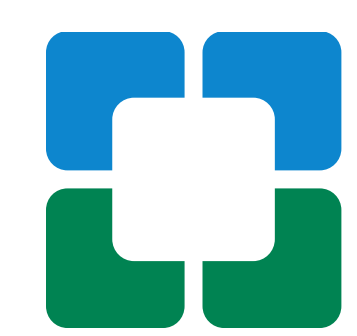




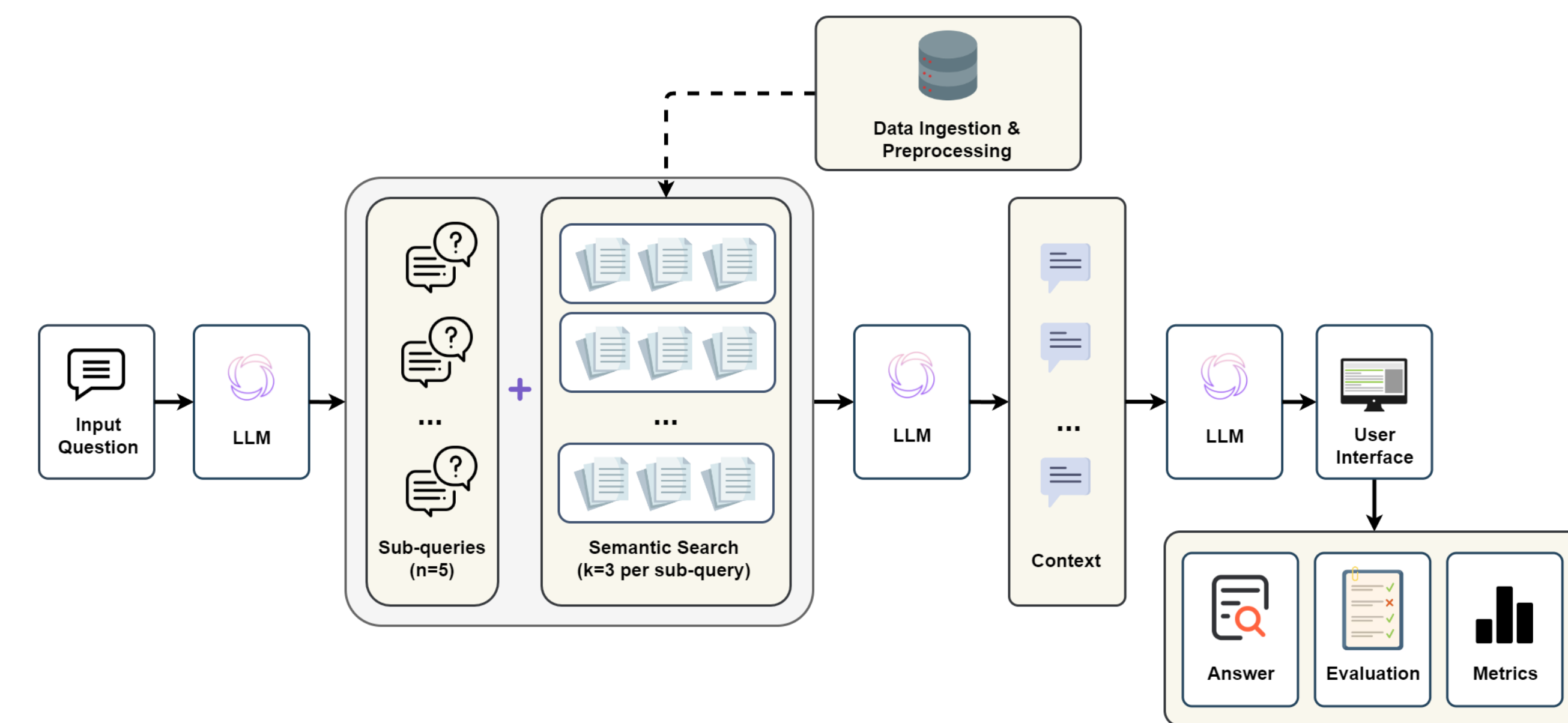
Introduction

- Aesthetic surgery requires specialized knowledge and clinical expertise
- Traditional literature search methods are time-intensive for specific clinical questions
- No AI clinical decision support systems previously developed specifically for evidence-based practice in aesthetic surgery
- Objective of this study was to develop a novel AI-powered clinical decision support system designed specifically for evidence-based guidance in aesthetic surgery that we eventually named AURA.

Methods

- Document Library**
 - 6,546 full-text open-access aesthetic surgery publications (January 2001-September 2024)
 - Multi-step document processing:
 - Initial extraction of diverse document formats
 - Text preprocessing and normalization
 - Segmentation into semantic chunks (500 chars with 50-char overlap)
- System Architecture**
 - Hybrid architecture combining vector search with dense passage retrieval
 - Python implementation with LangChain components
 - OpenAI embeddings for semantic vector representations
 - Chroma vector database for similarity-based retrieval
 - OpenAI's o1-mini model for language processing

Question Answering: Detailed View



Results

Metric	Average Score	Range
Faithfulness	0.94	0.67-1.00
Answer Relevancy	0.86	0.57-0.96
G-Eval Correctness	0.77	0.60-1.00
SEM Score	0.73	-
SEM Max Similarity	0.80	-

