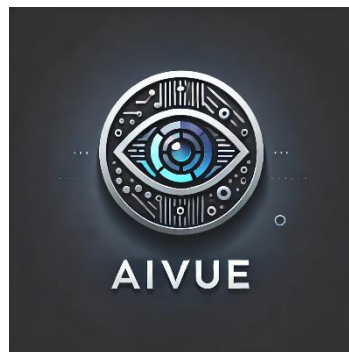






PROJECT PROPOSAL (SYNOPSIS)
of
MASTER OF COMPUTER APPLICATIONS
(MCA_NEW)

on



To

Project Co-ordinator(MCA_NEW)

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AI-Powered Real-Time Object Detection and Price Finder Tool (AIVue)

Introduction



This project aims to create an **AI-powered tool** capable of detecting objects in real-time from images and video streams. Once identified, the tool will retrieve the latest price and location details of the detected items. Users can interact with the tool via a '**Real-Time Details**' button that displays a summary in tabular format, showing item descriptions, current prices, and availability at nearby stores (online or offline).

The system addresses the increasing demand for intelligent shopping tools by providing users with up-to-date information on items they encounter in videos or images. The **core functionality** lies in detecting objects through advanced computer vision techniques, including **YOLO models**, and retrieving pricing data using APIs or web scraping tools. The results are presented in a **user-friendly tabular format**, showing the item's price and availability across multiple locations or platforms.

The tool not only assists in **product identification** and **price comparison** but also aids users by mapping nearby stores where the items are available, using **Google Places API**. This project provides a valuable solution for modern consumers by enabling **intelligent purchasing decisions** directly from videos or images.

Overview of Artificial Intelligence (AI)

Artificial Intelligence (AI) is a field of computer science focused on creating machines that can simulate human intelligence. AI enables systems to **perceive, learn, reason, and make decisions** to solve complex problems without explicit human intervention. The technologies that constitute AI include **machine learning (ML)**, **natural language processing (NLP)**, **computer vision**, and **robotics**. These systems leverage large datasets and sophisticated algorithms to develop self-improving models.



AI in the Context of E-commerce and Consumer Solutions

In recent years, AI has revolutionized the **e-commerce sector**, enhancing customer experiences and providing businesses with innovative ways to engage with consumers. AI solutions like **object detection**, **product recommendation systems**, **chatbots**, and **dynamic pricing models** have redefined how products are showcased and sold online.

AIVUE leverages AI, particularly **computer vision and real-time data analytics**, to bridge the gap between **physical world products** and **digital retail platforms**. This application ensures that consumers can identify items they see in videos or images and instantly access their real-time prices, availability, and store locations, facilitating **informed purchasing decisions**.

AI and User Experience: Enhancing Convenience

Traditional shopping involves either visiting stores physically or browsing e-commerce websites. **AIVUE** provides a new dimension to **visual shopping**, where users can simply upload **images or videos** of any product they encounter in their day-to-day life and instantly receive **real-time pricing details**. This **AI-driven visual shopping assistant** simplifies decision-making, eliminating the need for extensive manual searches on multiple e-commerce platforms.

The AI engine not only identifies the items but also ensures that the prices are fetched **from multiple e-commerce stores** (like Amazon or Flipkart) in real-time. Furthermore, **Google Places API integration** ensures that users can locate nearby stores where the identified items are available.

Why AI is Critical for AIVUE

AI technologies are essential for AIVUE because:

1. **Speed and Accuracy:** Real-time detection and price retrieval depend on fast and precise algorithms.
2. **Scalability:** The system can handle a **large number of user uploads and API calls** seamlessly.
3. **User-Centric Design:** AI adapts based on user behavior, making the tool more intuitive and useful over time.
4. **Automation:** Reduces the need for manual searching and shopping comparisons, saving time for users.



Objectives

- 1. Detect objects accurately from image and video inputs using computer vision models.**
- 2. Fetch real-time price details of identified items from various e-commerce platforms.**
- 3. Display itemized information, including store location and pricing, in a tabular format.**
- 4. Create a web-friendly interface to allow users to interact with the tool efficiently.**
- 5. Enable seamless integration with other web applications.**
- 6. Provide users with relevant data to enhance their purchasing decisions.**
- 7. Providing a Unique Experience to Customer**



Project Category

- **Artificial Intelligence (AI) and Machine Learning (ML)**
- **Computer Vision:** Object detection and classification.
- **Web Application Development:** Frontend-backend integration.

