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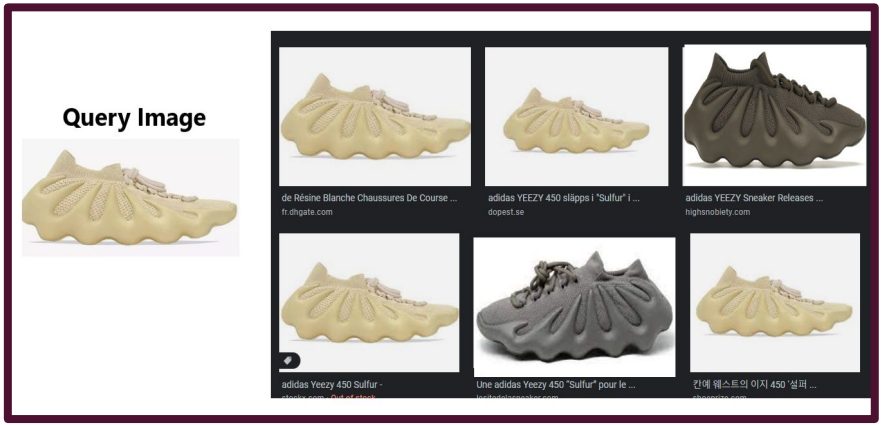
THEME & PROBLEM STATEMENT

Theme 2: Visual AI and Ecommerce

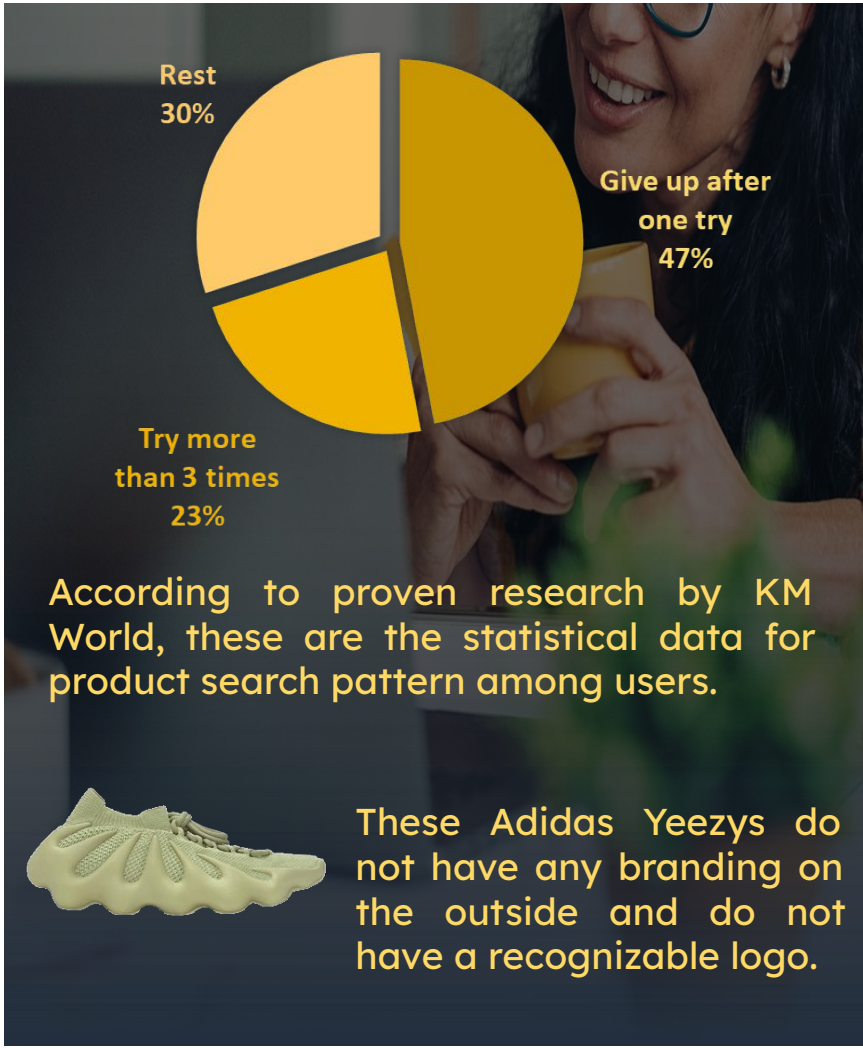
Develop an enhanced shopping experience by leveraging visual AI technology to improve product search, recommendations, and item identification in text, image or video content. Improve search functionalities and provide personalized product recommendations using image recognition and computer vision technology. Extend the X-ray feature from Amazon Prime Video to enable users to identify and directly purchase items featured in the video content, such as furniture, clothing, and other products. The goal is to create a more seamless, personalized, and engaging shopping experience for customers by harnessing the power of visual AI and computer vision technologies.

