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Chapter In Computer-Human Interaction

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Supporting designer’s decisions with AI assistance

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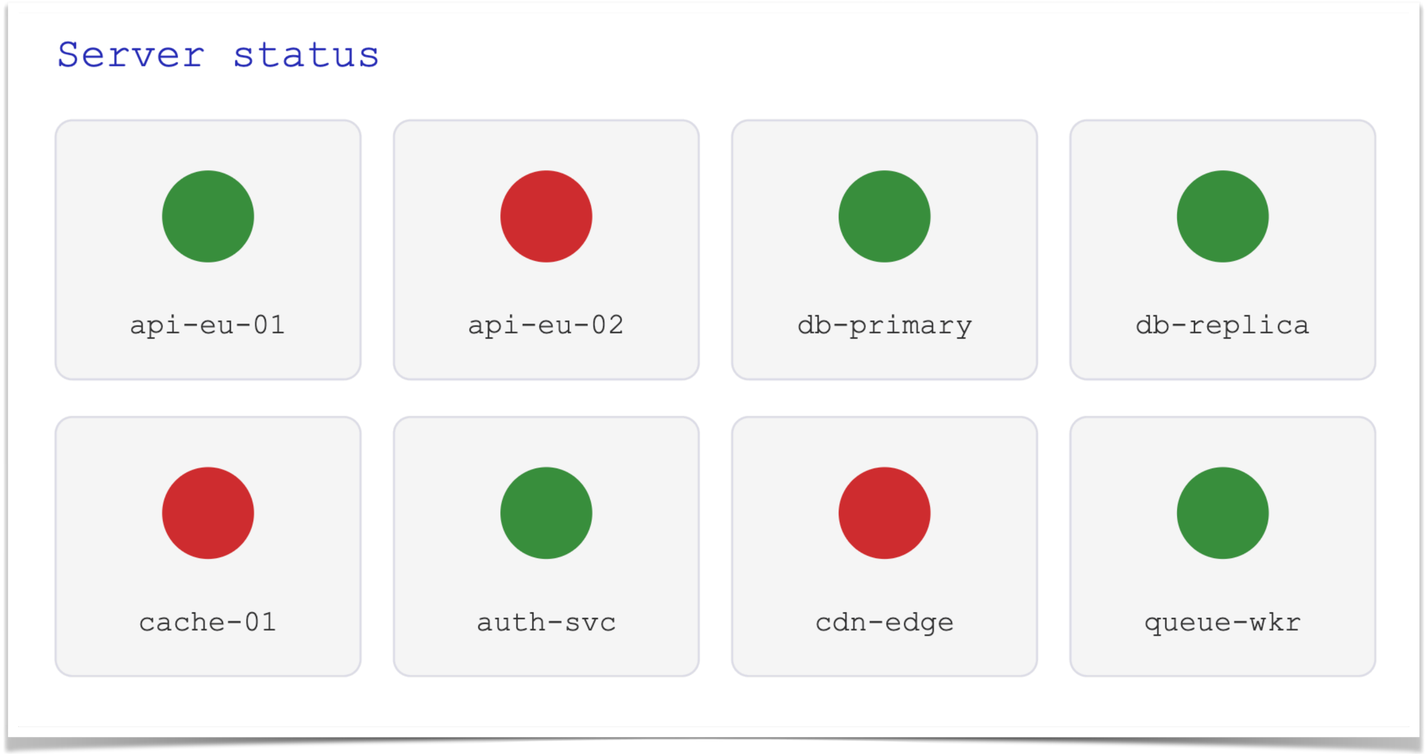
INTRODUCTION