Architecture and System Flow (Working Process)

This project follows a **three-tier architecture**:

1. Presentation Layer (Frontend):

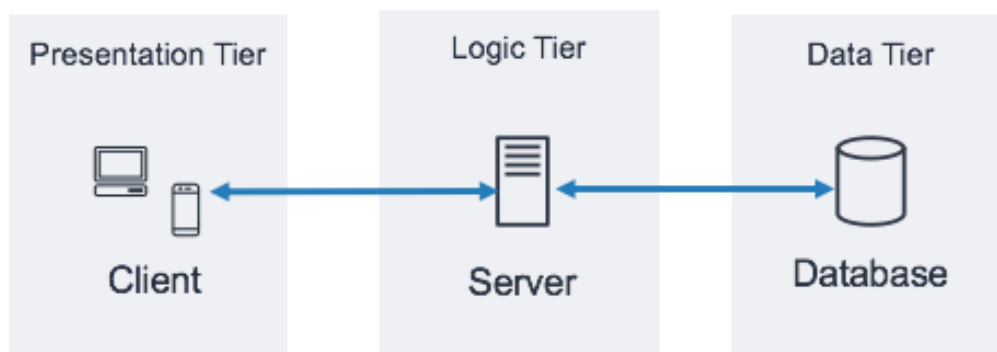
- Users upload images/videos and view results.
- 'Real-Time Details' button to trigger the price fetch operation.

2. Application Layer (Backend):

- Detects objects using models like YOLO.
- Fetches real-time data from APIs (Amazon, Flipkart, etc.).

3. Database Layer:

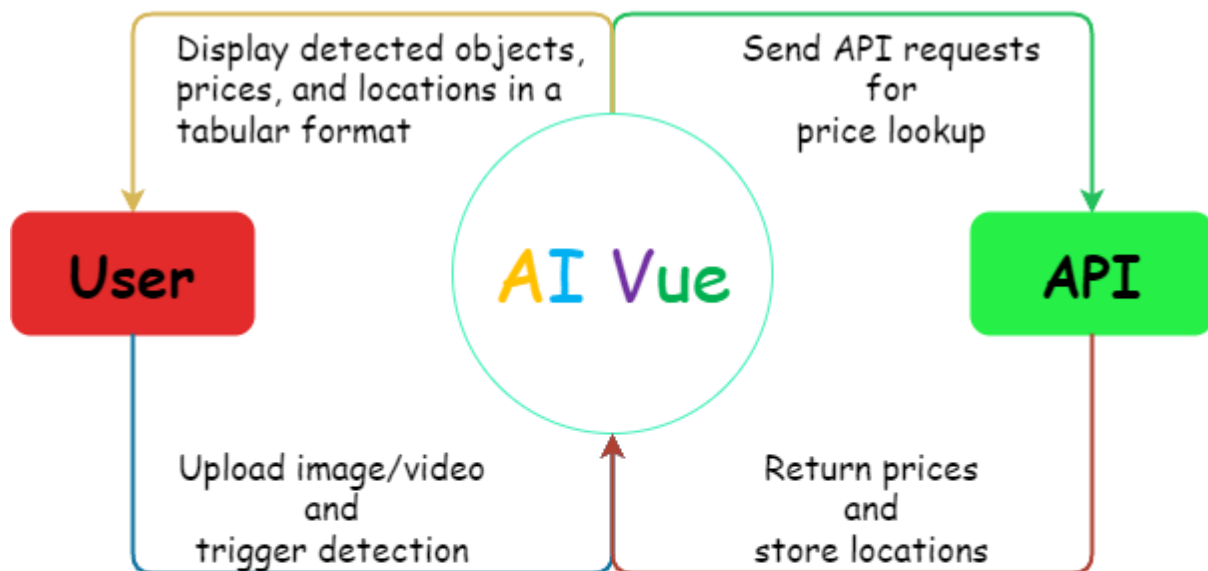
- Stores object metadata, user preferences, and session data.





