

Building AI Agents that actually automate Knowledge Work - Jerry Liu, LlamaIndex



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Agents are all the rage in 2025, and every single b2b SaaS startup/incumbent promises AI agents that can "automate work" in some way.

But how do you actually build this? The answer is two fold:

1. really really good tools
2. carefully tailored agent reasoning over these tools that range from assistant-to-automation based UXs.

The main goal of this talk is to a practical overview of agent architectures that can automate real-world work, with a focus on document-centric tasks. Learn the core building blocks of best-in-class "tools" around processing, manipulating, and indexing/retrieving PDFs to Excel spreadsheets. Also learn the range of agent architectures suited for different tasks, from chat assistant-based UXs with high human-in-the-loop, to automation UXs that rely on encoding a business process into an end-to-end task solver. These architectures have to be generalizable but also highly accurate as agents get increasingly better at reasoning and code-writing.

About Jerry Liu

Jerry is the co-founder/CEO of LlamaIndex, the most accurate and flexible way to automate your document workflows with AI agents. Before this, he led the ML monitoring team at Robust Intelligence, did self-driving AI research at Uber ATG and worked on recommendation systems at Quora.

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<https://www.ai.engineer/newsletter>

Building AI Agents that *actually* Automate Knowledge Work

Jerry Liu
CEO
LlamaIndex



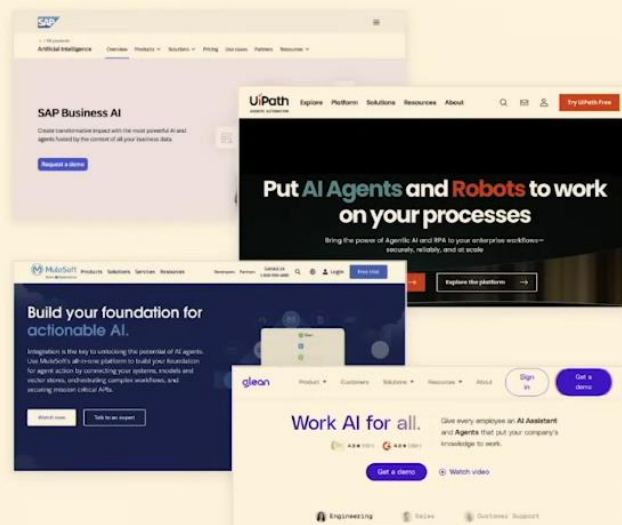
AI Agents can "Automate Knowledge Work"

A big promise of AI agents is making knowledge workers more efficient:

- Lower cost, save time
- More data, better decision-making

Every b2b SaaS is talking about it.

But does "knowledge work automation" just mean RAG chatbots?

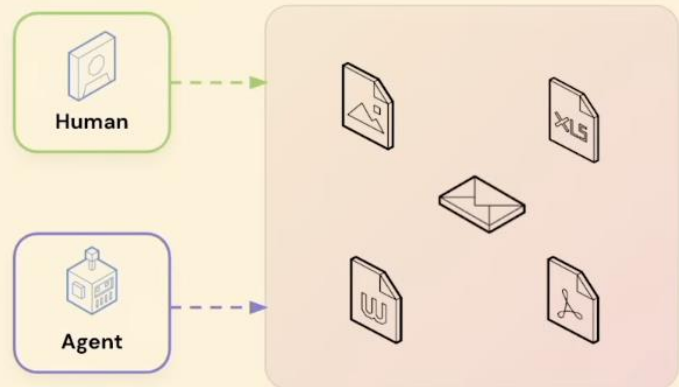


The Alpha is in Unstructured Data

90% of Enterprise Data Lives in Documents*

Humans historically needed to read/write these documents.

For the first time, AI agents can reason and act over massive amounts of unstructured context tokens.



*Source: IDC, 'Unstructured Data: What Every Executive Needs to Know About Unstructured Data' [White paper], IDC <https://www.box.com/resources/unstructured-data-paper>

3

The "Unlock" is in the Tools and Architecture

Helping Humans with Document Work



Assistive Agent

Help humans get more information, faster.



Automation Agent

Automate routine tasks in the background, take actions on behalf of the user.

Necessary ingredients for automation



Tools

Surface relevant **context**. Let agent take **external actions**.

Connect through MCP/A2A

+



Architecture

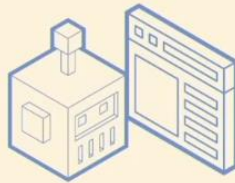
Encode business logic through agent reasoning.