Design is not the icing on the cake

Marina Maciá - marinam.ferrandez@ua.es

Design is not decoration

Every UI/UX decision must be intentional and well-founded



Status encoded by color only

Design is not decoration

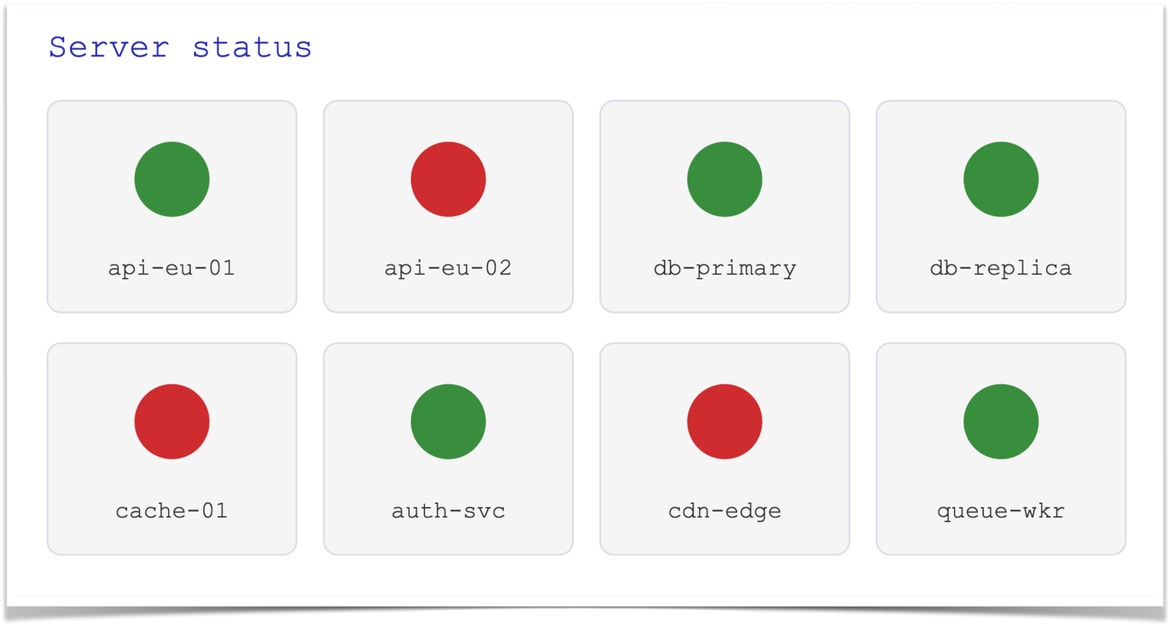
Every UI/UX decision must be intentional and well-founded



