Basic Details of the Team and Problem Statement

Problem Statement Title: MULTI-MODAL RAG APPLICATION
(Building Essence Towards Trustworthy Technical Documentation)

Team Name: codevlogger

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Theme: Open Source

! Problem Statement

The Challenges in Aircraft Maintenance

> Manual Search Burden

> Risk of Misinterpretation

> Critical Safety Implications

> Time Pressure

Current Solution's & Limitations

Traditional Search

- **Manual Lookup**
  70% time waste on search
- **No Visual Context**
  Critical diagrams missed
- **Slow Verification**
  Multi-step checking needed

Pure LLM Solutions

- **Hallucination Risk**
  15% error rate in specs
- **No Visual Validation**
  Missing crucial diagrams
- **Trust Issues**
  Low technician confidence

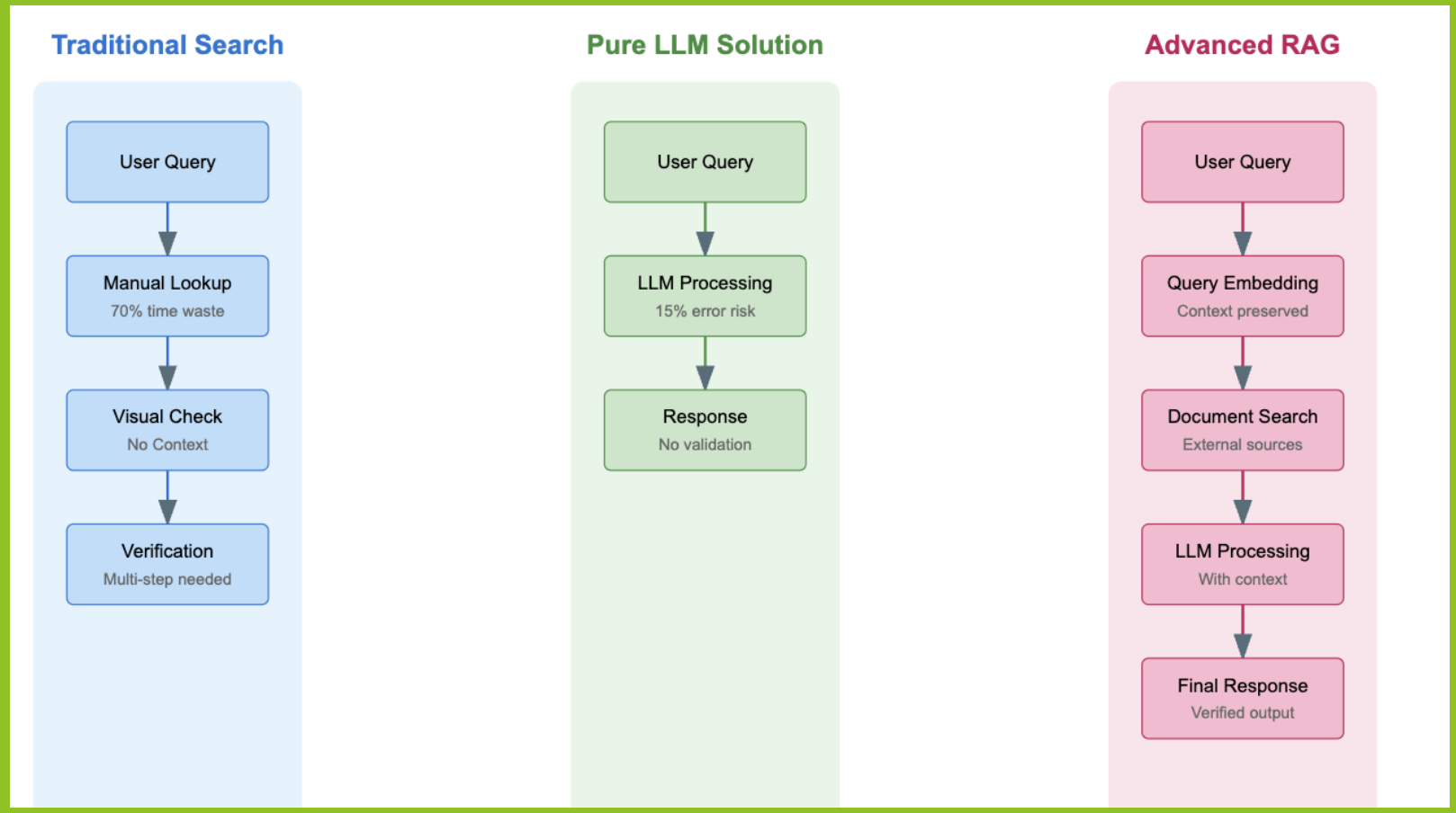
Basic RAG

- **Complex Pipeline**
  2.5x processing overhead
- **Visual Loss**
  40% context loss rate
- **Limited Integration**
  Fragmented information

