

# EVOLVING SKILLSET OF A GRADUATE ARCHITECT

AN EVALUATION OF AI IN ARCHITECTURE

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AI research at Henry J Lyons



# How it Started



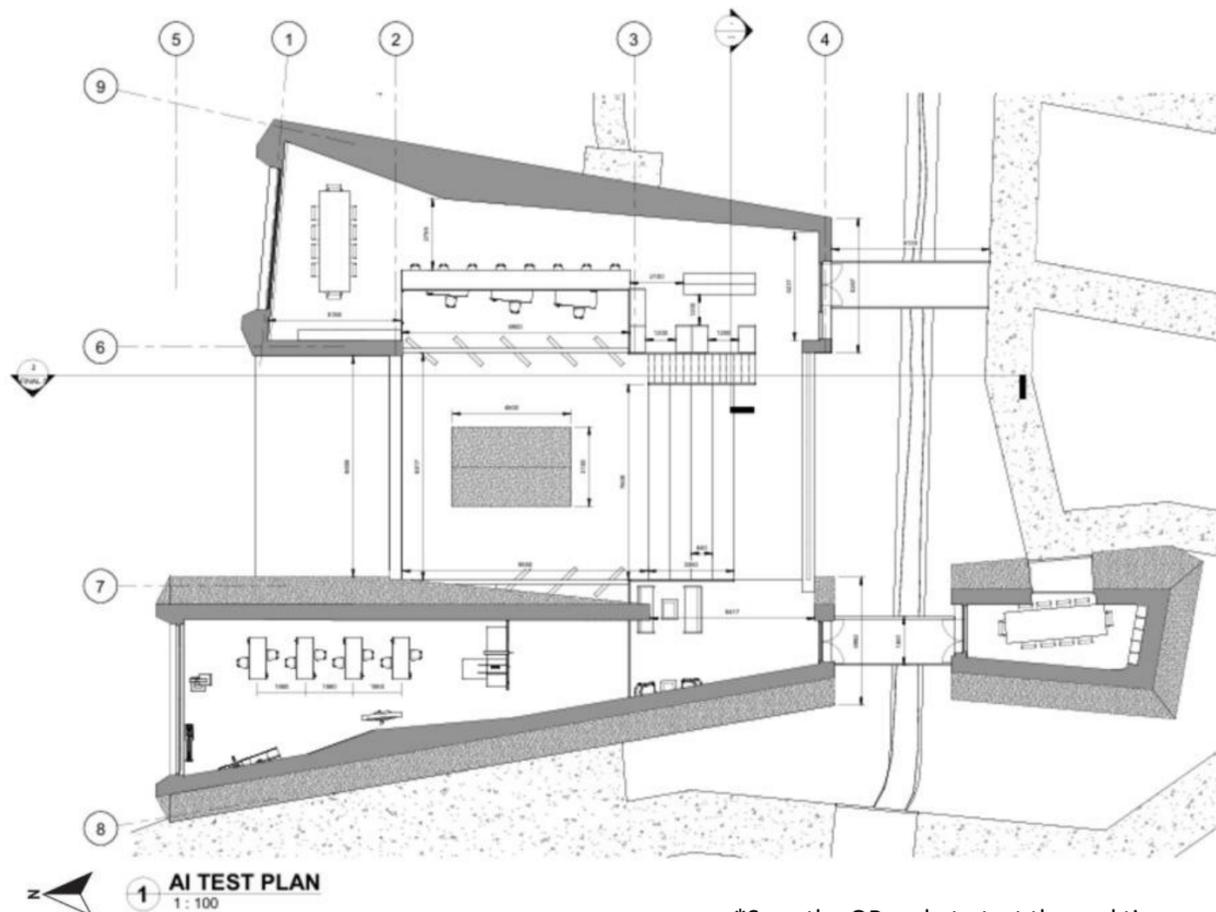
**SCAN TO TRY THE APPLICATION**

The problem: quality assurance lacked the structured, data-driven support seen in other professions

The research: The Yale collaboration allowed exploration of an AI-powered drawing-review tool to address that gap

The prototype: Computer vision model which ran in real time on a phone camera

The conclusion: To progress further, the research needed access to structured, consistent office data



\*Scan the QR code to test the real time scan prototype

# Why Make Our Own?

Compliance: Clear audit trails over “black boxes”