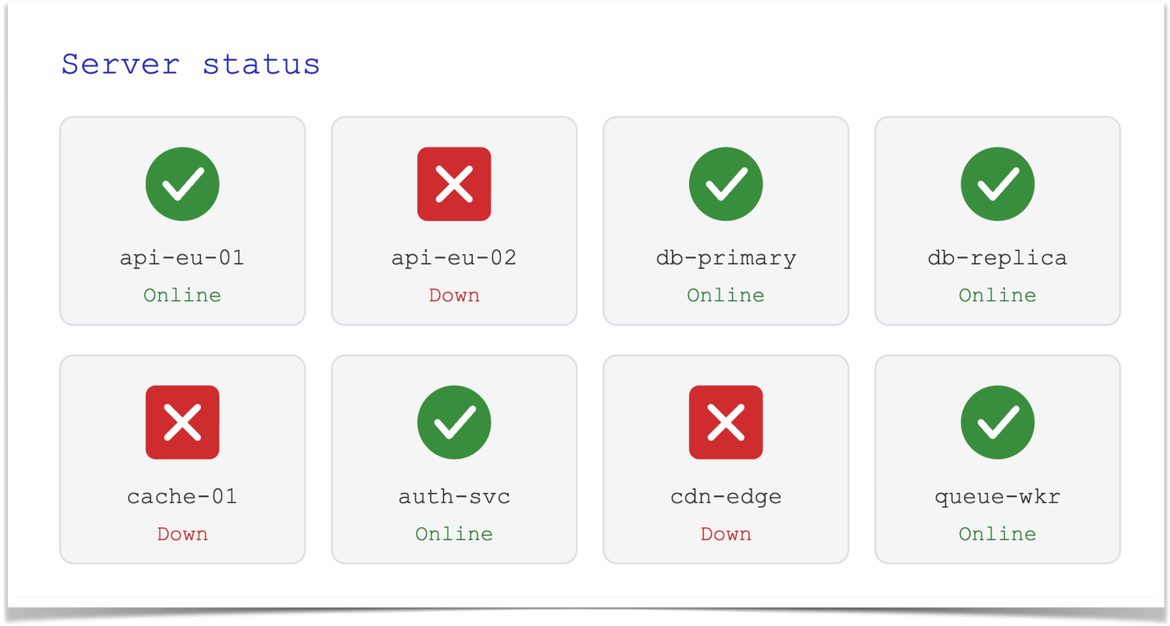
Seen with deuteranopia

Design is not decoration

Every UI/UX decision must be intentional and well-founded



Status encoded by color only



Color + shape + text: readable by everyone

Designer's bibliography

A single UI requires consulting a huge amount of documentation

DESIGN LITERATURE

Multiple disciplines: Typography, color theory, composition, fundamentals…

STANDARDS AND REGULATIONS

ISO 9241, WCAG, EN 301 549, plus national laws …

DESIGN SYSTEMS

Device and platform guidelines, brand identity, …

The shortcut

Commercial LLMs

THE GAIN

- They save time
- Ask in your own words
- Cross-disciplinary

THE COST

- No control over the knowledge
  (sources the answer is based on)
- Licensing restrictions
  (can’t be freely uploaded)
- Post-hoc attributions
  (not used to produce the answer)
- Confidentiality
  (“Where are my designs going?”)

Other fields already use RAG

Retrieval-Augmented Generation

A language model that, before answering, retrieves relevant passages from a curated document collection and generates its answer from them

Lewis et al., 2020

- Control over the knowledge base
- Updates without retraining the model
- Traceable, verifiable sources
- Reduced hallucinations
- Can run locally, so data stays private

Proposal

Testing the viability of local LLMs with RAG for UI design

Can a local LLM with RAG give useful and verifiable answers to UI design questions?

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RELATED WORK

Commercial design tools

- Generative tools produce screens and prototypes
- Figma plugins show interest in supporting design decisions
- Users can’t customize the knowledge the system relies on



UI design research

Existing tools focus on a single stage

Rodrigues et al., 2026	Machado & Campos, 2021	Castro & Campos, 2025	Duan et al., 2024
Creativity Support Tools	Prototyping	Code generation	Screen evaluation

Our proposal: Assistance while making decisions, at every stage

To the best of our knowledge…

There is no labelled design corpus, no guidance on how to ingest design books, and no LLM + RAG pipeline for design decisions

That’s why we start with a proof of concept

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METHODOLOGY

Corpus selection

Consultation stack

- **184 documents**: born-digital, scanned, and web content.
- Interface guidelines, design system documentation, and reference books