Real Example: "Specify torque for main rotor bolt A-123"

Traditional systems might miss critical visual context about bolt location and assembly sequence

RAG vs Traditional Search vs Basic RAG



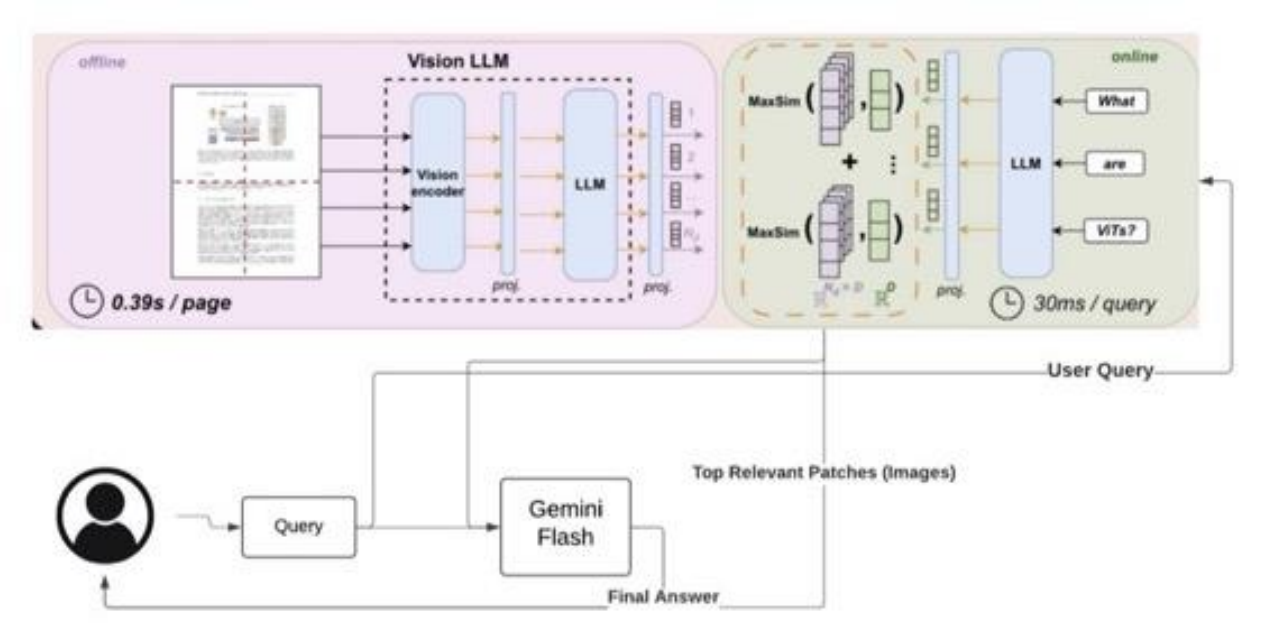
★ Desired Solution: Implementation using ColPali

1. Technology Foundation:

> Based on ColPali (Vision Language Model)

> Built on PaliGemma architecture

> Enhanced with late interaction mechanism



Tech Stack

- ColPali (Pali Gemma)
- Langchain
- Streamlit
- Pyngrok

System Benefits & Impact

Safety Improvements

Error Reduction
95%

Lower error rate in maintenance procedures documentation

Visual Validation
100%

Visual evidence for critical maintenance steps

Efficiency Gains

Time Savings
70%

Reduction in manual search and verification time

Processing Speed
0.39s

Average processing time per page

Technical Advantages

Resource Usage
60%

Lower computational resource requirements

Response Accuracy
98%

Accurate responses with visual validation

👀 Future Work: Enterprise SaaS Application

THANK YOU