Transparency: Visible probability vs True/ false outputs

Structure: Database ready vs generative text outputs

Control: Adapt tools to practice, not practice to tools

AI Literacy: Understanding the logic behind AI

DRAWING 77% 98%

78%

91% 93%

TITLE NOTES 95%

86%

96%

88%

81%

78%

92%

13 objects detected

Confidence Threshold: 70%  
0% ———— 100%

Overlap Threshold: 50  
0% ———— 100%

Opacity Threshold: 75  
0% ———— 100%

Label Display Mode:  
Draw Confidence

```
{  
  "predictions": [  
    {  
      "x": 688.501,  
      "y": 308.454,  
      "width": 121.255,  
      "height": 569.291,  
      "confidence": 0.977,  
      "class": "LEGEND",  
      "class_id": 3,  
      "detection_id": "143da8a"  
    },  
    {  
      "x": 656.601,  
      "y": 1032.602,  
      "width": 177.673,  
      "height": 61.  
    }  
  ]  
}
```

Copy

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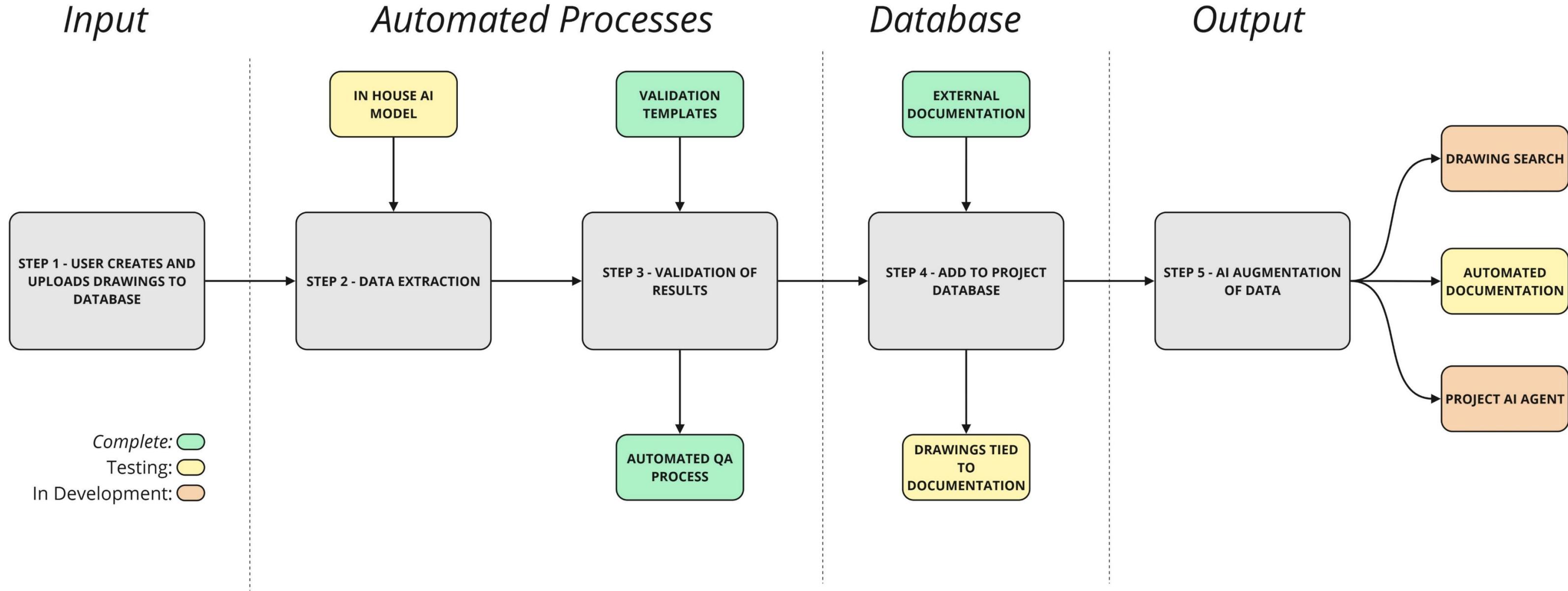
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# How it Works



# Verification Process

The interface displays a document titled "M1-HJL-B1-01-DR-A-1171\_2.pdf". On the left, a sidebar contains "Quick Upload", "Projects", "Drawing Settings", "Report Templates", and "Settings". Below this is a "PINNED PROJECTS" section with "No pinned projects" and a note to "Star projects to pin them here".

The main area features a "Settings" panel with "Drawing Type" set to "BASE CHECK" and "Validation Status" set to "Invalid". A "User control bar" contains buttons for "Run Validation", "OCR Comparison", "Download Raw JSON", and "Delete Drawing".

