

HABITUATE

An AI-driven habit-tracking app

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01

HELLO PROBLEM, HELLO SOLUTION

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Why did we make Habituate?





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- Habit formation and maintenance is challenging for many people.
- It's easy to miss subtle signs of waning motivation or changing routines.
 - *this quickly leads to abandoning positive habits!*
- Existing habit trackers often rely on simple manual logging.
 - *these lack the nuance to catch these early indicators of potential failure.*

RELATED WORK

The individual actions of people, whether related to eating, exercise, recreational drug use, or preventive and rehabilitative activities, directly impact the health risks associated with contemporary lifestyle. These risks must be modified for users to be effectively treated [1].

The ML-based system proposed by Gowthamani et al. [2022] analyzes user activity data obtained via a web application using machine learning methods. Relevant information is obtained from the user at login. After that, a binary classification algorithm trained on earlier user datasets is applied to this data. Whether a user's behavior is normal or needs care is determined by the system. With tasks completed, users can keep track of their progress and export the data as a PDF [2].

Habit Driven, an AI-powered app, assists in the development of habits and goal-achieving. It provides consumers with an all-encompassing method for encouraging beneficial behavioral changes through the use of tailored tracking, professional advice, and informative material delivery. The user logs their daily activity in a form, which is analyzed using AI for goal tracking, based on which a chatbot provides insights upon request [3].

But these still work with manual logging and do not motivate people when they slack!



ha·bit·u·ate

/hə'biCHə,wāt/

make or become
accustomed or used
to something.

OXFORD DICTIONARY

- Anomaly detection will identify early signs of disorganization or clutter in a user's workspace.
- By analyzing images of meals, the tracker will help users identify unhealthy food patterns and make more informed dietary choices.