NEED FOR AI IN SHOPPING

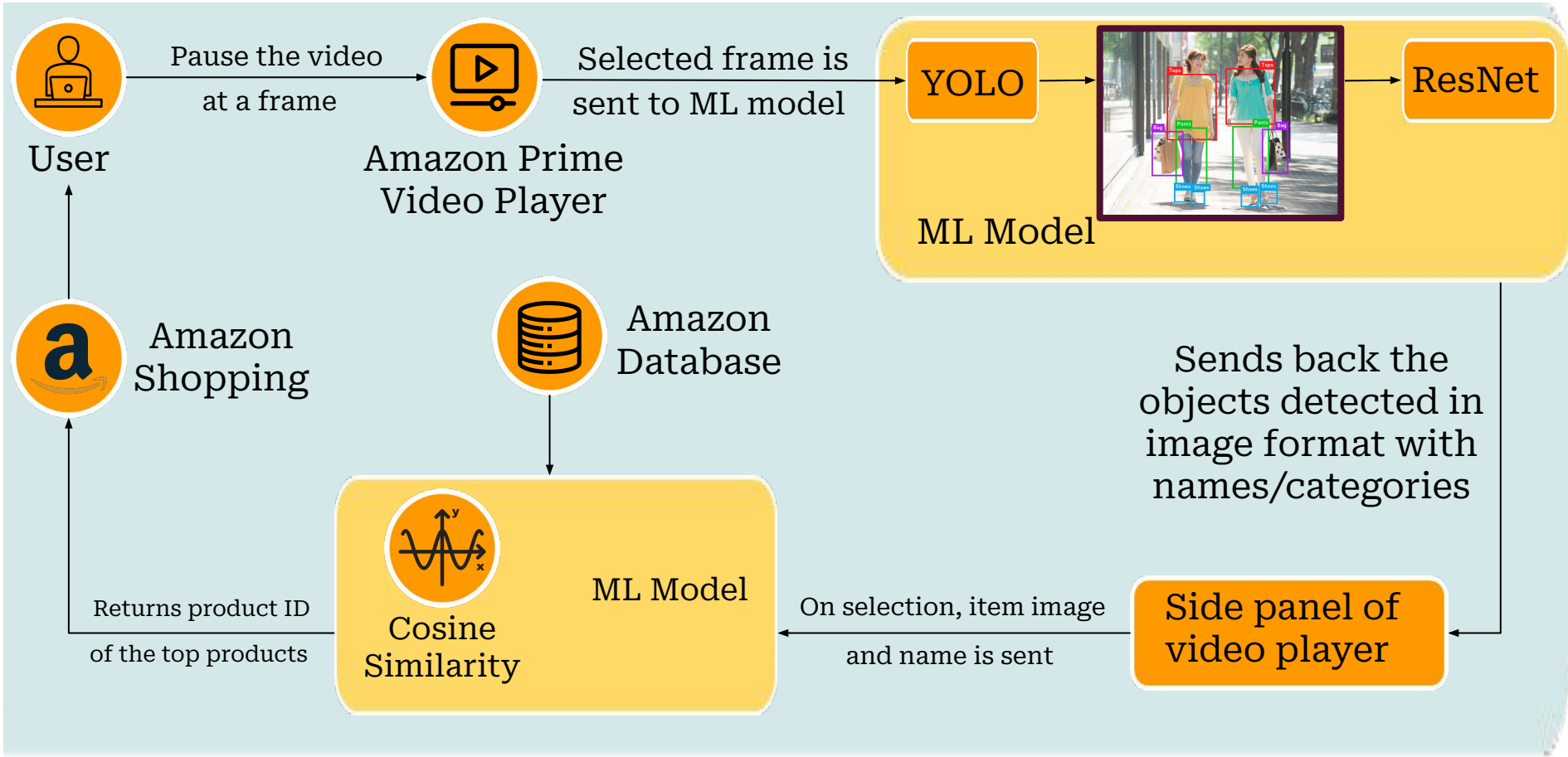
The market for AI technology in retail is projected to grow 32 percent a year, topping $85 billion by 2032, according to Fortune Business Insights.