The central drawing is annotated with various elements and their confidence scores: "DRAWING\_0.98", "DRAWING\_NOTES\_0.60", "LEGEND\_0.94", "REVISION\_TABLE\_0.97", "TITLE\_BLOCK\_0.97", "TITLE\_CLIENT\_0.81", "TITLE\_PROJECTNAME\_0.76", "TITLE\_DRAWINGNAME\_0.89", "TITLE\_PROJECTNUM\_0.60", "TITLE\_SCALE\_0.36", and "TITLE\_DRAWINGNUM\_0.87". A "Henry J Lyons" logo is visible at the bottom of the drawing.

On the right, a "Summary" panel provides key metrics: File Size (1.05 MB), Validation Score (40%), Validation Status (Invalid), OCR Status (Complete), Total Detected Annotations (13), Average Annotation Confidence (78%), Lowest Annotation Confidence (36% (title drawingname)), OCR Results Score (Pending), and Validation Attempts (Pending).

Below the summary is "Title Block Data" with fields: Drawing Name (EXTERNAL WALLS SETTING OUT BLOCK B1-01 FIRST FLOOR PLAN), Drawing Number (STATUS CODE: DRAWING NUMBER S2 M1-HJL-B1-01-DR-A-1171 REVISION T1), Project Name (CHERRYWOOD M1), Project Number (950874), Scale (As indicated), and Date (NOT DETECTED).

The bottom right section, "Validation Failed (8/14 rules passed)", lists specific failures: "DRAWING TITLE: DRAWING\_TITLE: expected 1, found 0", "TITLE DATE: TITLE\_DATE: expected 1, found 0", and "TITLE DRAWINGNAME: TITLE\_DRAWINGNAME: expected 1, found 2".

Quick access sidebar for program tabs

User favoured projects

Annotated drawing highlighting where data is being pulled from

User specified / automatic detection validation template

User control bar

At a glance summary of drawing validation

Extracted title block data from drawing. compared against project documentation

Validation results highlight to user what to change

## LLM Model Output:

Text:

OTHER PENETRATIONS INTO AND OUT OF COMPARTMENTALISATION AS INDICATED IN FIRE CERTIFICATE DRAWINGS AND REPORT. CONTRACTOR TO ENSURE THE FULL COMPARTMENTALISATION IS MAINTAINED THROUGHOUT THE PROJECT TO EFFECTIVELY STOP THE PASSAGE OF FIRE, SMOKE AND OTHER HOT GASES AND ACOUSTIC TRANSMISSIONS FROM ONE AREA TO ANOTHER VIA SUITABLE MEANS FOR ALL CONDITIONS. SAMPLE INSPECTION BY DESIGN TEAM WILL BE REQUIRED TO BE FINISHED AND INTUMESCENT PAINT, REFER SPECIFICATION.

7. EXACT LOCATIONS FOR ALL CEILING HUNG, WALL MOUNTED M&E FIXTURES TO BE AGREED WITH ARCHITECT.

534 tokens

294 words

1954 characters

Tokenized text:

GENERAL NOTE

1. THE CONTRACTOR IS TO REFER TO ALL DOCUMENTS IN THE WORKS SCHEDULE AND ALL INFORMATION IN THE PROJECT PARTICULARS AND PRELIMINARIES FOR FURTHER DETAIL.
2. THE CONTRACTOR IS RESPONSIBLE FOR THE CO-ORDINATION, SEQUENCING & COMPLETION OF ALL SUB-STRUCTURE ELEMENTS AND SUPERSTRUCTURE ELEMENTS AS PER SPEC.
3. THE CONTRACTOR IS TO ENSURE THE BUILDING & WORKS ARE CONSTRUCTED IN FULL ACCORDANCE

## HJL Model Output:

Text:

DRAWING LEGEND TO BE READ IN CONJUNCTION WITH ARCHITECTS SPECIFICATION (FOR FULL DESCRIPTIONS AND PERFORMANCE REQUIREMENTS) VENUE AREA GREY BOX FITOUT INDICATIVE LAYOUT ONLY - WALLS, DOORS CEILING AND FLOOR FINISH WITHIN THIS AREA ARE NOT WITHIN PROJECT SCOPE. TEMPORARY STEPS TO BE INSTALLEDA AS REQUIRED. TEMPORARY EMERGENCY MEP EQUIPMENT TO BE INSTALLED AS PER MEP CONSULTANTS SPECIFICATION. WPS-102 SPECIALIST SUBCONTRACTOR DESIGN TO ACHIEVE GRADE 3 BASEMENT AS SET OUT IN BS8120 & STRUCTURAL SPECIFICATION BY WATERMAN MOYIAN, UTILISING A "CAVITY DRAN METHOD" OR SIMILAR ACCEPTABLE SYSTEM. FULL SYSIEM. DESIGN, INCLUDING RADON INFLIRATION PREVENTION,