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02

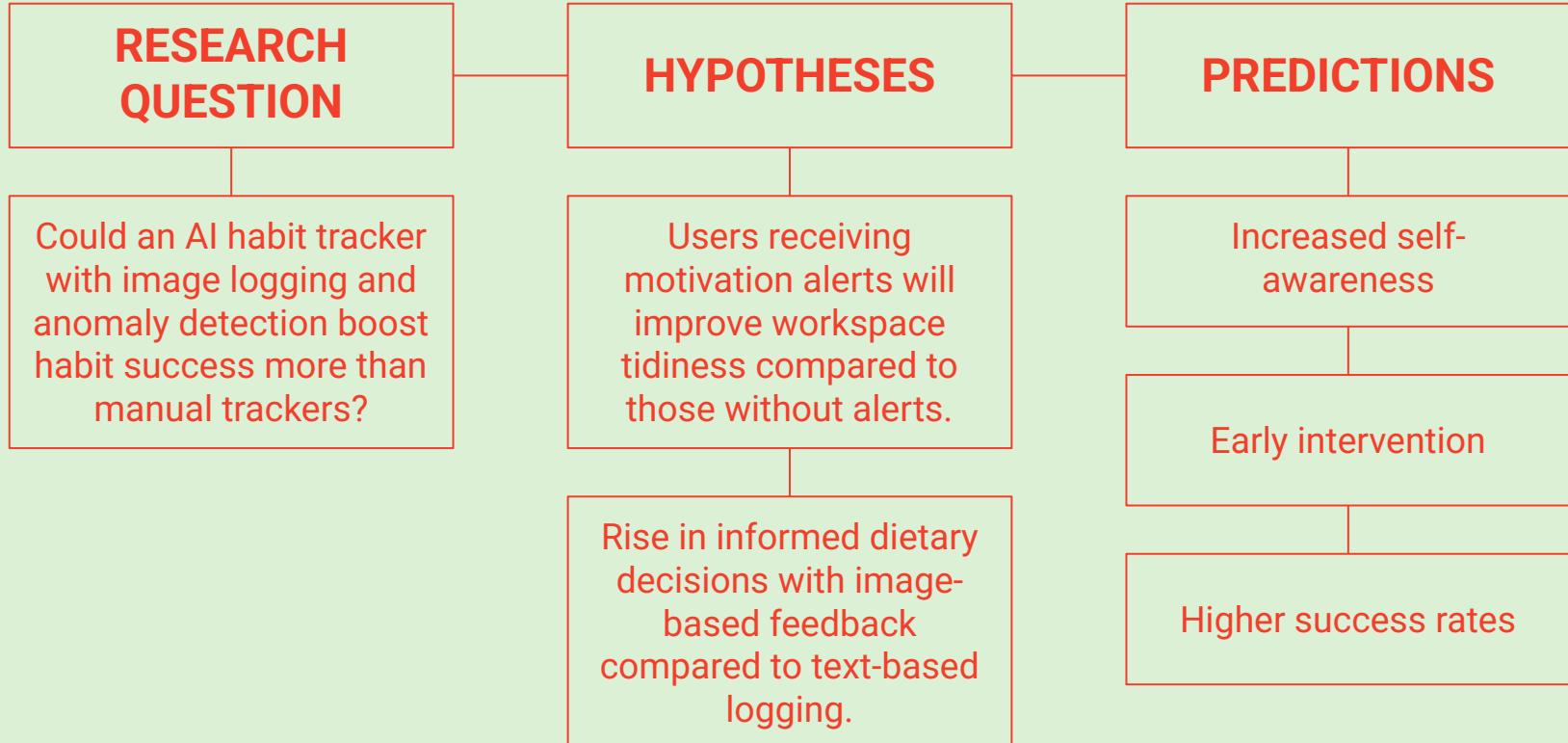
THE STUDY

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Research question, hypotheses, and predictions





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03

THE PROCESS

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App workflow, project pipeline, and resources

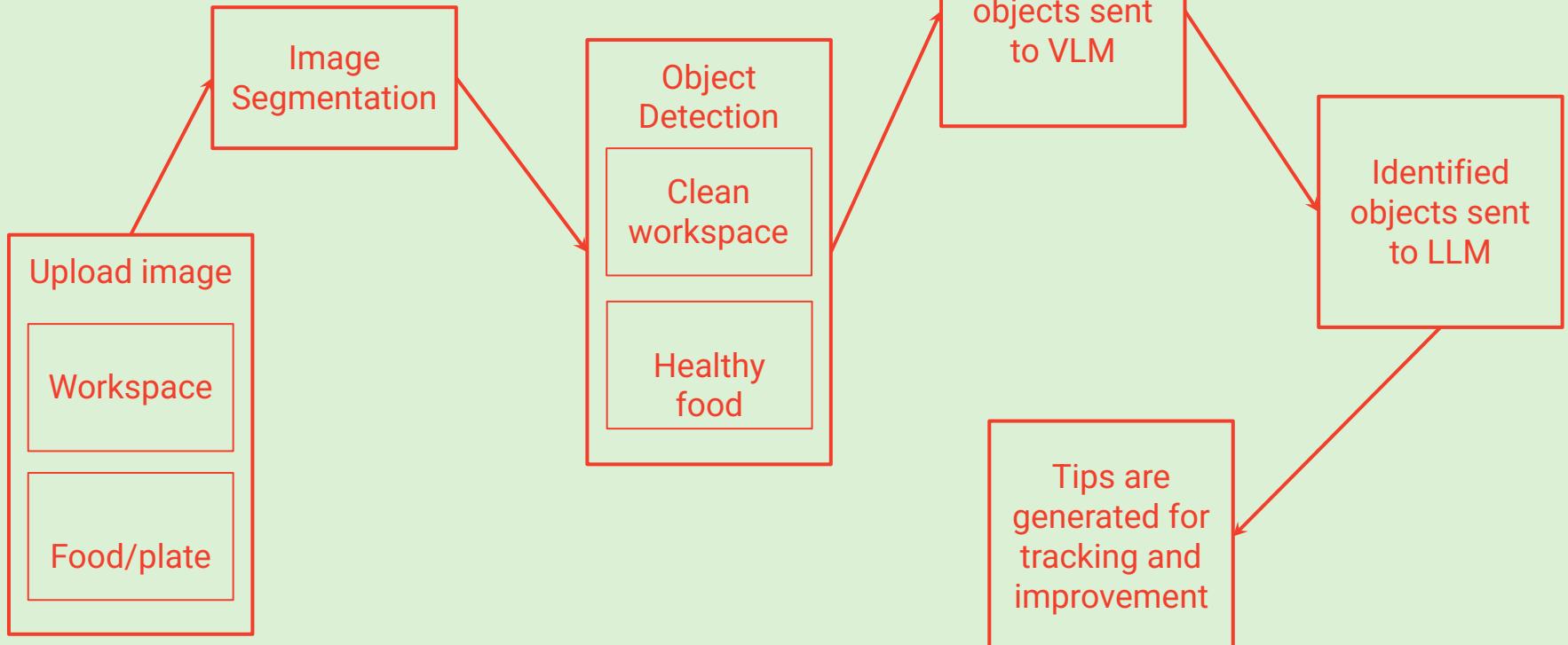




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APP WORKFLOW





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RESOURCES USED



MODELS

- ResNet
- RetinaNet
- Visual Transformer
- Facebook Detr
- YOLOv8
- YOLOv5
- MoonDream2
- Mixtral-7B



TOOLS & PLATFORMS

- Gradio
- RN Camera API
- ChromaDB
- FAISS
- Langchain
- Llama
- Roboflow
- HuggingFace