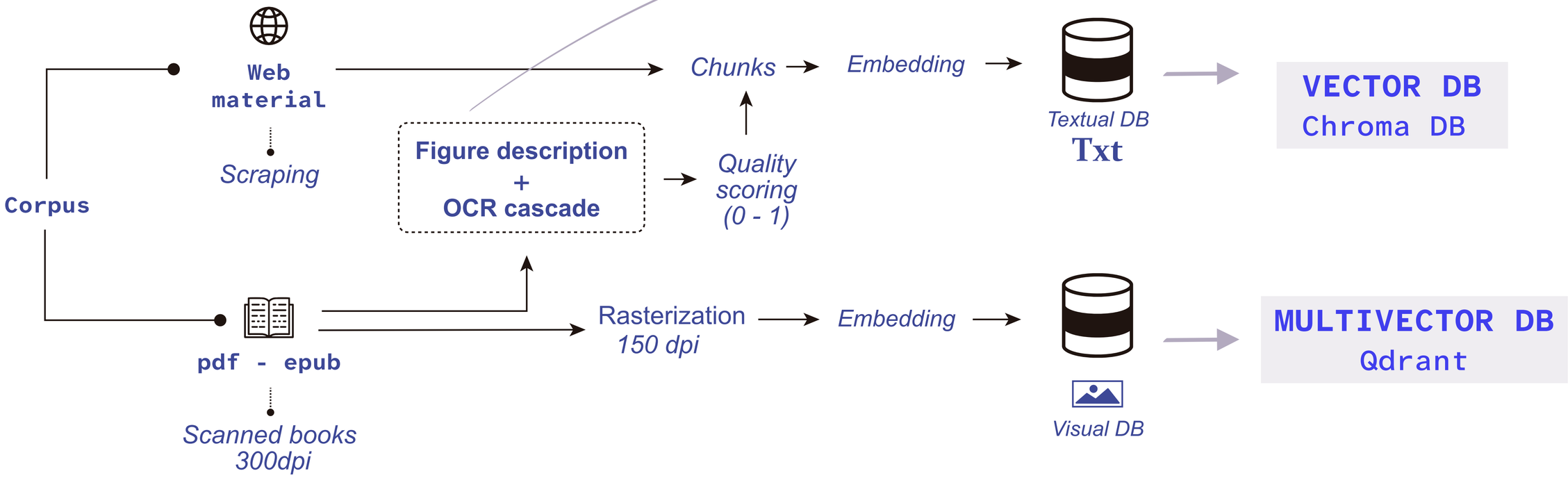
typography/the-practice-o…	The Practice of Typography	Theodore Low…	typogra…	1900	public_domain
ui_ux/about-face-3.pdf	About Face: The Essentials…	Alan Cooper	ui_ux	1995	all_rights_reserved
ui_ux/atomic-design.pdf	Atomic Design	Brad Frost	ui_ux	2016	all_rights_reserved
ui_ux/the-elements-of-use…	The Elements of User Exper…	Jesse James …	ui_ux	2003	all_rights_reserved
ui_ux/designing_interface…	Designing Interface Animat…	Val Head	ui_ux	2016	all_rights_reserved
ui_ux/design_for_hackers_…	Design for Hackers: Revers…	David Kadavy	ui_ux	2011	all_rights_reserved
ui_ux/don't_make_me_think…	Don't Make Me Think	Steve Krug	ui_ux	2000	all_rights_reserved
ui_ux/ux-for-beginners.pdf	UX for Beginners	Joel Marsh	ui_ux	2016	all_rights_reserved
ui_ux/designing-web-inter…	Designing Web Interfaces: …	Bill Scott &…	ui_ux	2009	all_rights_reserved
ui_ux/standards/iso_iec_2…	ISO/IEC 25062:2006 Softwar…	Internationa…	ui_ux	2006	une_school_licence
ui_ux/standards/iso_12207…	ISO/IEC 12207:2008 Systems…	Internationa…	ui_ux	2008	une_school_licence
ui_ux/standards/une_en_is…	UNE-EN ISO 9241-151:2008 E…	Spanish Asso…	ui_ux	2008	une_school_licence
ui_ux/standards/en_iso_92…	EN ISO 9241-303:2011 Ergon…	Internationa…	ui_ux	2011	une_school_licence
i_ux/standards/iso_iec_2…	ISO/IEC 25010:2011 Systems…	Internationa…	ui_ux	2011	une_school_licence
ui_ux/standards/une_en_is…	EN ISO 9241-410:2008/A1:20…	Spanish Asso…	ui_ux	2012	une_school_licence
ui_ux/standards/iso_iec_2…	ISO/IEC 25022:2016 Systems…	Internationa…	ui_ux	2016	une_school_licence
ui_ux/standards/une_en_is…	UNE-EN ISO 9241-920:2016 E…	Spanish Asso…	ui_ux	2016	une_school_licence
ui_ux/standards/une_en_is…	UNE-EN ISO 9241-112:2017 E…	Spanish Asso…	ui_ux	2017	une_school_licence
ui_ux/standards/une_en_is…	UNE-EN ISO 9241-333:2017 E…	Spanish Asso…	ui_ux	2017	une_school_licence
ui_ux/standards/une_en_is…	UNE-EN ISO 9241-11:2018 Er…	Spanish Asso…	ui_ux	2018	une_school_licence
ui_ux/standards/une_en_is…	UNE-EN ISO 25066:2019 Syst…	Spanish Asso…	ui_ux	2019	une_school_licence
ui_ux/standards/une_en_is…	UNE-EN ISO 9241-210:2019 E…	Spanish Asso…	ui_ux	2019	une_school_licence
ui_ux/standards/une_en_is…	UNE-EN ISO 9241-220:2019 E…	Spanish Asso…	ui_ux	2019	une_school_licence
ui_ux/standards/une_en_is…	UNE-EN ISO 9241-110:2020 E…	Spanish Asso…	ui_ux	2020	une_school_licence
ui_ux/standards/une_en_is…	UNE-EN ISO 9241-940:2022 E…	Spanish Asso…	ui_ux	2022	une_school_licence
ui_ux/standards/iso_iec_2…	ISO/IEC 25019:2023 Systems…	Internationa…	ui_ux	2023	une_school_licence
dictionary/diccionario-di…	Pequeño Diccionario del Di…	Reimers Desi…	diction…	2011	creative_commons
fundamentals/conceptos-de…	Conceptos de diseño gráfico	Jordi Alberi…	fundame…	2020	cc-by-sa