1129 tokens

541 words

3740 characters

Tokenized text:

DOORS CEILING AND FLOOR FINISH WITHIN THIS AREA ARE NOT WITHIN PROJECT SCOPE. TEMPORARY STEPS TO BE INSTALLEDA AS REQUIRED. TEMPORARY EMERGENCY MEP EQUIPMENT TO BE INSTALLED AS PER MEP CONSULTANTS SPECIFICATION. WPS-102 SPECIALIST SUBCONTRACTOR DESIGN TO ACHIEVE GRADE 3 BASEMENT AS SET OUT IN BS8120 & STRUCTURAL SPECIFICATION BY WATERMAN MOYIAN, UTILISING A "CAVITY DRAN METHOD" OR SIMILAR ACCEPTABLE SYSTEM. FULL SYSIEM. DESIGN, INCLUDING RADON INFLIRATION PREVENTION, INCLUDNG SUMPS, PUMPS ETC, BY SPECIALIST

# Model Performance

Performance: Achieved 96% accuracy across 25 distinct categories

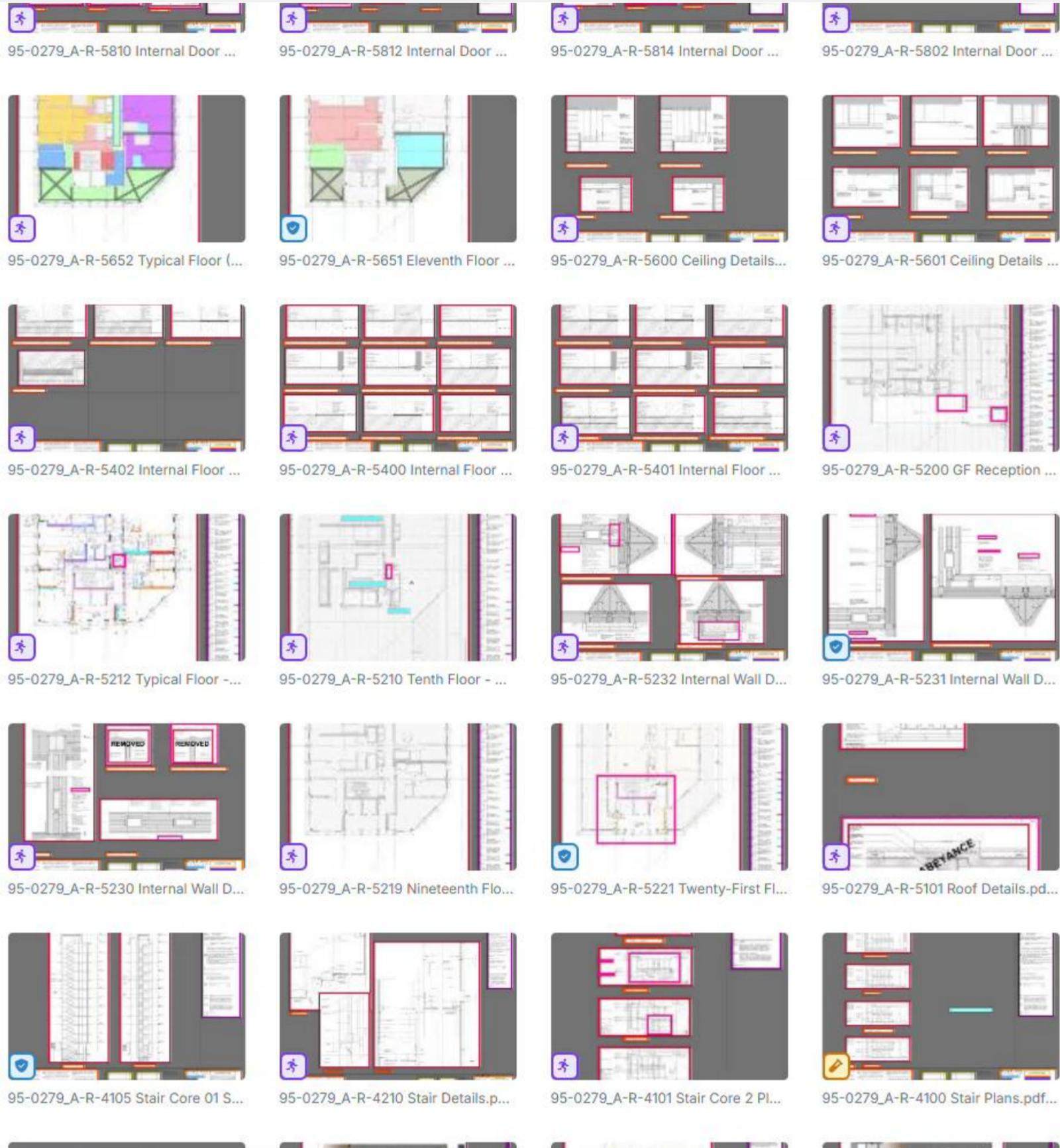
Benchmark: Leading VLMs average just ~41% accuracy on building plans.