4

Building Advanced Document Agents



Building a document toolbox
(MCP Server)

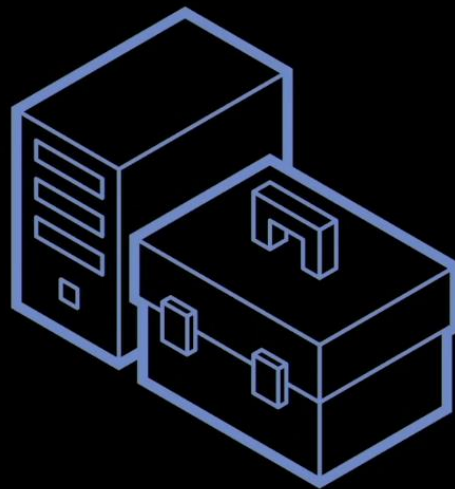


Agent Design Patterns: From
Assistant to Automation UXs



Document Agent
Use Cases

Building a Document Toolbox



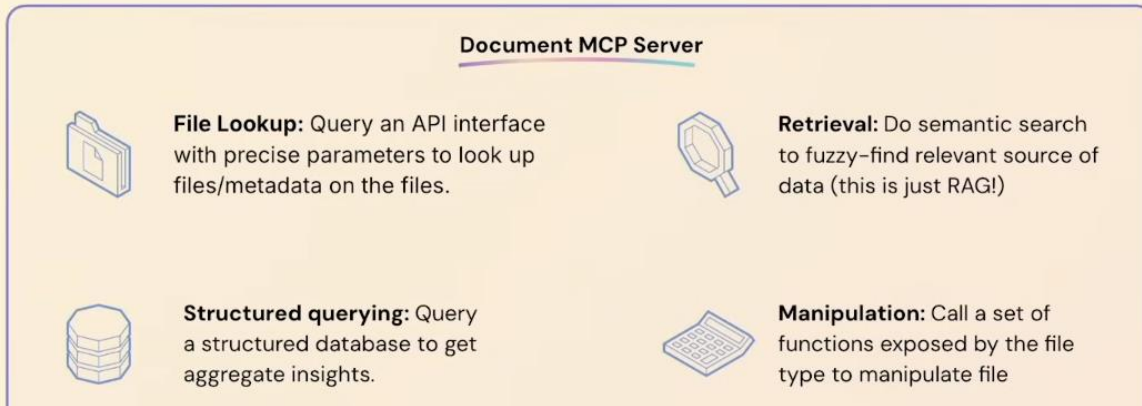
Building a Document Toolbox

Agents need the right tool interfaces over your documents.



To ensure the data is high quality, agents need a layer to **process and structure documents** into highly accurate data

Tool Interfaces over Documents



Issue: Complex Documents

A lot of documents can be classified as **complex**:

- Embedded Tables, Charts, Images
- Irregular Layouts
- Headers/Footers
- Different languages
- Irregular fonts

⚠ If the documents are not processed correctly, the agents will **fail**!



10

VLM-Native Parsing and Extraction

Traditional ML Methods

Use task-specific ML models (OCR, layout detection)

Pros

High accuracy on specific docs & tasks

Cons

Not robust to document type and layout variations

Adapting GenAI Models (LLMs, VLMs)

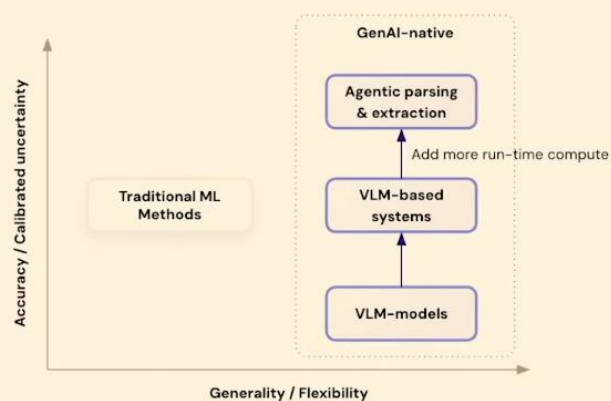
Combine generalist foundation models with strong vision capabilities (i.e. VLMs) with best-practice parsing heuristics.

Pros

- Higher general accuracy than traditional approaches
- Adding more agentic run-time compute can further improve accuracy through self-reflection.

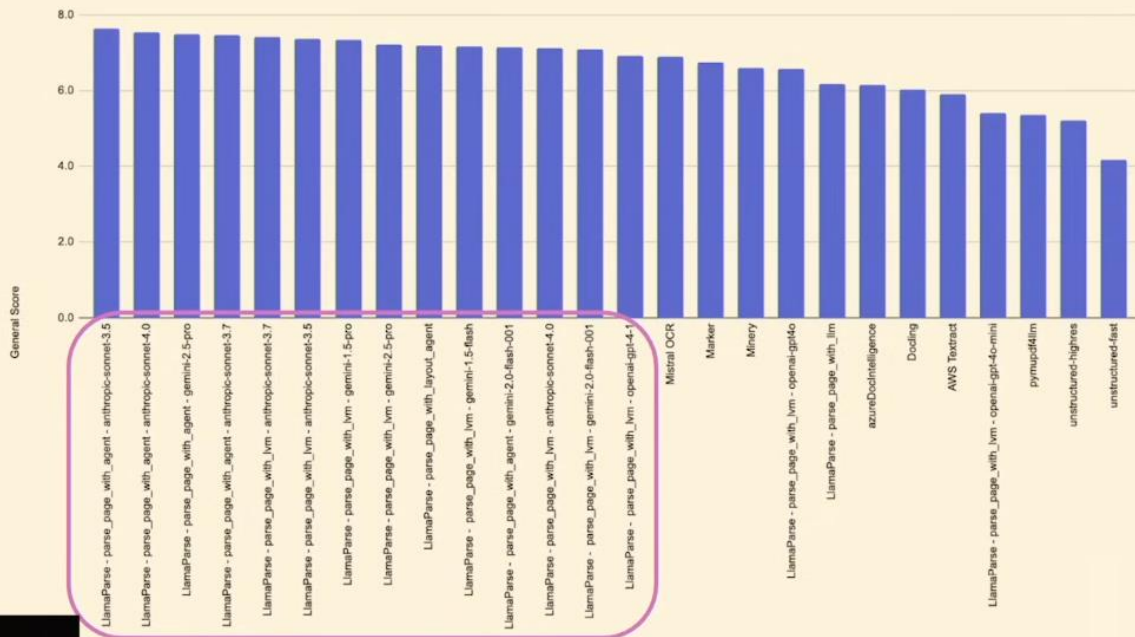
Cons

• High cost, long-tail issues (high-res docs, fonts)



