Verification

Modular AI Pipeline for SRS Cleaning, Image-to-Text Conversion, Semantic Section Mapping, and Checklist-Based Compliance Verification

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Overview

SQAG reviews large volumes of technical documents such as SRS, SDD, and ICD. Many submissions suffer from incorrect templates, missing sections, irrelevant content, and unclear diagrams, making manual review slow and inconsistent.

Problem Statement

Manual SRS verification is time-consuming, inconsistent, and cognitively demanding. Non-standard formats, missing sections, and non-machine-readable diagrams increase review effort and require multiple reviewers for consensus.

Objectives

Develop an LLM-based web application with a modular AI pipeline to automate PDF preprocessing, image understanding, semantic section mapping, prompt-driven compliance checking, and interactive reporting.

Proposed Solution

An AI-assisted modular pipeline that converts SRS PDFs into structured Markdown, interprets images using multimodal LLMs, maps sections semantically, and evaluates checklist compliance using explainable LLM reasoning.

Methodology

Phase I: PDF preprocessing, Docling conversion, image captioning using Gemma-3.

Phase II: Semantic section mapping using embeddings and fuzzy matching.

Phase III: Checklist-based compliance verification using GLM-4.

Implementation

Python backend, Streamlit UI, Docling, Gemma-3 (4B), GLM-4, and SentenceTransformers. Workflow: PDF upload → processing → evaluation → scoring → report export.

Results

Tested on 7 SRS documents with 100% section mapping accuracy and image caption integration. LLM reasoning consistency of 80–90% and significant reduction in review time from hours to minutes.

Conclusion

The system reduces manual effort, improves standardization, and demonstrates the effectiveness of multimodal LLMs for domain-specific document verification within secure environments.

Future Scope

Support for additional document types, automatic template detection, improved table handling, RAG-based verification, and enhanced UI/UX.