Corpus catalogue with metadata for each source

Ingestion of corpus

Consultation stack

OCR CASCADE
1. PyMuPDF
2. Marker-pdf
3. qwen2.5vl:7b
4. gemma4:26b



Model selection

Consultation stack



All on a single 24 GB consumer GPU

Role	Model	VRAM
At query time		
Generation (B, T, V)	gemma4:26b (Q4_K_M)	≈17 GB
Text embedding (T)	nomic-embed-text-v2-moe	≈1 GB
Visual retrieval (V)	colqwen2.5-v0.2 (bf16)	≈6 GB
At ingestion time		
Figure description	gemma4:26b	≈17 GB
OCR fallback, first	qwen2.5vl:7b	≈6 GB
OCR fallback, second	gemma4:26b	≈17 GB

Four conditions to test

Consultation stack

B

Base model

Control condition

Local LLM answering from its own knowledge

T

Textual RAG

Local + Textual DB

Top-10 text fragments

V

Visual RAG

Local + Visual DB

Top-10 pages attached as images

C

Commercial

Reference condition

Claude Fable (high-effort) Same prompt and images, no corpus, new session per question.

Question bank

Evaluation protocol

- **48 questions** from a UI designer's daily practice.
- **Recall**: Expected sources marked.
- Same **fixed prompt** for every condition.
- Some questions add **synthetic images.**

Prompt

You are an expert in UI design. For each response, if the available image, prompt, or retrieved context is insufficient, indicate what information is missing and how that uncertainty affects the recommendation

Question example

I set the body text of this app at 14 px, which looked fine for the young audience it was designed for. Now, that same app should also be aimed at people in their seventies. Is there a minimum type size I can actually point to?

Blind expert assessment

Evaluation protocol

- All responses rated by a **single expert** UI designer
- **Web interface**: the four answers to each question, in random order and unlabelled
- Every cited page can be **opened** for verification
- Each question is its own control

QUESTION 24

I set the body text of this app at 14 px, which looked fine for the young audience it was designed for. Now, that same app should also be aimed at people in their seventies. Is there a minimum type size I can actually point to?

ANSWER 4

There is no single universal minimum size, as the ideal size depends on the specific medium, the viewing distance, and the visual acuity of the user. While 10 points is considered a "magic number" for body-copy in general [**Mastering Graphics: Design and Production Made Easy, p.73**], 12 points is the most common standard for body-text and is recommended for reading-heavy experiences [**Designing Interfaces: Patterns for Effective Interaction Design, p.290**]. Furthermore, for users with lower visual acuity (such as those in their seventies), the application should allow characters to be displayed at a larger height [**en_iso_9241_303_2011, p.22**], especially since type should be made larger the farther it is from the reader's eye [**Graphic Design for the Electronic Age, p.20**].

NOTES

Mastering Graphics: Design and Production Made Easy, p.73 View page View transcription

◉ — ○ Supports ○ Partial ○ Hallucination ○ Not in library

Designing Interfaces: Patterns for Effective Interaction Design, p.290 View page View transcription

◉ — ○ Supports ○ Partial ○ Hallucination ○ Not in library

Taken together, does it resolve your need?

◉ It resolves it, and I can verify it
○ It resolves it, but I can't verify it
○ Relevant, but not enough
○ Off topic / made up

Does it acknowledge what it cannot know?

◉ Ignores its limits
○ Mentions its limits
○ Clearly separates what it cannot claim

Sufficiency

Verifiability

Web interface for evaluation

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RESULTS

Condition T (Textual RAG)

Local, useful, and verifiable

Same usefulness
42 (B) · 42 (T) · 43 (C)

Citations hold up
0.94 precision

Condition	Sufficient	Verified	Source recall
B - Base model	42 / 48	-	-
T - Textual RAG	42 / 48	42 / 48	0.77
V - Visual RAG	18 / 48	17 / 48	0.81
C - Commercial	43 / 48	-	-

Condition V (Visual RAG)