Visual Search: With a query image, the customer can find all the available options, offers, and even colors much faster with a simple image upload. This allows the customer to shop without needing to figure out the best keyword, phrase, or description of the product that finds the best match according to them.



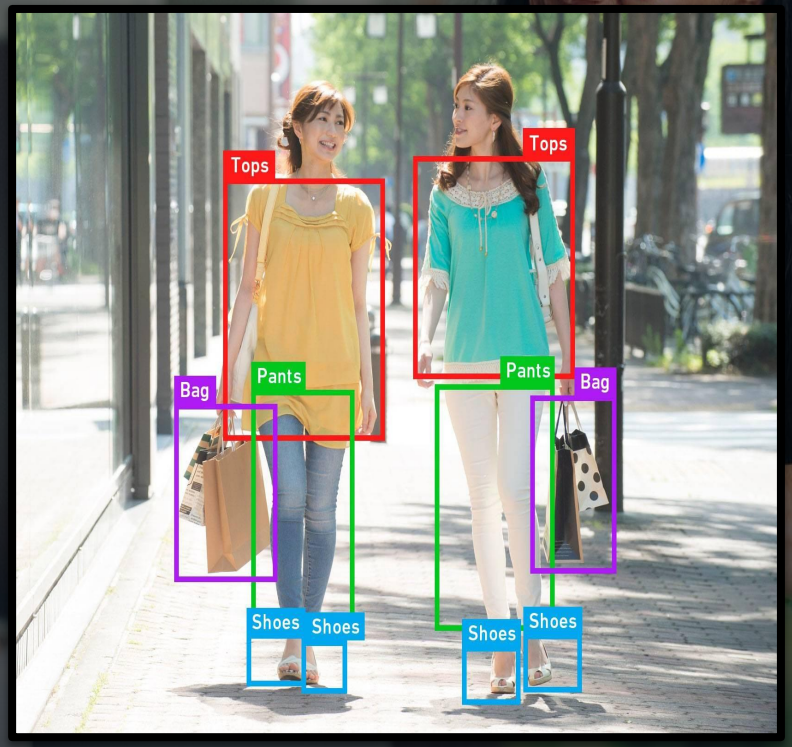
BLOCK DIAGRAM



YOLO

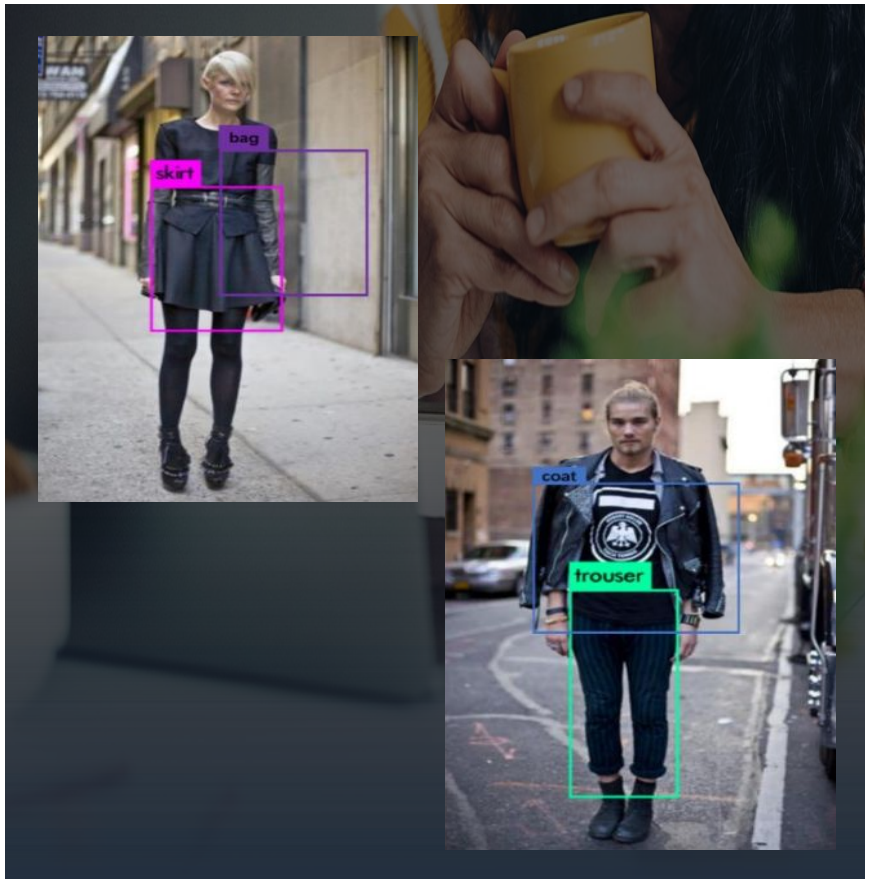
Integrating **YOLO(You Only Look Once)** for real-time product identification and tracking transforms shopping by enhancing customer engagement, streamlining operations, and creating a more efficient and enjoyable shopping experience.