Conclusion: General models reason well but lack domain knowledge

Below is a graph comparing our model to the findings of AECFoundry:

Criteria	HJL Model	Best VLM
Categories Tested	25	5
Accuracy Average	96%	41%
Lowest accuracy	90%(configurable)	26%/14%
Speed	3.4s / sheet	Hours/150

# The Reality



Time: 10-15 mins per sheet, 375 drawings.

Subjectivity: Inconsistent categorisation or labelling confuse the model.

Rapid Development: investments could be risky, as new models in future could have the same abilities.

The background features a complex, abstract pattern of fine, wavy lines in shades of blue, orange, and yellow, creating a shimmering, textured effect. On the left side, there is a dark, irregular silhouette that appears to be a person's head and shoulders in profile, looking towards the right. The overall composition is dynamic and visually rich.

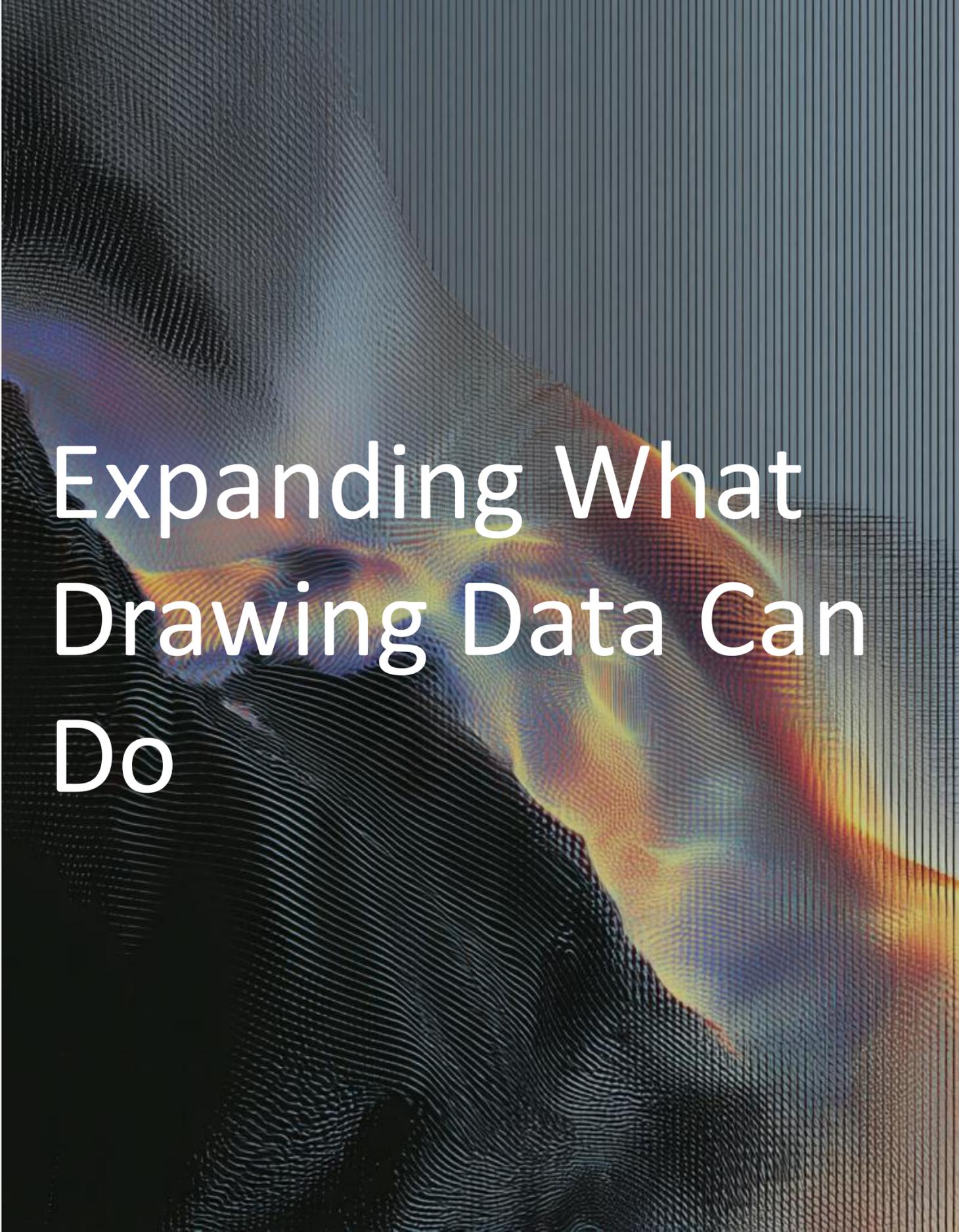
# What This Means For Practice

Practice data is a resource  
its value grows as AI capability increases

Structured, accessible data realises that value

Drawing data = searchable, verifiable, reusable knowledge

Safeguard our value  
treat drawings as reusable IP



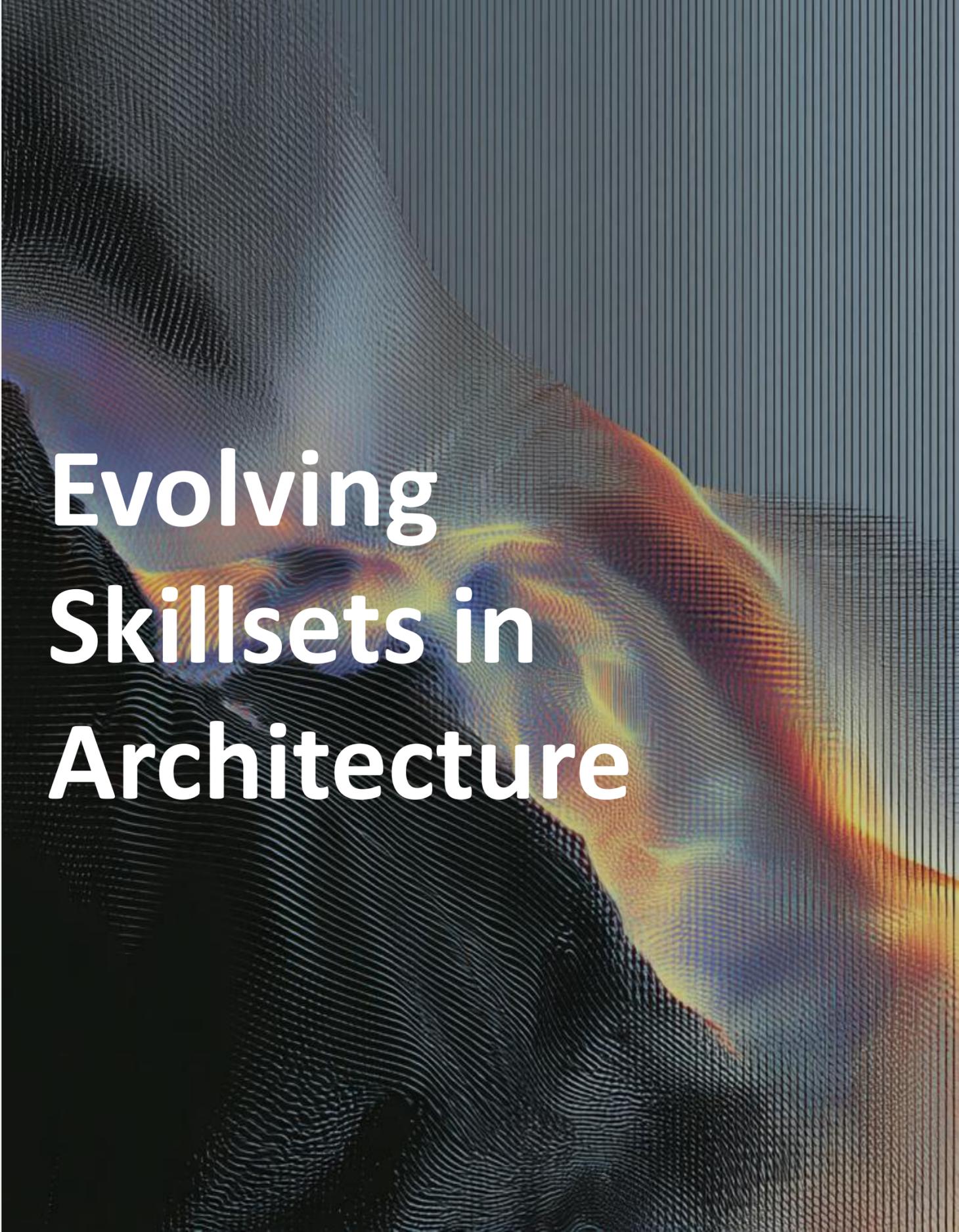
# Expanding What Drawing Data Can Do

Graduates now bring new technical abilities,  
expanding what practices can deliver

