

Agentic Price Estimator

Project Overview

This project is an end-to-end Agentic AI system that autonomously scans online platforms for the latest deals, evaluates product pricing using multiple intelligent agents, and sends real-time notifications to users. It uses a modular multi-agent architecture where each agent performs a specialized task such as deal scanning, price estimation, discount extraction, memory management, and user messaging.

A key component of the system is the Ensemble Pricing Engine, which combines predictions from a QLoRA-finetuned LLaMA model, a RAG-based price retriever, a Random Forest model, and a Linear Regression model to generate highly accurate estimated prices. The system collects product details, computes estimated and discount prices, captures the product URL, and sends updates to the user at configurable intervals.

To maintain continuity, the platform uses a persistent JSON memory store that prevents duplicate deal notifications and retains context across runs. All agents communicate using structured outputs, ensuring predictable, stable, and coordinated agent behavior.

The project leverages technologies such as QLoRA, RAG, Random Forest, Linear Regression, Python, Gradio, ChromaDB, Hugging Face, Modal, and Weights & Biases. Through custom LLaMA finetuning, the system achieved a significant accuracy improvement, increasing performance from 28% to 62.8%.

Project Architecture

UI (Gradio)

↓

Agent Framework (Memory, Logs)

↓

Planning Agent

↓

[Scanner Agent → Frontier Agent → Specialist Agent → Random Forest Agent]

↓

Ensemble Agent (Final price estimate)

↓

Messaging Agent (Alerts user)

Project execution Logs

```
PS C:\Users\Jayanth\projects\Price_Estimator\Project_Files\agent_files> conda activate llms
PS C:\Users\Jayanth\projects\Price_Estimator\Project_Files\agent_files> python price_is_right_final.py
* Running on local URL: http://127.0.0.1:7860
* To create a public link, set `share=True` in `launch()`.

[2025-12-02 23:42:55 -0500] [Agents] [INFO] [Agent Framework] Initializing Agent Framework
[2025-12-02 23:42:55 -0500] [Agents] [INFO] [Agent Framework] Initializing Agent Framework
[2025-12-02 23:42:55 -0500] [Agents] [INFO] [Planning Agent] Planning Agent is initializing
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[2025-12-02 23:42:55 -0500] [Agents] [INFO] [Specialist Agent] Specialist Agent is initializing - connecting to modal
[2025-12-02 23:42:55 -0500] [Agents] [INFO] [Specialist Agent] Specialist Agent is ready
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[2025-12-02 23:42:55 -0500] [Agents] [INFO] [Frontier Agent] Frontier Agent is setting up with OpenAI
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[2025-12-02 23:42:55 -0500] [Agents] [INFO] Use pytorch device_name: cpu
[2025-12-02 23:42:55 -0500] [Agents] [INFO] Use pytorch device_name: cpu
[2025-12-02 23:42:55 -0500] [Agents] [INFO] Load pretrained SentenceTransformer: sentence-transformers/all-MiniLM-L6-v2
[2025-12-02 23:42:55 -0500] [Agents] [INFO] Load pretrained SentenceTransformer: sentence-transformers/all-MiniLM-L6-v2
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[2025-12-02 23:42:55 -0500] [Agents] [INFO] Load pretrained SentenceTransformer: sentence-transformers/all-MiniLM-L6-v2
[2025-12-02 23:42:58 -0500] [Agents] [INFO] [Frontier Agent] Frontier Agent is ready
[2025-12-02 23:42:58 -0500] [Agents] [INFO] [Frontier Agent] Frontier Agent is ready
[2025-12-02 23:42:58 -0500] [Agents] [INFO] [Random Forest Agent] Random Forest Agent is initializing
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[2025-12-02 23:43:14 -0500] [Agents] [INFO] [Random Forest Agent] Random Forest Agent is ready
[2025-12-02 23:43:14 -0500] [Agents] [INFO] [Random Forest Agent] Random Forest Agent is ready
[2025-12-02 23:43:14 -0500] [Agents] [INFO] [Ensemble Agent] Ensemble Agent is ready
[2025-12-02 23:43:14 -0500] [Agents] [INFO] [Ensemble Agent] Ensemble Agent is ready
[2025-12-02 23:43:14 -0500] [Agents] [INFO] [Messaging Agent] Messaging Agent is initializing
[2025-12-02 23:43:14 -0500] [Agents] [INFO] [Messaging Agent] Messaging Agent is initializing
[2025-12-02 23:43:14 -0500] [Agents] [INFO] [Messaging Agent] Messaging Agent has initialized Pushover
[2025-12-02 23:43:14 -0500] [Agents] [INFO] [Messaging Agent] Messaging Agent has initialized Pushover
[2025-12-02 23:43:14 -0500] [Agents] [INFO] [Planning Agent] Planning Agent is ready
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[2025-12-02 23:43:14 -0500] [Agents] [INFO] [Agent Framework] Agent Framework is ready
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Below is the output screenshot. Where it shows the history of the deals which was notified to the user. When I click on the row, it will retrigger the notification to the user.

The Price is Right - Autonomous Agent Framework that hunts for deals

A proprietary fine-tuned LLM deployed on Modal and a RAG pipeline with a frontier model collaborate to send push notifications with great online deals.

Deals found so far	Price	Estimate	Discount	URL
The Samsung Galaxy Watch Ultra is a premium 47mm LTE Titanium smartwatch designed for both style and functionality. It features a circular display made with durable materials suitable for outdoor activities, providing GPS tracking, health monitoring, and custom apps for various needs. The robust design integrates a range of smart features including notifications, music control, and heart rate tracking, making it an ideal companion for fitness enthusiasts and tech-savvy users alike.	\$350.00	\$773.81	\$423.81	https://www.dealnews.com/Samsung-Galaxy-Watch-Ultra-47-mm-LTE-Titanium-Smartwatch-up-to-350-off-w-Trade-in-free-shipping/21663266.html?iref=rss-c142
The Refurbished Unlocked Apple iPhone 14 Pro Max offers an impressive 256GB storage and a huge display, perfect for both media consumption and productivity. Enjoy advanced camera technology for stunning photos. This model is designed to provide a seamless user experience with 5G capabilities for faster downloads and streaming. Refurbished to high standards, it comes in various colors and can support all the latest apps from the App Store, accommodating any Apple enthusiast's needs.	\$705.00	\$930.88	\$225.88	https://www.dealnews.com/products/Apple/Unlocked-Apple-iPhone-14-Pro-Max-256-GB-Smartphone/462808.html?iref=rss-c142

It includes HDR10+ and HLG support for a superior viewing experience. The TV operates on the Tizen OS, which seamlessly integrates with Alexa and Google Assistant, allowing for easy voice control. With multiple HDMI and USB ports, it offers versatile	\$248.00	\$670.64	\$422.64	https://www.dealnews.com/products/Samsung/Samsung-UN55-U7900-XXZAA-U7900-Series-55-4-K-UHD-LED-Smart-Tizen-TV-2025/492330.html?iref=rss-c142
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[Random Forest Agent] Random Forest Agent is initializing
```