YOLO model takes input as image or video and it detects various fashion accessories such as T-shirts, Pants, Tops etc.



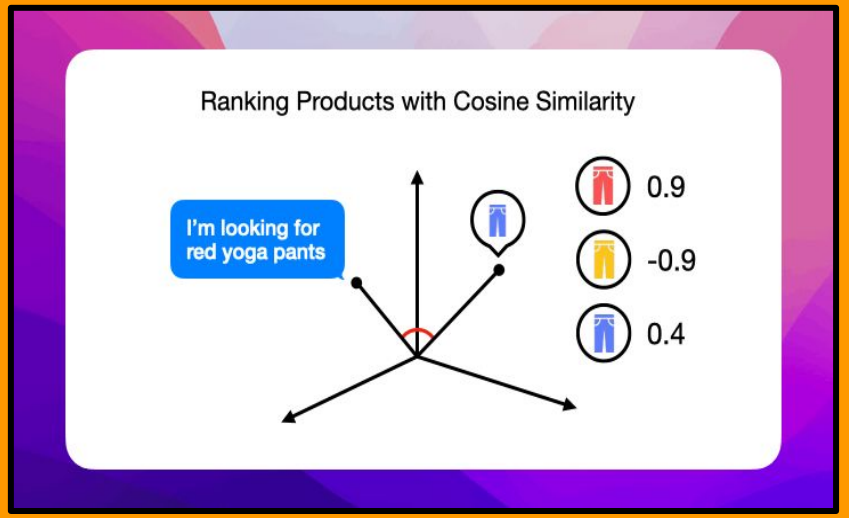
YOLO used for object detection

WORKING OF YOLO



- YOLO employs single CNN to predict **multiple bounding boxes** & **class probabilities**.
- Unlike traditional methods, YOLO treats detection as a **regression** problem, streamlining the process.
- Input image is divided into an **S×S grid**.
- Each grid cell predicts:
  - X,Y : Coordinates of the bounding box center relative to the grid cell.
  - W,H : Width and height relative to the image.
  - Confidence score : **Likelihood of the box containing an object** and the **accuracy** of the bounding box.
  - Class probabilities.