Less reliance on major software vendors as open-source tools mature

Open source carries risk - protect privacy and intellectual property

Responsible AI use means choosing tools that fit our work



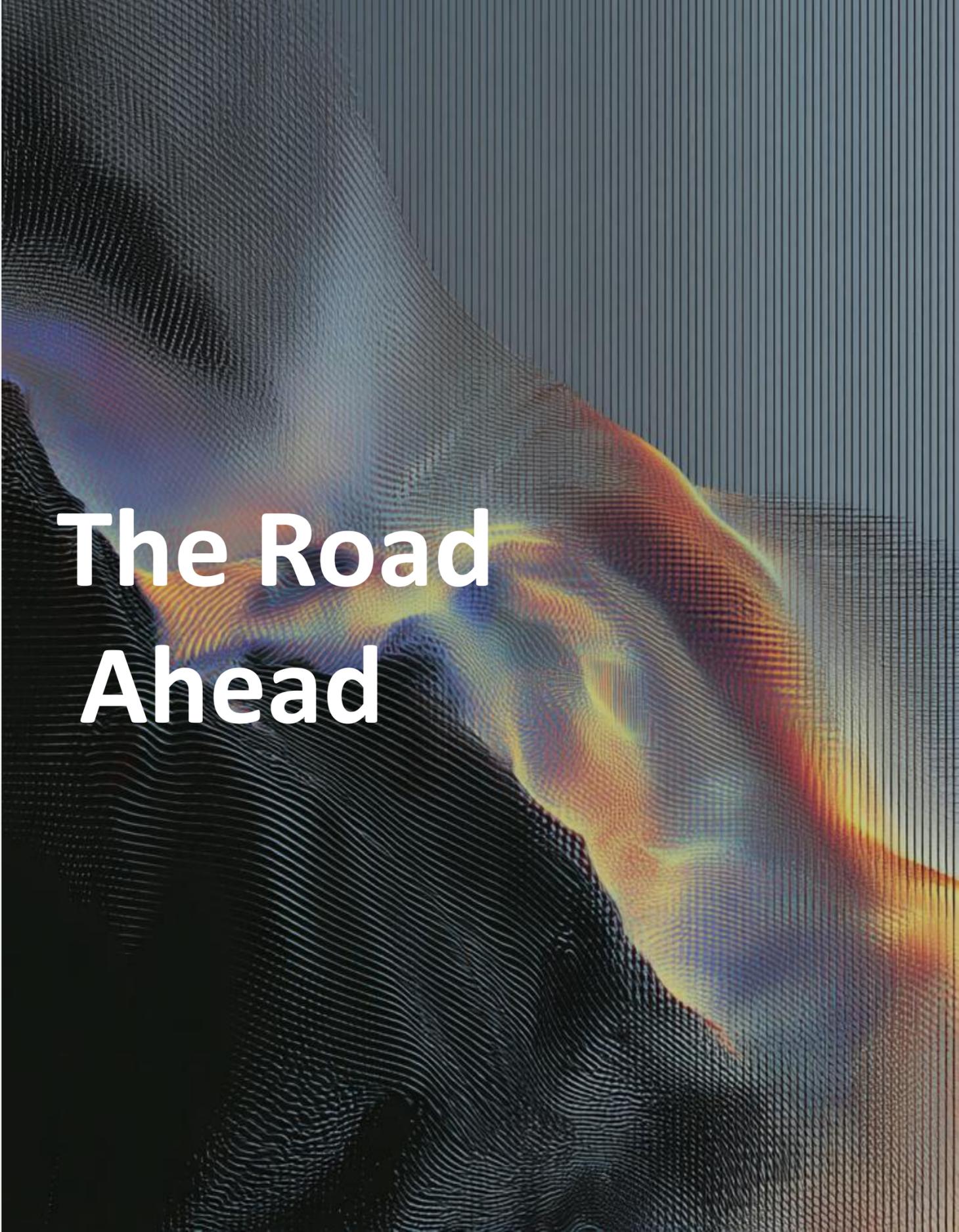
# Evolving Skillsets in Architecture

If visual-language capabilities emerge, we'll understand and apply them responsibly

