



BEYOND VISION

Metadata-Augmented AI for Iconclass
Classification in Medieval Manuscripts

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THE PROBLEM

+ Manual Iconographic Classification Does Not Scale

- Structured metadata is essential for interoperability
- Iconclass = powerful but labor-intensive
- Medieval manuscripts = high narrative density
- Example: 654 miniatures in one manuscript



CASE STUDY: THE WENZELSBIBEL

- Commissioned by King Wenceslas IV
- ca. 1389–1400, Prague
- 6 volumes, 1,214 folios
- 654 main miniatures
- First programmatic German OT translation from the Vulgate
- UNESCO “Memory of the World”



WHAT IS ICONCLASS?

- International hierarchical classification system
- Multi-level codes
- Multilingual, widely adopted
- Enables cross-collection linking



7 Bible

71 Old Testament

71B Genesis from the descendants of Cain and Seth to Abraham

71B3 Story of Noah

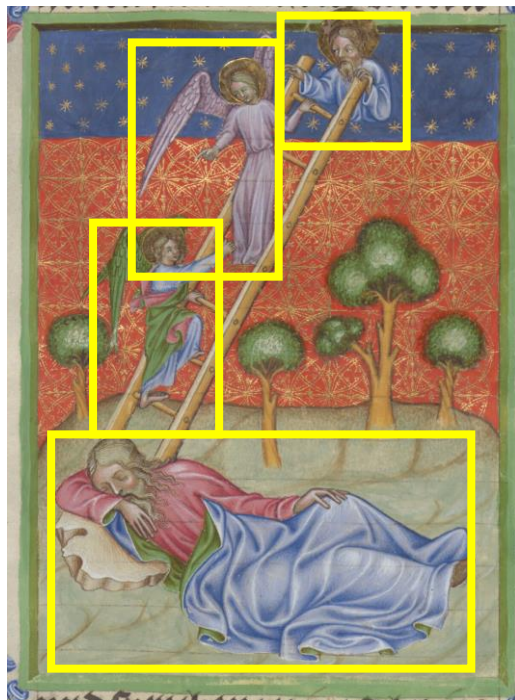
71B33 The Flood and destruction of mankind ~ story of Noah
(Genesis 7:10 - 8:17)

71B332 The ark of Noah comes to rest on Mount Ararat

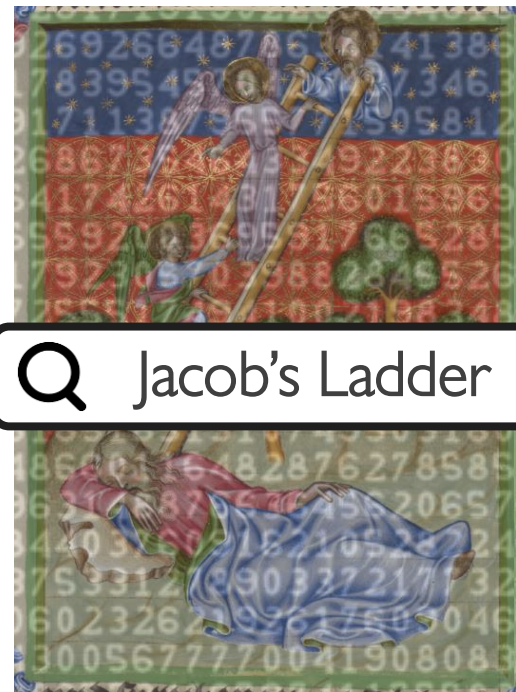
71B3322 Noah sends off a dove

**71B33221 The dove returns with an olive branch
~ story of Noah**

PRIOR APPROACHES




CNNs



CLIP



Fine-Tuning



The illustration shows Jacob lying on the ground asleep with his head on a stone, while a ladder rises to the sky beside him, upon which angels are ascending and descending, depicting Jacob's dream at Bethel. (GPT-4.1)

71C3121 the dream of Jacob

OUR SOLUTION:



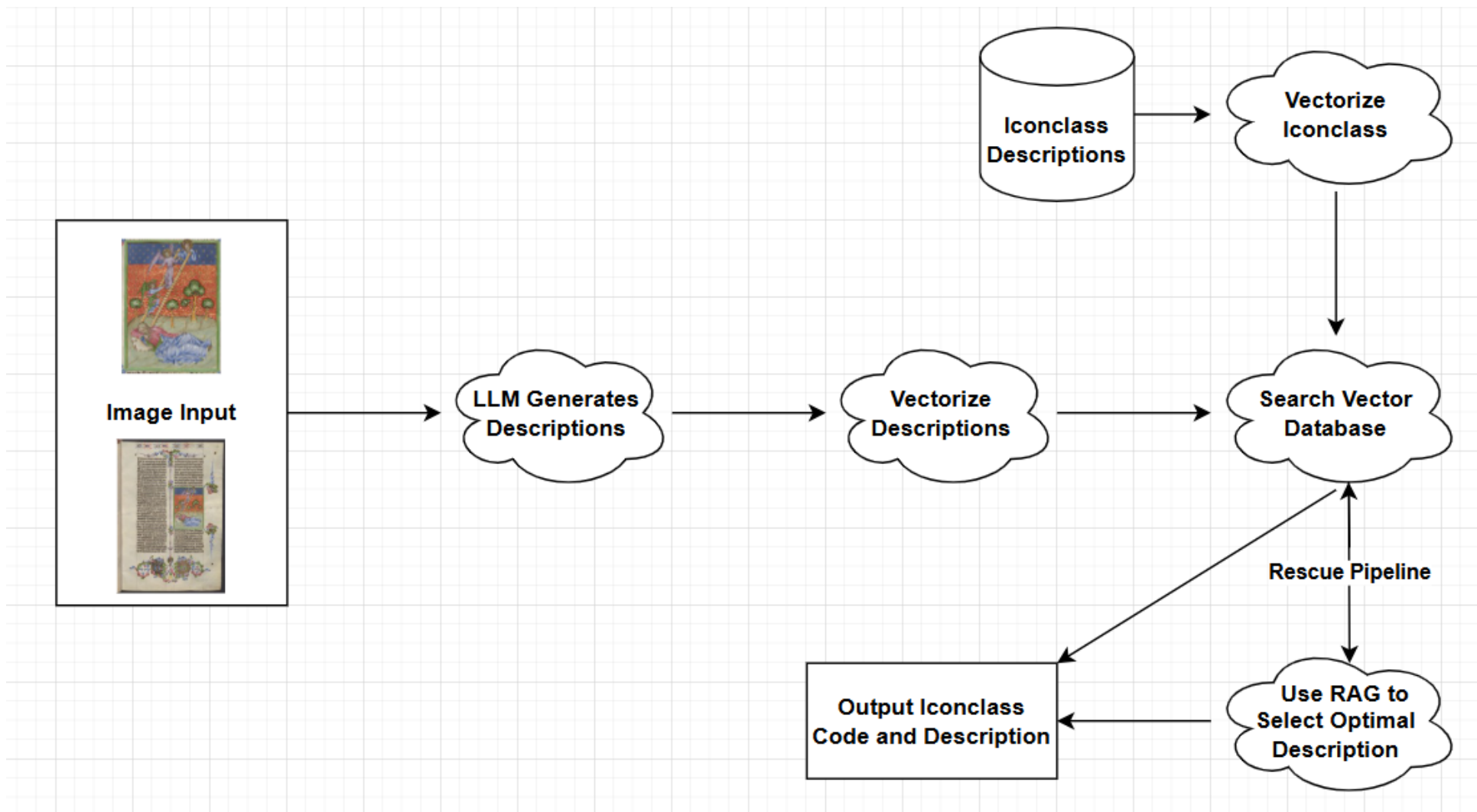
A Text-First RAG Pipeline

- No model fine-tuning
- No training dataset required
- Uses LLM-generated descriptions
- Retrieval-Augmented Generation (RAG)
- Expert validation built in

INPUT TYPES



PIPELINE OVERVIEW





BEST CONFIGURATION

- Full Page
- GPT-4.1
- OT Prompt
- Basic Vector Database

RESCUE PIPELINE

- “None” option
- Parent Levels
- Hierarchical List

71C1: story of Abraham

↳ 71C11: story of Abraham (part I)