COSINE SIMILARITY



Cosine similarity is a measure of similarity between two non-zero vectors of an inner product space. it can be used to find how similar two items are based on their features, such as color, style, or other attributes.

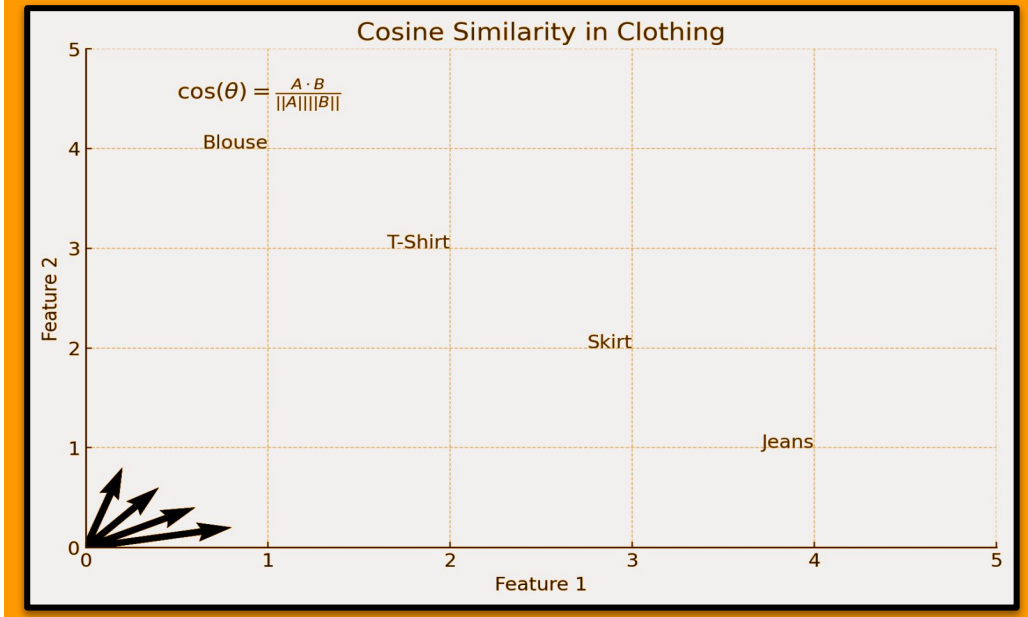
- Represents each item as a **vector** of features.For example, a shirt could be represented by its color, style, brand, etc.

WORKING OF COSINE SIMILARITY

- In a multi-dimensional space, where each dimension corresponds to a product , the cosine similarity captures the **orientation** (the angle) of the different products.

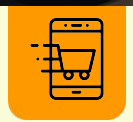
- Cosine Similarity formula:-

cosø=(A.B)/||A|.|B||



SUCCESS METRICS & IMPACT

We expect our model to improve User Satisfaction , higher Accuracy resulting in increased User Engagement.



Enhanced Shopping Experience

-Increases convenience.

-Allows personalization by allowing options.

-Makes more engaging & interactive shopping experience

Time Saving

-Efficient search.

-Immediate purchase of products seen in video content.

-Allows comparison among similar items aiding informed decision making.

For Customers

Increased Sales

-Personalized recommendations boost purchase rates.

-Enable instant purchases from videos to drive spontaneous sales.

Customer Insights

-Understand customer preferences through visual AI interaction data.

-Spot trends and popular products using visual search and recommendation data.

Competitive Advantage

-Establish as a leader in advanced AI-driven customer experiences.

-Distinguish by offering unique, cutting-edge features unmatched by competitors.