11

Parse Performance



Parse Modes

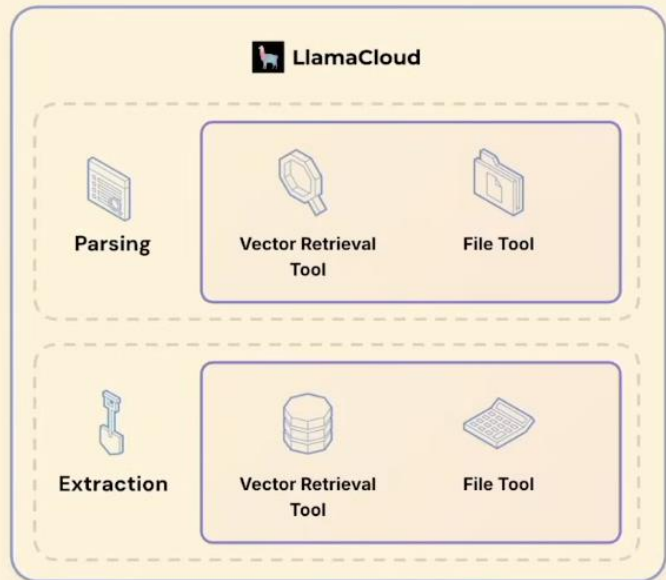
Parser

12

LlamaCloud: Agentic Document Toolbox

LlamaCloud is the genAI-native document toolbox for all downstream agent workflows.

Parse, extract, and index data for downstream workflows.



13

Special Release: Excel!

A lot of knowledge work happens in Microsoft Excel, but it is **unsolved by LLMs**.

Excel sheets are visually structured for humans, not for machine readability

Baselines:

- ❌ Text-to-CSV
- ❌ Vector retrieval
- ❌ Dumping tokens all into the prompt

Profit and Loss

Acme Corp

For the month ended 30 June 2023

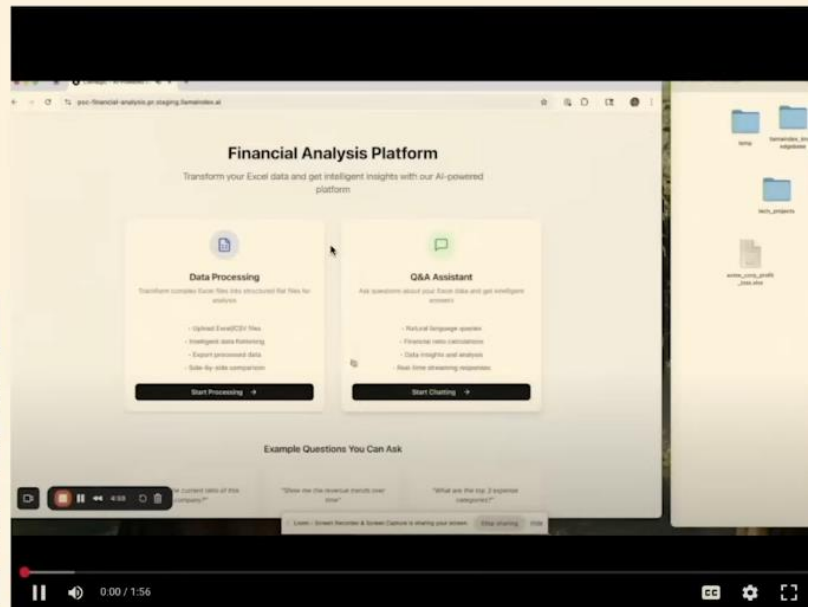
Account	Jun 2023	May 2023	Apr 2023	Mar 2023	Feb 2023	Jan 2023	Dec 2022
Income							
Other Revenue	(411.60)	4,067.33	2,574.08	9,587.45	26,570.28	28,598.44	51,359.65
Sales - SolarMate Panels	1,634,877.72	1,824,809.19	1,431,798.08	1,692,396.14	1,407,866.93	1,939,293.79	1,534,068.19
Sales - GlowCharge Lamps	12,941.20	44,630.76	13,153.71	59,880.85	71,652.49	93,975.01	17,122.30
Sales - EcoFlow Water Bottles	353,170.82	64,870.56	74,317.12	149,776.46	21,787.12	35,449.07	23,788.46
Sales - AeroGrip Yoga Mats	103,129.22	0.00	73,845.88	0.00	90,941.75	105,581.58	0.00
Sales - ThermoTech Jackets	2,390,663.81	1,338,386.79	1,719,429.14	1,309,466.44	1,165,902.34	2,433,383.87	2,503,217.53
Total Income	4,494,371.17	3,276,764.63	3,315,118.01	3,221,107.34	2,784,700.91	4,636,261.76	4,129,556.13
Cost of Sales							
Damaged Goods	113,397.91	116,956.73	111,092.98	110,125.12	210,269.27	311,074.34	17,230.41
AeroGrip Yoga Mats	66,075.84	875.28	50,172.20	0.00	61,609.60	71,781.52	0.00
SolarMate Panels	556,369.31	577,748.85	291,114.24	474,118.52	278,309.73	653,710.63	360,327.02
GlowCharge Lamps	205,144.17	172,639.00	127,673.90	96,553.03	112,410.32	123,562.98	48,446.21
EcoFlow Water Bottles	35,000.00	35,000.00	35,000.00	35,000.00	35,000.00	35,000.00	35,000.00
ThermoTech Jackets	8,085.37	309,610.36	269,950.11	130,755.88	66,092.67	194,684.54	231,615.80
Freight (COGS)	45,333.42	44,711.16	27,243.87	39,762.66	35,035.13	32,070.17	57,656.41
Inventory Adjustment	17,610.50	780.66	0.00	(196.43)	0.00	52.52	85.45
Other COGS	490.00	574.01	0.00	1,098.20	2,547.00	3,293.00	4,477.27
Packaging - GlowCharge Lamps	91,174.32	27,941.20	0.00	0.00	0.00	0.00	0.00
Packaging - SolarMate Panels	14,000.00	14,000.00	14,000.00	14,000.00	14,000.00	14,000.00	14,000.00
Packaging - EcoFlow Water Bottles	10,000.00	21,971.36	0.00	0.00	10,000.00	0.00	0.00
Packaging - ThermoTech Jackets	53,204.84	34,364.72	4,417.20	10,000.00	6,000.00	6,000.00	6,000.00
Promotions - AeroGrip Yoga Mats	8,418.50	2,722.91	26,756.07	203.65	3,592.42	3,351.62	9,754.25
Promotions - SolarMate Panels	55,394.19	70,551.17	135,155.19	2,290.42	71,903.89	59,587.38	243,519.86
Promotions - EcoFlow Water Bottles	62,965.10	239,907.67	182,749.23	12,975.87	74,690.81	52,078.24	77,198.61
Promotions - GlowCharge Lamps	11,136.93	16,264.30	26,586.91	7,884.24	10,223.55	8,370.97	6,262.86
Promotions - ThermoTech Jackets	24,232.39	35,574.30	11,269.12	13,621.76	87,408.54	23,738.01	90,975.09
Sales Rebates - AeroGrip Yoga Mats	0.00	0.00	0.00	0.00	0.00	2,637.45	0.00
Sales Rebates - SolarMate Panels	0.00	0.00	34,291.00	0.00	0.00	50,452.04	0.00
Sales Rebates - EcoFlow Water Bottle	121,953.83	29,368.07	110,797.36	788.44	8,409.07	32,164.38	25,804.68
Sales Rebates - GlowCharge Lamps	8,465.98	27,327.93	20,195.10	788.44	7,420.62	14,629.32	0.00
Sales Rebates - ThermoTech Jackets	14,882.03	29,368.08	121,670.93	788.44	7,790.65	21,757.12	25,804.70
Warehousing Charges	168,174.87	242,732.94	239,272.72	248,673.67	239,396.11	169,285.81	252,040.02
Total Cost of Sales	1,681,509.50	2,050,990.70	1,839,408.13	1,199,231.91	1,342,109.38	1,882,922.04	1,506,198.64
Gross Profit	2,812,861.67	1,225,773.93	1,475,709.88	2,021,875.43	1,442,591.53	2,753,339.72	2,623,357.49

Special Release: Excel!

We built an Excel agent capable of:

- Data Transformation:** Transforming each sheet into a normalized 2D format.
- Agentic QA:** Answer questions over cells in any of the sheets.

This is available in early preview.



1. **Data Transformation:** Transforming each sheet into a normalized 2D format.
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Account	Jun 2023	May 2023	Apr 2023	Mar 2023	Feb 2023	Jan 2023	Dec 2022	Nov 2022	Oct 2022	...
Revenue										
Revenue - Total	1,000,000.00	950,000.00	900,000.00	850,000.00	800,000.00	750,000.00	700,000.00	650,000.00	600,000.00	...
Revenue - Product A	500,000.00	480,000.00	460,000.00	440,000.00	420,000.00	400,000.00	380,000.00	360,000.00	340,000.00	...
Revenue - Product B	500,000.00	470,000.00	440,000.00	410,000.00	380,000.00	350,000.00	320,000.00	290,000.00	260,000.00	...
Expenses										
Expenses - Total	600,000.00	580,000.00	560,000.00	540,000.00	520,000.00	500,000.00	480,000.00	460,000.00	440,000.00	...
Expenses - Salaries	300,000.00	290,000.00	280,000.00	270,000.00	260,000.00	250,000.00	240,000.00	230,000.00	220,000.00	...
Expenses - Rent	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	...
Expenses - Utilities	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	...
Profit										
Profit - Total	400,000.00	370,000.00	340,000.00	310,000.00	280,000.00	250,000.00	220,000.00	190,000.00	160,000.00	...