↳ 71C116: the battle of the kings and the rescue of Lot (Genesis 14:1-17)

↳ 71C1163: Sodom and Gomorrah are plundered; Lot is taken into captivity

↳ 71C12: story of Abraham (part II)

↳ 71C123: Lot and the two angels (Genesis 19:1-23)

↳ 71C1233: Lot entertaining the angels

↳ 71C12334: the two angels intervene and strike the mob that surround Lot's house with blindness

↳ 71C124: the destruction of Sodom and Gomorrah: Lot and his family flee to Zoar, carrying their belongings; an angel may be showing the way (Genesis 19:24-29)

↳ 71C125: Lot and his daughters (Genesis 19:30-38)

↳ 71C1252: Lot's daughters make their father drunk

↳ 71C12521: Lot's daughters lie with their father in turn

RESCUE PIPELINE

- **Step 1:** Send hierarchical list with broad levels removed
- **Step 2:** Rescue step → If all 1*, check 7* and vice versa
- **Step 3:** Only send broad parent levels
- **Step 4:** Simply choose a biblical book
- **Step 5:** Fall back to 71: Old Testament

MULTIMODAL ENHANCEMENT



- + Jacob's dream
- + Description



- + Jacob's dream
- + Description

EVALUATION

+ PREDICTIONS MAY BE:

- Fully correct
- Partially correct
- Correct at higher level only
- Overly specific

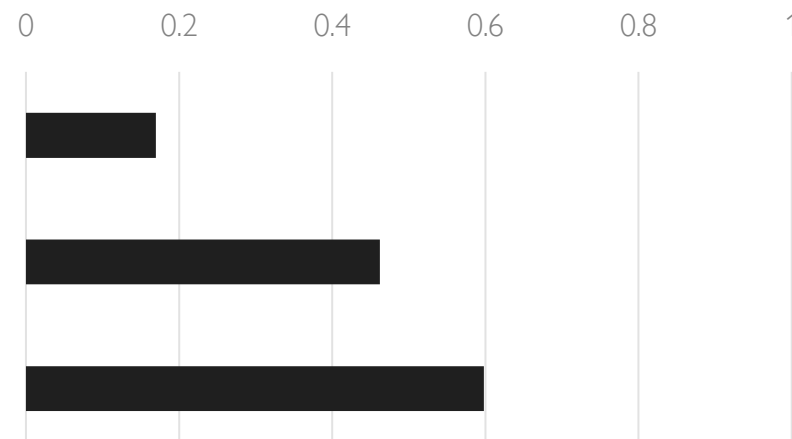
+ WE USED:

- Precision
- Recall
- F1-score
- Weighted partial-match scoring
- Truncation analysis