Performance Highlights

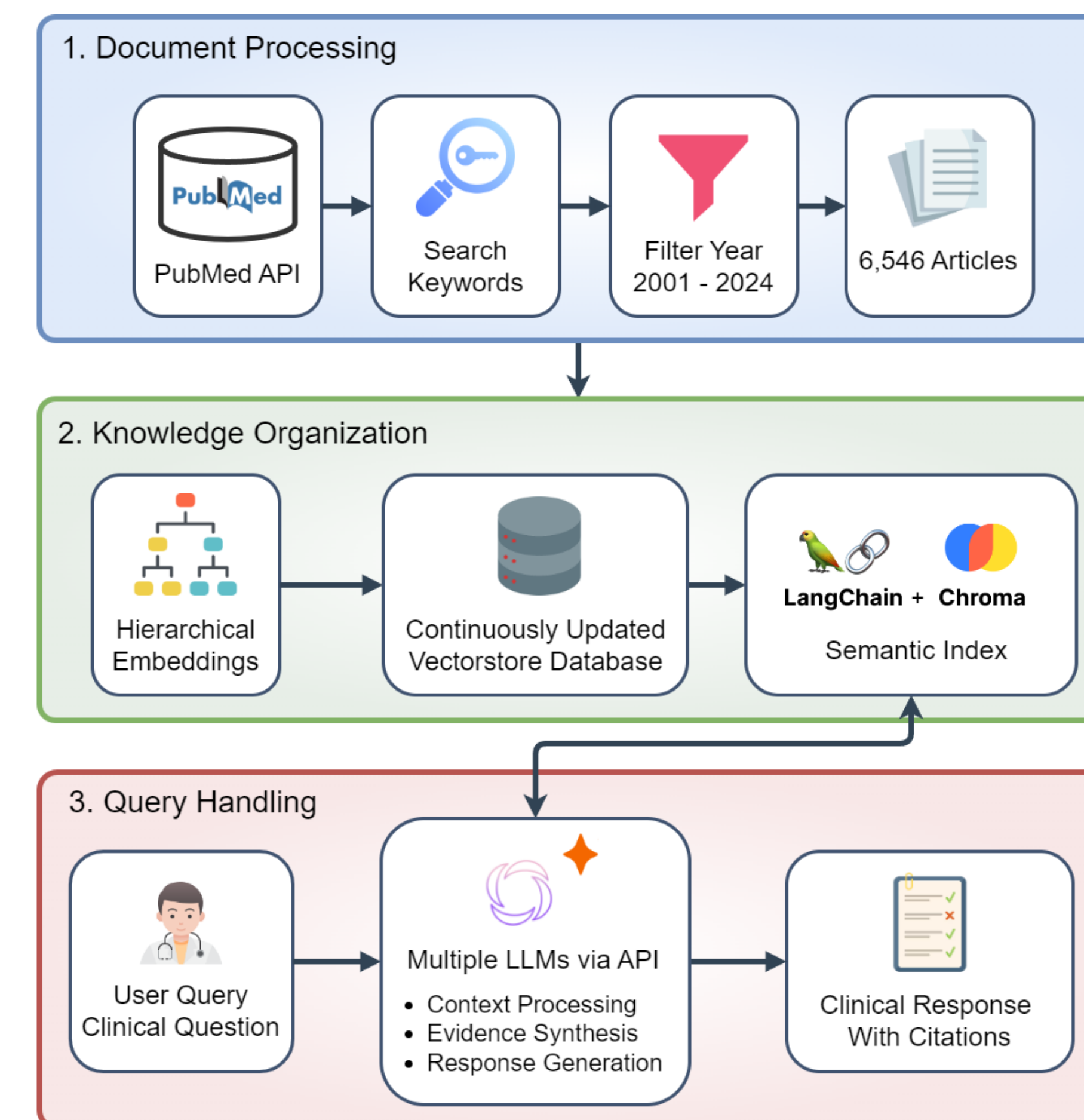
Strongest Performance

Post-abdominoplasty seroma: Faithfulness: 0.97, Relevancy: 1.00, Correctness: 1.00
SMAS preservation: Faithfulness: 1.00, Relevancy: 0.95, Correctness: 0.80

More Modest Performance

Buttock fat grafting: Faithfulness: 0.89, Relevancy: 0.57, Correctness: 0.60
Microneedling vs. laser: Faithfulness: 0.83, Relevancy: 0.66, Correctness: 0.60

AURA Workflow



Discussion

Clinical Implications

- Provides rapid, evidence-based guidance for aesthetic surgeons
- Particularly strong for:
 - Technical questions on established procedures
 - Safety-related questions and complication management
 - Patient selection criteria
- Demonstrates appropriate epistemic humility for areas with evolving evidence

Integration into Practice

- Transparent presentation of source materials
- Web-based interface for integration into existing clinical workflows
- Valuable during preoperative planning and patient consultations

Limitations

- Knowledge base limited to open-access literature
- Top retrieval approach may occasionally miss relevant information
- Current evaluation limited to 14 clinical questions
- Cannot replace clinical judgment, surgical expertise, or hands-on experience

Conclusion

- AURA is the first specialized AI clinical decision support system for aesthetic surgery
- Delivers relevant, accurate information across diverse aesthetic surgery domains
- Offers aesthetic surgeons an efficient, evidence-based resource
- Future development should focus on:
 - Expanding knowledge sources
 - Prospective clinical validation
 - Implementation emphasizing transparent source presentation