Data Flow Diagram

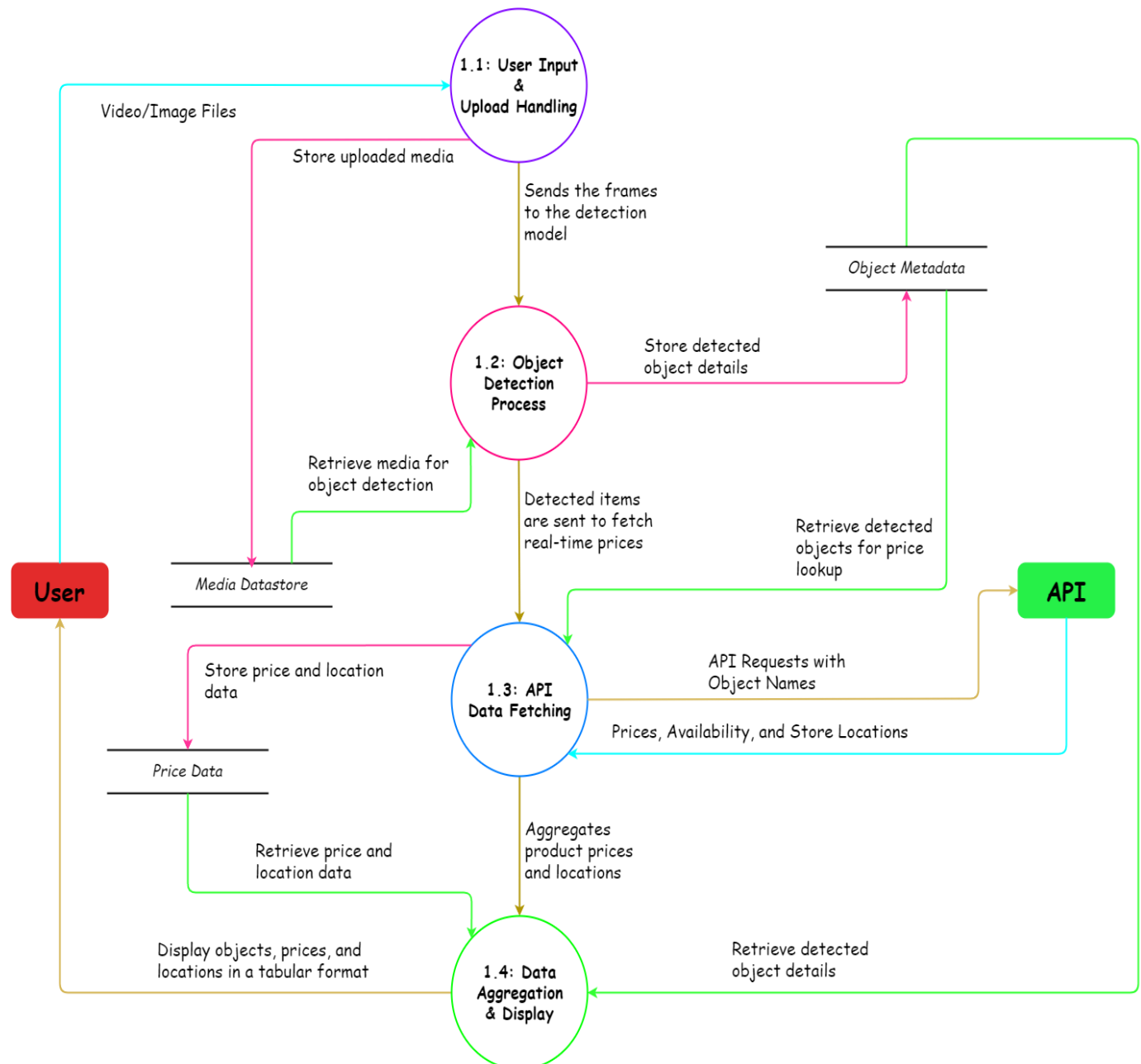
Context Level DFD



DFD Level-0
(Context Diagram)