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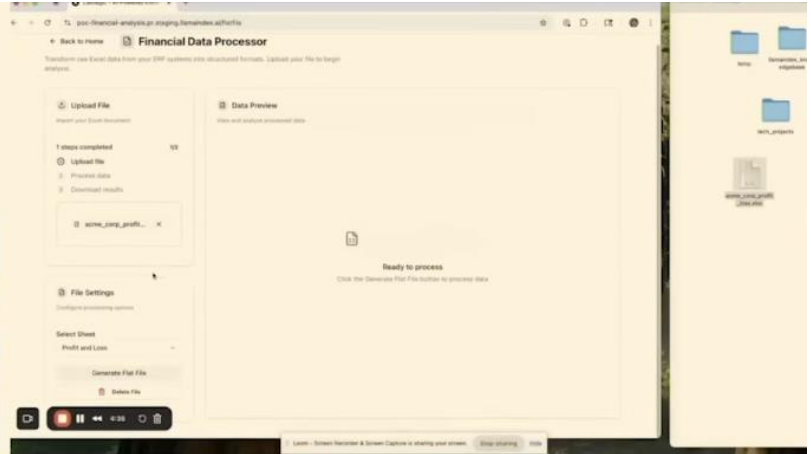
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Expenses - Rent	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	100,000.00	...
Expenses - Utilities	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	...
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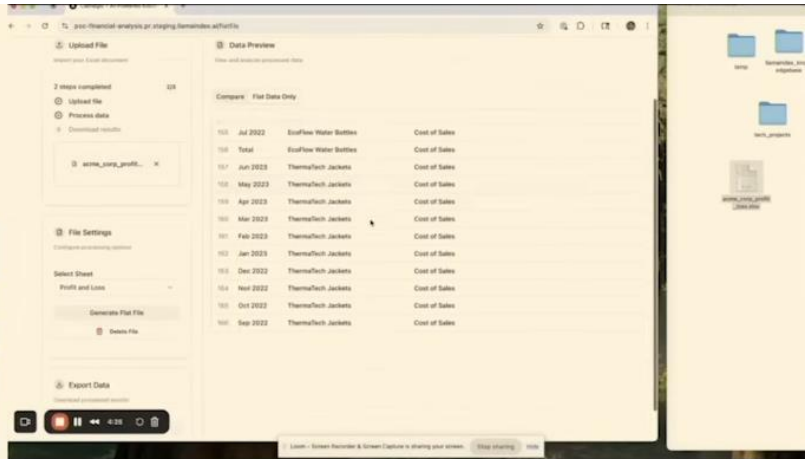
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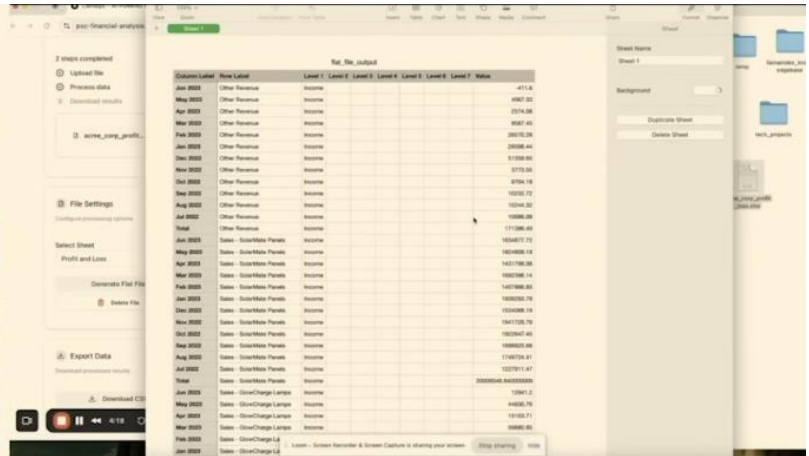
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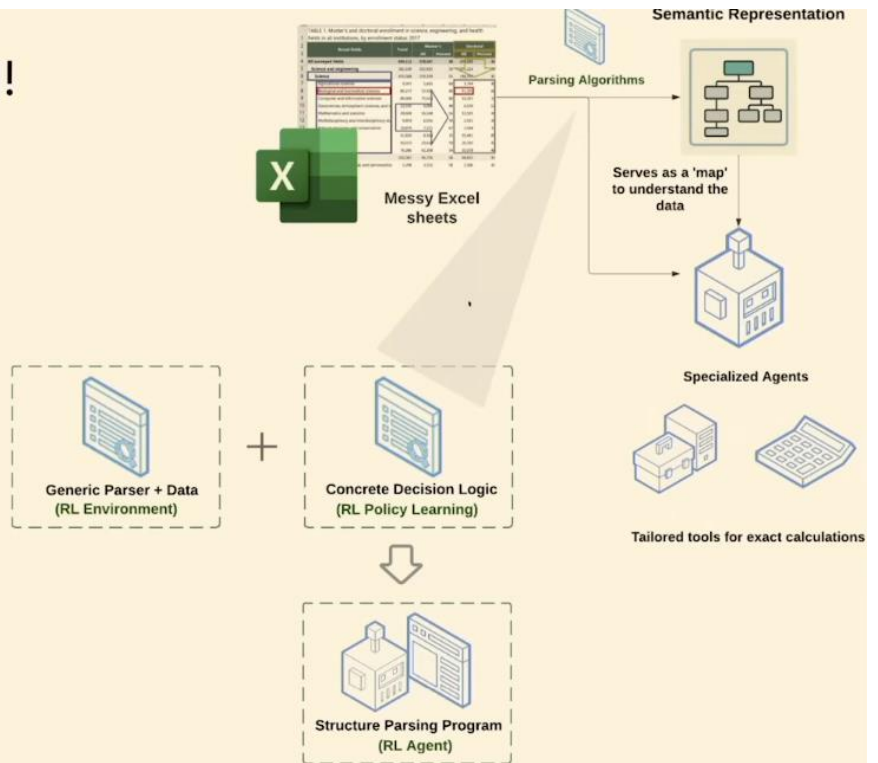
LlamaIndex QA benchmark - complex complex financial sheets