Retrieval works, but the answers don't use it

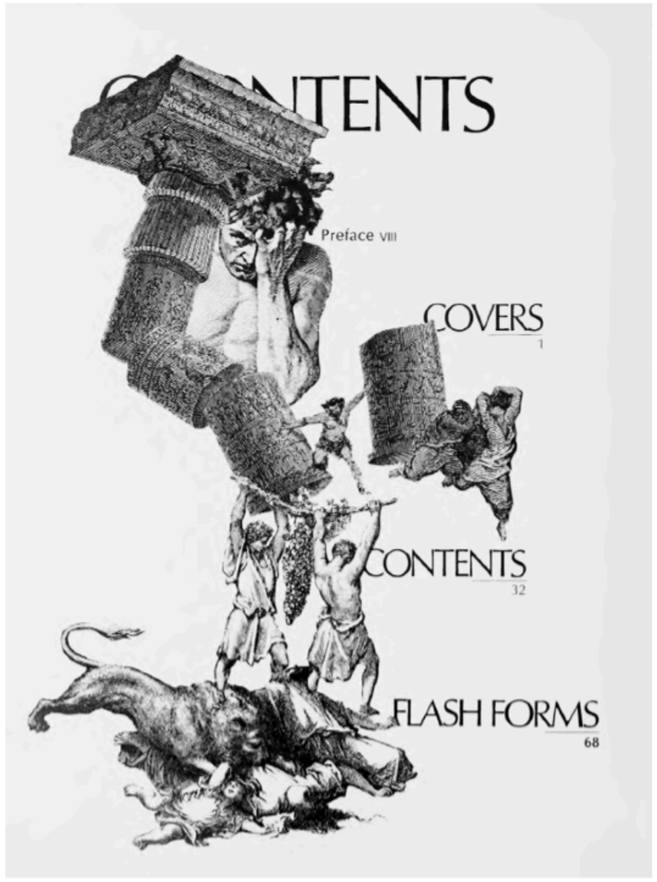
Future work

PLAUSIBLE EXPLANATION

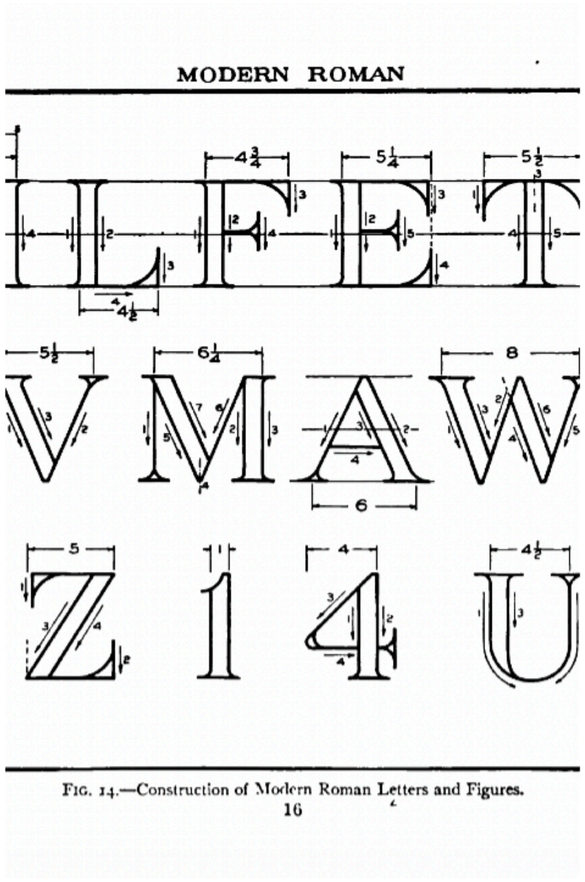
Vision-language models are not trained to read design pages.

- Design books break the grid: non-Manhattan layouts with vertical captions, figures over text and scattered paragraphs…

Condition	Sufficient	Verified	Source recall
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Pages from the corpus: Designing for Magazines (White, 1982) and The Essentials of Lettering (French & Meiklejohn, 1912).

05

CONCLUSIONS

Conclusions

RQ: Can a local LLM with RAG give useful and verifiable answers to UI design questions?

A local model grounded in the designer's own library is as useful as a commercial assistant, and its answers can be checked.

- **Verifiable, not just sufficient:** citations hold up when the page is opened
- **Private by design:** the corpus never leaves the machine
- **Evidence over trust:** with no single right answer, the designer sees which authors disagree, and decides

Limitations and future work

A proof of concept: testing viability, not selecting a model

LIMITATIONS

One expert wrote, sourced and rated the evaluation
(no inter-rater agreement)

FUTURE WORK

Several evaluators and inter-rater agreement

Improve the visual branch

A labelled design corpus

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Thanks for your attention

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