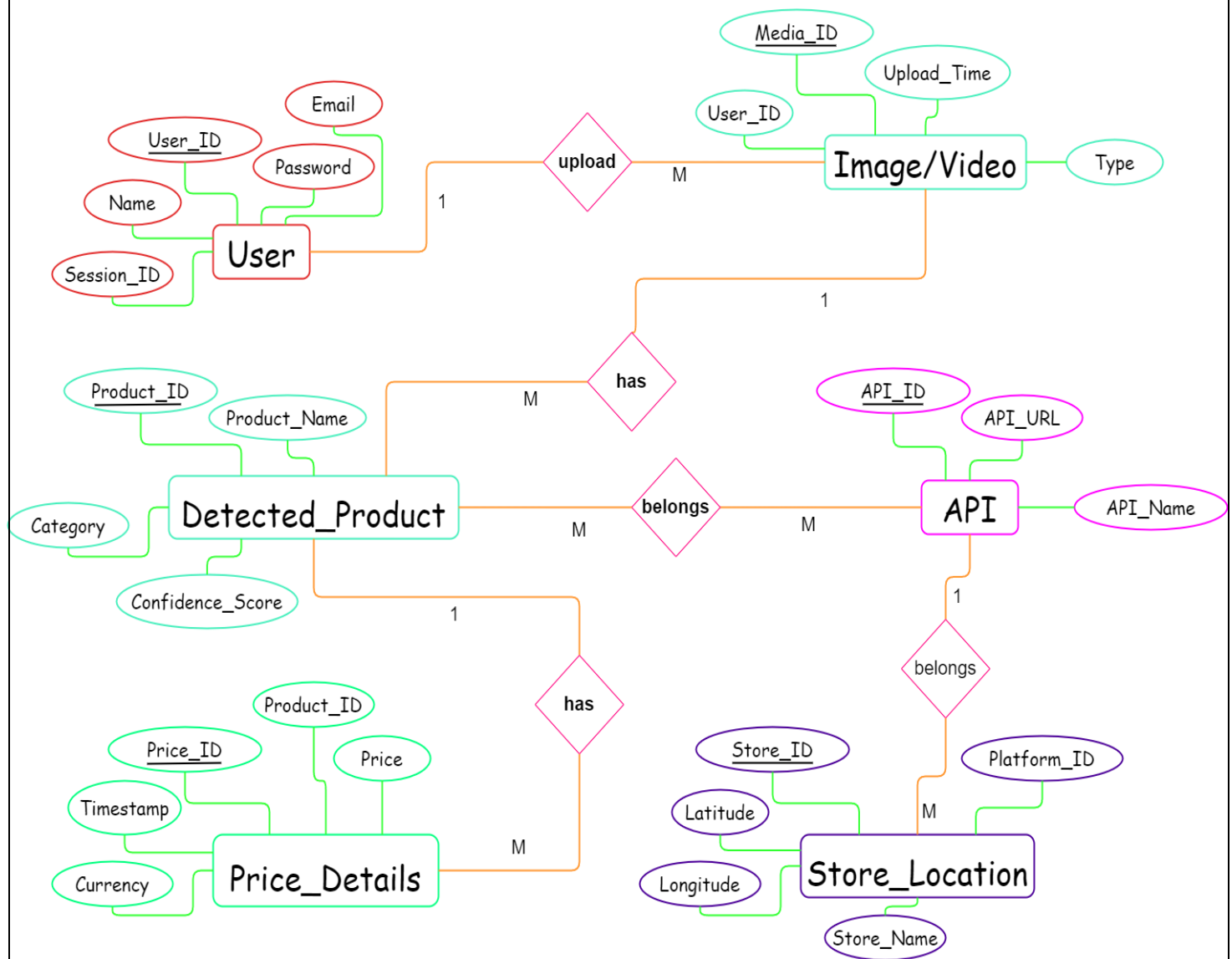
Level-1 DFD



DFD Level-1



Entity Relationship Diagram





Modules Description

1. Object Detection Module:

- Uses YOLO for frame-by-frame analysis of images and videos.

2. Price Lookup Module:

- Utilizes APIs and web scraping tools like BeautifulSoup to fetch real-time prices.

3. Web Interface Module:

- Built with Django and NextJs for seamless user interaction.

4. Data Display Module:

- Presents information in a tabular format with item names, prices, and store locations.



Tools, Platform, and Software Requirements

The **Hardware** which was used by me for developing the application are as under :-

- ✓ Processor (CPU) : i7 14700HX
- ✓ RAM : 16 GB
- ✓ GPU : RTX 4060 (8GB DDR6 VRAM)
- ✓ SSD (Storage) : 25 GB

The **software** which was required for developing the application are as under :-

- ✓ Operating System : Windows 11
- ✓ Database : MongoDB
- ✓ Documentation : Ms Word
- ✓ IDE : VS CODE

Programming Languages:

- ✓ Front End : Html, Css, Javascript
- ✓ Back End : Python

Frameworks and Libraries:

- ✓ Django for backend.
- ✓ NextJs and TailwindCss for frontend.
- ✓ OpenCV, YOLO for object detection.
- ✓ BeautifulSoup/Scrapy for price scraping.

APIs:

- ✓ Google Places API for location data.
- ✓ Amazon Product Advertising API for price data.



Testing Methodologies

- **White-Box Testing:** Verify internal logic and object detection models.
- **Black-Box Testing:** Ensure smooth integration between modules and APIs.

Levels of Testing

- ✓ **Unit Testing** : It is done at the level of each individual program.
- ✓ **Module Testing** : Testing a complete module, a collection of related program units to check if the module is working properly as a whole and producing the desired output is known as module testing.
- ✓ **Integration Testing** : In integration testing, the main purpose is to detect problems in interfaces between modules. Test communication between frontend, backend, and third-party APIs.
- ✓ **System Testing** : In system testing, we test the system as a whole with all parts integrated together in an operational environment. Validate performance with real-time data inputs.



Limitations

1. Requires a stable internet connection to fetch real-time prices and location data.
2. Accuracy may vary based on the quality of the input video/images.
3. Web scraping limitations if access to certain sites is restricted.

Future Scope

1. Expand the database to include more e-commerce platforms and price sources.
2. Integrate **voice assistance** to enhance usability.
3. Enable **multilingual support** to cater to a global audience.
4. Deploy on cloud platforms (e.g., AWS, GCP) for scalability.

Conclusion

This AI-powered tool bridges the gap between **computer vision** and **real-time price discovery**, offering users valuable insights from their visual inputs. Its seamless integration into web applications makes it a highly practical solution for e-commerce platforms and online shoppers, setting the foundation for future advancements in **intelligent shopping tools**.