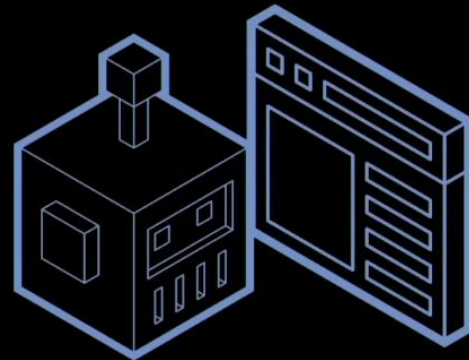
Special Release: Excel!

Our pipeline combines **RL-based data modeling** with **specialized agents tools**:

1. **RL-based structure understanding** → Learn a semantic map of the sheet, use good-ol reinforcement learning to adapt to a given format.
2. **Uses specialized sub-agents + tools** → Agents that can reason using tailored tools for arithmetic and data aggregation.

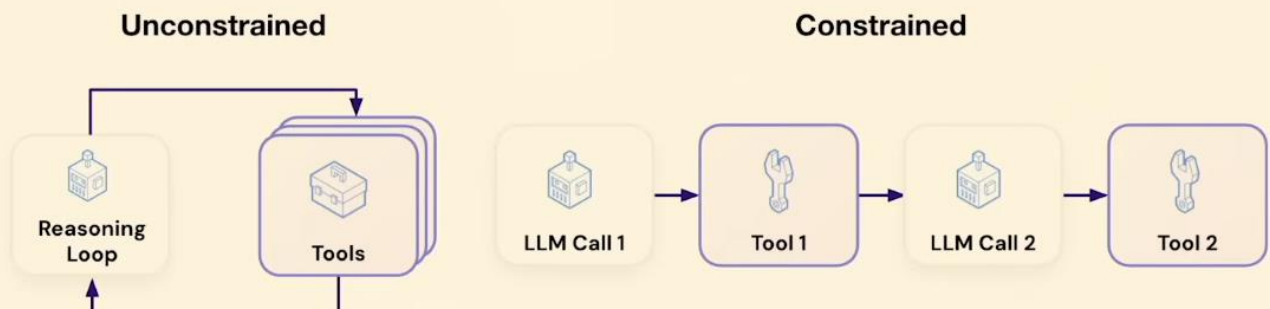


Agent Design Patterns From Assistant to Automation UX



Agent Orchestration Primitives

Agent Orchestration ranges from **constrained** to **unconstrained**.



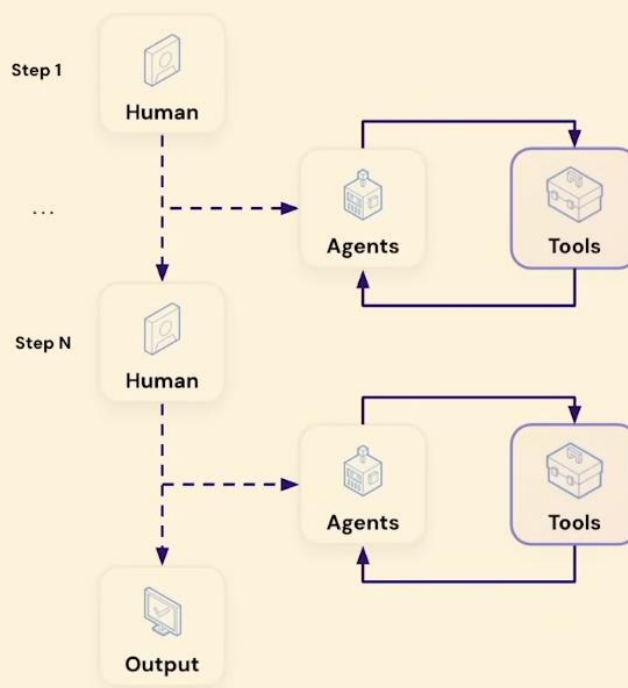
Assistant UX

Goal

Surfacing information and/or producing a single unit of knowledge work.