For Businesses

FUTURE SCOPE & OBJECTIVES

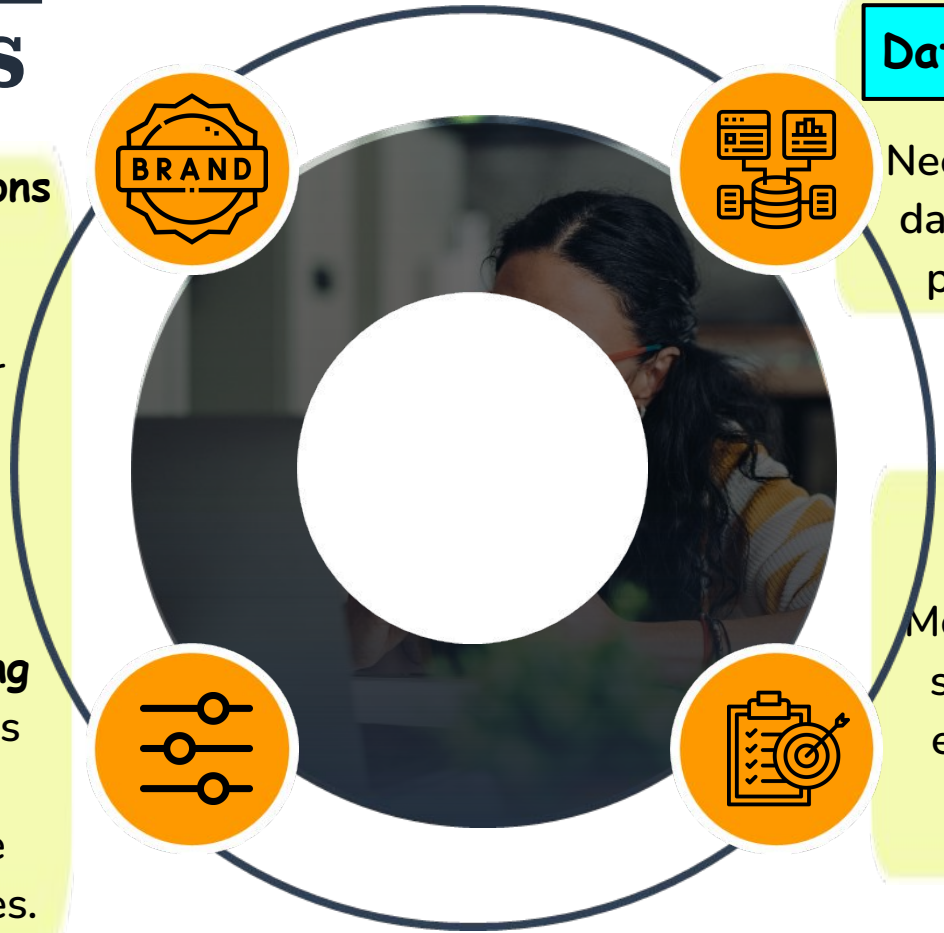
Brand-Specific Suggestions

Tailor product recommendations to user-preferred brands for increased relevance.

Future Scope

Attribute-Based Filtering

Differentiate product types (e.g., half sleeves vs. full sleeves shirts) for precise matches to user preferences.



Data Requirement

Need a comprehensive dataset with detailed product attributes.

Objective

More personalized and satisfying shopping experience through advanced technologies

SCALABILITY PROBLEMS

- **Large Volume of Images:**
  Storing and managing a large number of high-resolution images requires substantial storage and efficient indexing.

- **High Computational Load:**
  Image processing and feature extraction for a large number of images is computationally intensive.

- **Real-time Image Search:**
  Providing real-time search results can be challenging due to the latency involved in image processing and querying large datasets.

SOLUTIONS

- **Distributed Storage and Indexing:**
  Use cloud-based storage solutions that offer scalability and redundancy.
  Implement distributed indexing techniques that allow efficient searching across large datasets.

- **Efficient Image Processing Pipelines:**
  Develop pipelines that preprocess images (e.g., resizing, normalization) before feature extraction.
  Use batch processing to handle large volumes of images efficiently.

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Thank You!