Increase in model spatial intelligence

Resurgence of AR/VR technology

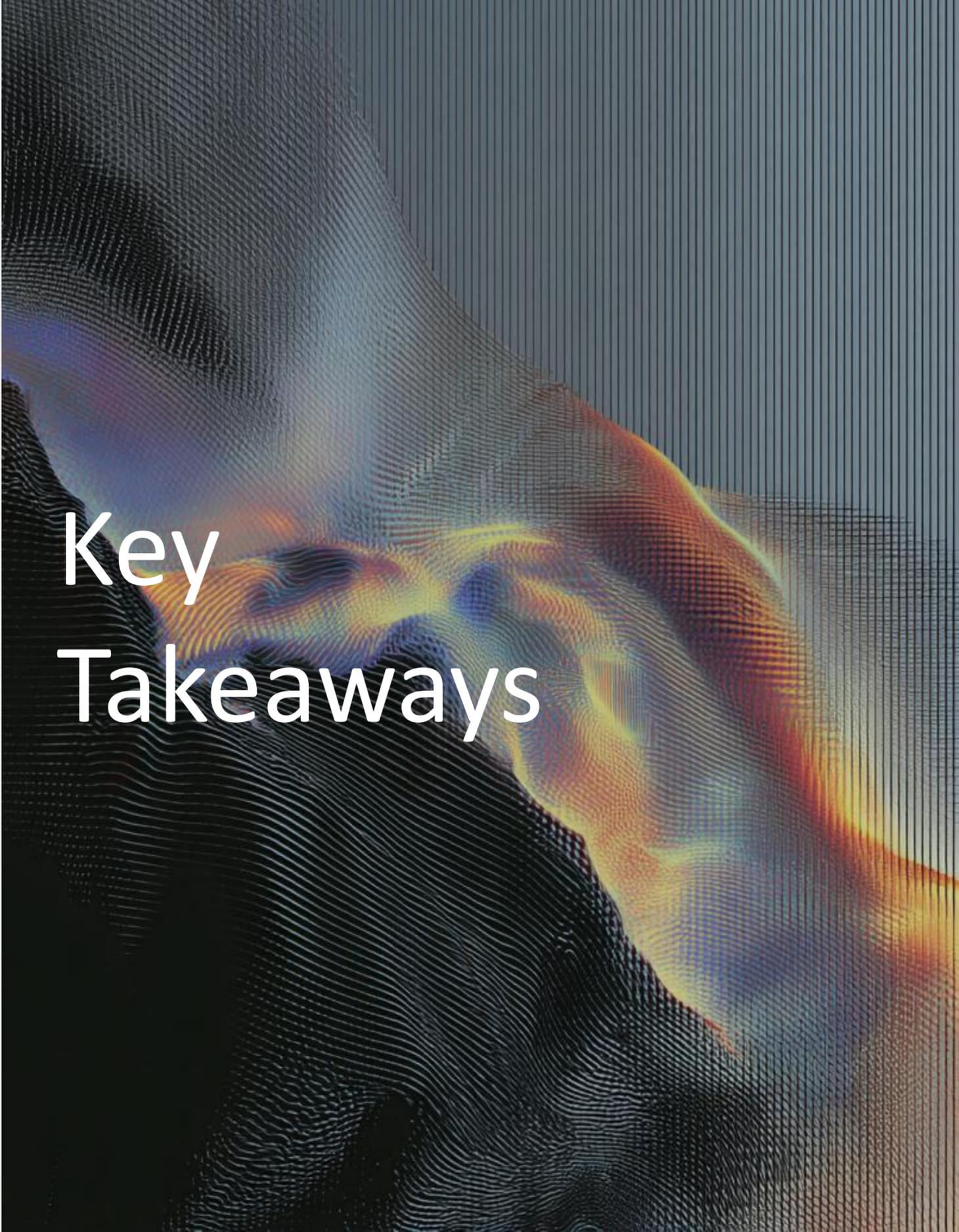
# The Road Ahead

The right side of the image features a dark, textured background with a grid-like pattern. A large, colorful, wavy shape, resembling a stylized wave or a path, flows across the scene. The colors transition from dark blue and purple on the left to bright yellow and orange on the right, creating a sense of movement and depth. The overall aesthetic is futuristic and technological.

AI remains an assistant, more time for creativity

Software should adapt to our workflows

Learning how these systems work safeguards our value and expands  
our reach as designers



# Key Takeaways