Properties

- **UX:** Chat-oriented
- **Input:** Natural language or file
- **Architecture:** Unconstrained, more tools, high HITL
- **Output:** Output is synthesized information and/or a knowledge artifact

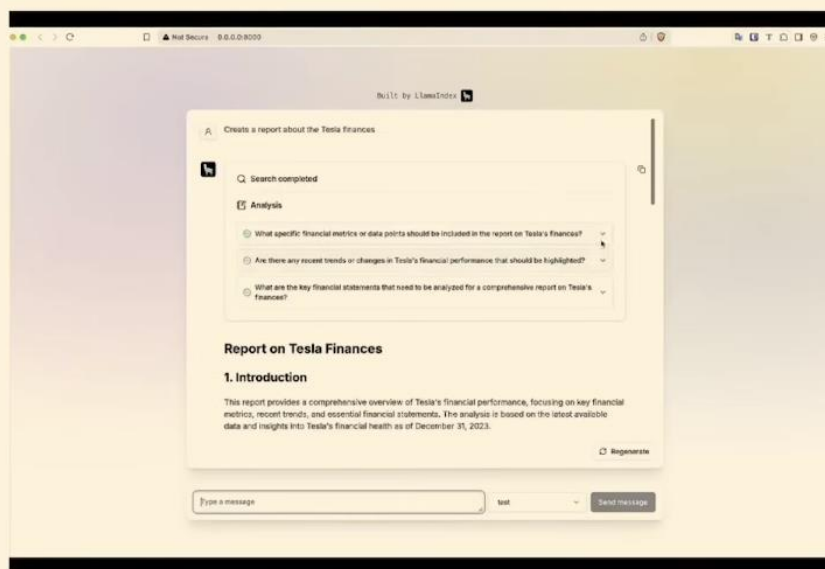


22

Assistant UX

Use Cases

- Financial due diligence
- Customer support
- Workplace search



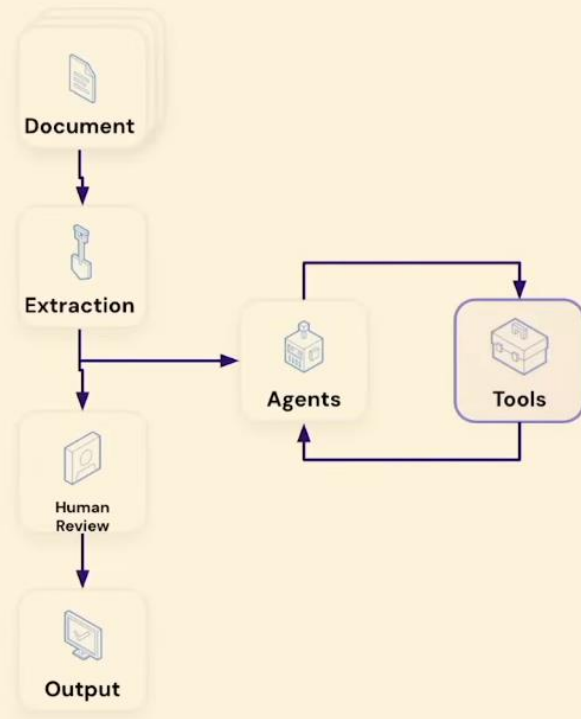
Automation UX

Agentic Document Workflows

Goal: Process routine tasks and processes to increase efficiency

Properties:

- **UX:** Batch processing of jobs, review results, wait until done
- **Input:** Batch of inputs (e.g. files)
- **Architecture:** Constrained, multi-step, lower HITL
- **Output:** Structured results, integration with API

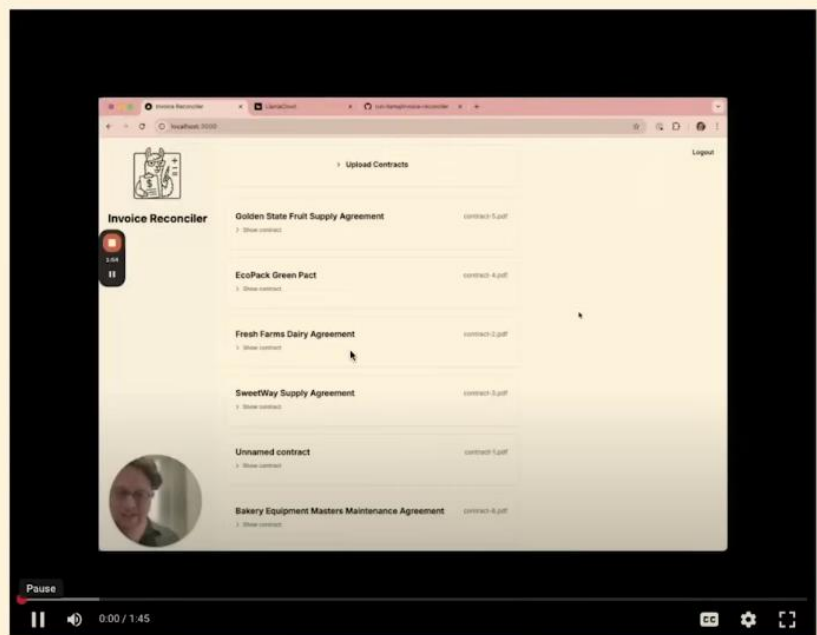


24

Automation UX

Use Cases

- Financial Data Normalization
- Datasheet Extraction
- Patient Record Extraction
- Invoice Reconciliation