RESULTS



METHOD	PRECISION
OpenCLIP	0.1694
Keyword	0.4620
Page Image Only + RAG	0.5978

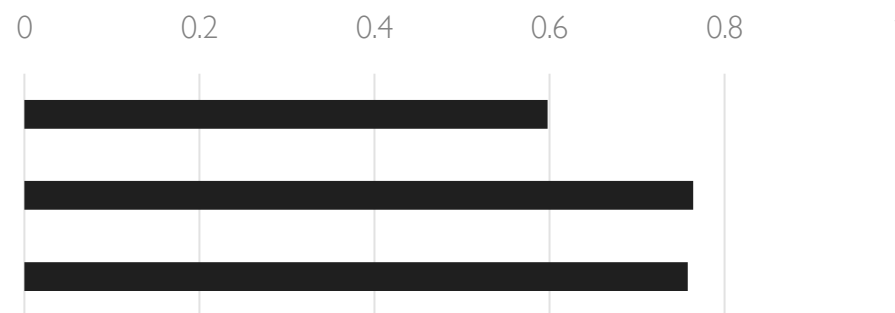


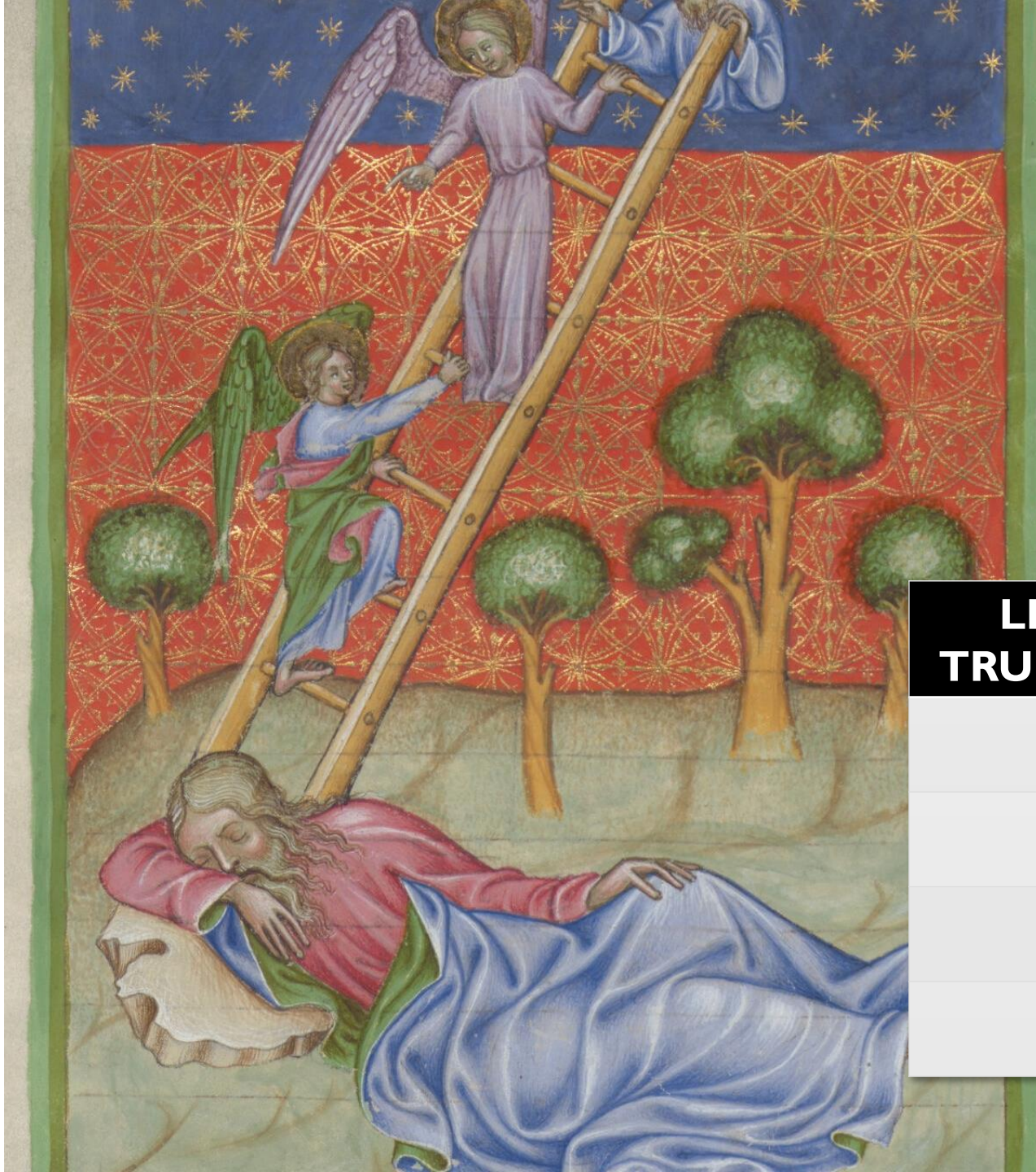
WHAT ABOUT TEXT ALONE?

+ Skip Image Step

- No LLM Step 1
- Title Alone
- Title + Description

METHOD	PRECISION
Page Image Only + RAG	0.5978
Illustration + Title	0.7640
Title + Description	0.7570





TRUNCATION ANALYSIS

Illustration + Title

LEVELS TRUNCATED	PRECISION	AVERAGE LEVELS LEFT
0	0.7637	6.31
1	0.8194	5.31
2	0.8698	4.32
3	0.9030	3.32

TEXT-FIRST WORKS

- No training data required
- Low on-site computational cost
- Can supplement or replace with metadata
- Works with large and small collections





THANK YOU



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