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[Frontier Agent] Frontier Agent is ready
[Random Forest Agent] Random Forest Agent is initializing
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```
[Random Forest Agent] Random Forest Agent is ready
[Ensemble Agent] Ensemble Agent is ready
[Messaging Agent] Messaging Agent is initializing
[Messaging Agent] Messaging Agent has initialized Pushover
```

Use via API 🚀 · Built with Gradio 🎨 · Settings ⚙️

11:49

47%



All Messages

Search

P

Pricer

11:49 PM

Deal Alert! Price=\$705.00,
Estimate=\$930.88,
Discount=\$225.88 :The Refurb... <https://www.dealnews.com/products/Apple/Unlocked-Apple-iPhone-14-Pro-Max-256-GB-Smartphone/462808.html?iref=rss-c142>

P

Pricer

11:45 PM

Deal Alert! Price=\$350.00,
Estimate=\$773.81,
Discount=\$423.81 :The Samsun... <https://www.dealnews.com/Samsung-Galaxy-Watch-Ultra-47-mm-LTE-Titanium-Smartwatch-up-to-350-off-w-Trade-in-free-shipping/21663266.html?iref=rss-c142>

P

Pricer

Nov 16

Deal Alert! Price=\$163.00,
Estimate=\$490.78,
Discount=\$327.78 :The iRobot... <https://www.dealnews.com/products/iRobot/iRobot-Roomba-Combo-j5-Self-Emptying-Robot-Vacuum-Mop/495750.html?iref=rss-f1912>

P

Pricer

Nov 16

Deal Alert! Price=\$163.00