<https://github.com/run-llama/invoice-reconciler>

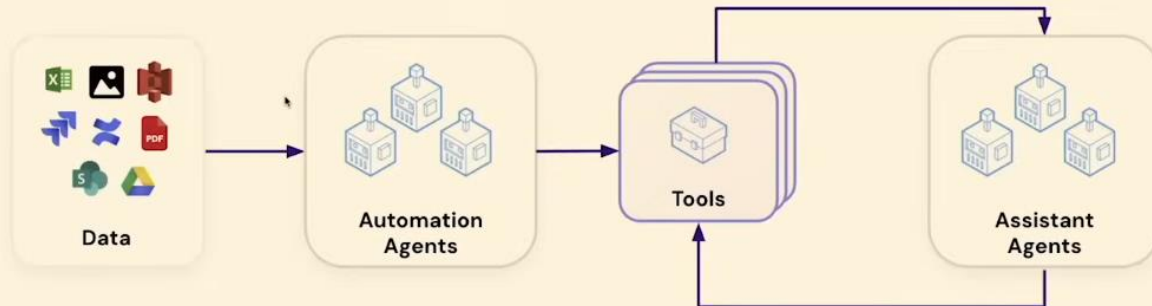
Agent Backend/Frontend

Automation agents

Automate data ETL, runs in background.

Assistant agents

Human interface over existing tools.



Not every tool depends on agentic reasoning, but **automation agents** can power the tool that assistants depend on.

26

Document Agent Use Cases

Real-world use cases of workflow automation



[Automation + Assistant UX] Financial Due Diligence

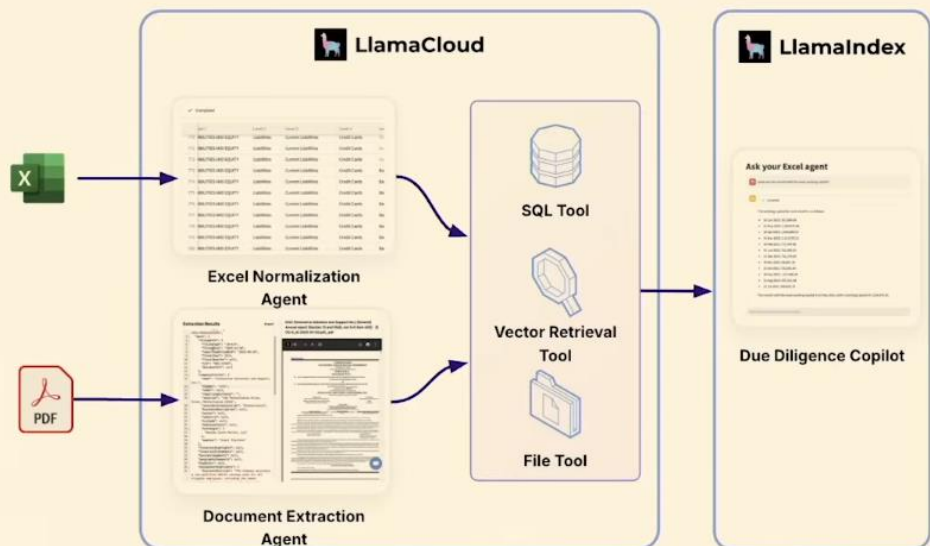
CARLYLE

Use Case

An e2e leveraged buyout agent

Impact

"This end-to-end agentic workflow to do a leveraged buyout model created decision-making value in the tens of millions of dollars."



[Assistant UX] Enterprise Search Chatbots



Use Cases

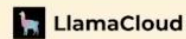
Service Center Assistant, Health and Safety Assistant, Technical Datasheet Analysis

Adoption

1k-3k+ users internally

Impact

Process a new data+RAG pipeline from weeks to minutes.



Document Index

Parse, chunk, and embed a large volume of data



Retrieval Tool(s)



Domain-specific chatbots

[Automation UX] Technical Datasheet Ingestion

Global Electronics Company

Use Cases

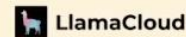
Electronics data enrichment, multi-supplier data standardization

Volume

300+ suppliers, 100K+ parts across 30K+ unique datasheets

Impact

Transform weeks of manual technical writer work into automated extraction



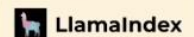
Attribute Extraction Agent

Parsing and Extraction

- Diagrams and Charts
- Formulas
- Tables



SQL Tool



Design Copilot



The Leading Platform for Document AI

LlamaIndex is the most accurate and customizable platform for automating your document workflows with agentic AI.

Backed By: Greylock, NVP



4M+
Monthly Downloads



41K+
GitHub Stars



200M+
Pages processed



150K+
Signups

300+ of the Fortune 500 use LlamaIndex

salesforce

KPMG

CARLYLE

CEMEX

T Systems

adyen

Rakuten

F500 Energy
Company

Leading
semiconductor chip
manufacturer

Global Staffing
Agency

Global Private
Investment Firm

Data Analytics +
Legal Tech
Company

Multinational Tire
Company

Global Investment
Bank

Leading Japanese
Tech Conglomerate

Electronics
Distributor +
Solutions Provider

Japanese
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Manufacturer

11x

Big 4 Audit Firm

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UNIVERSITY OF CALIFORNIA