COMPUTE

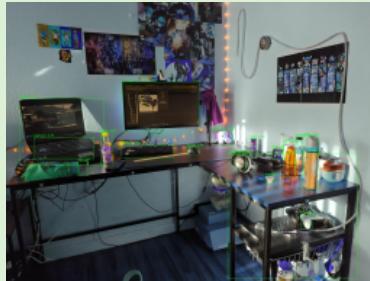
- vast.ai
- Google Colab GPUs
- ASU Sol



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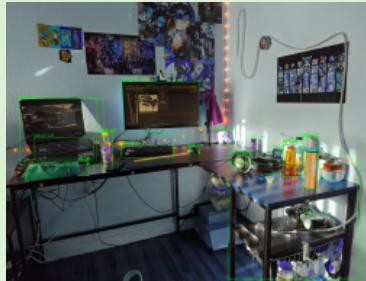


ResNet



- Strong ability to detect larger objects, such as monitors and chairs, with high confidence.
- It occasionally missed smaller items like pens or notebooks.

RetinaNet



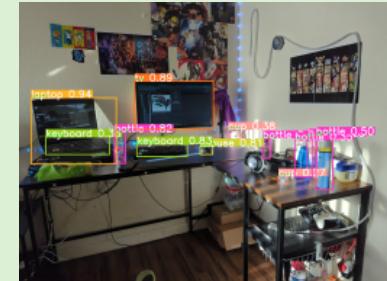
- Performed well in detecting both large and small objects.
- Its precision in bounding box placement was notable.
- Suffers from multiple bounding boxes

ViT



- ViT excelled in recognizing objects with complex shapes and in cluttered scenes.
- It was particularly good at identifying overlapping objects.

YOLOv8



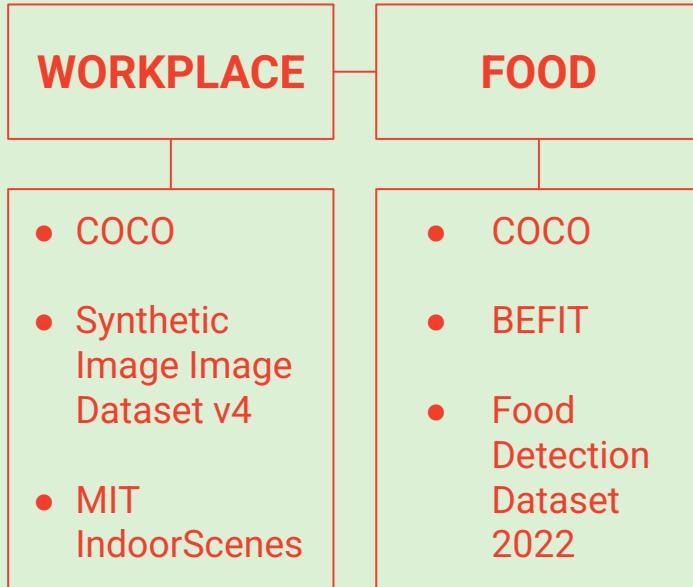
- YOLOv8 demonstrated exceptional speed and accuracy.
- It reliably detected a wide range of objects with high confidence scores.



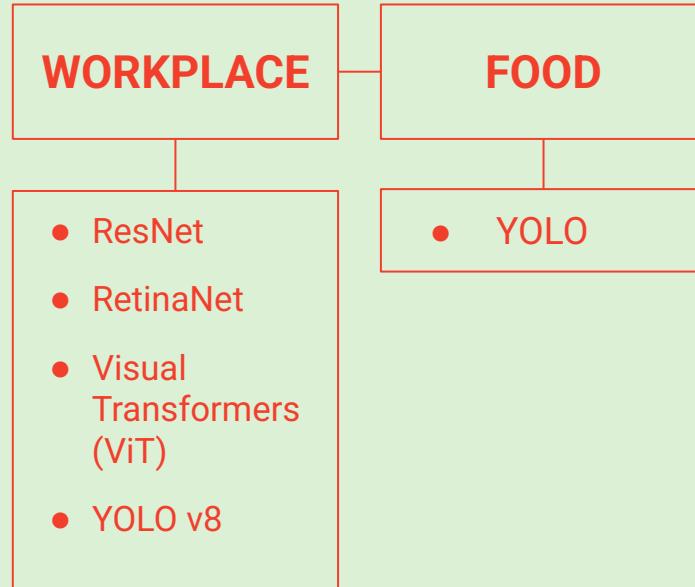
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DATASETS CONSIDERED FOR OBJECT DETECTION



MODELS CONSIDERED FOR OBJECT DETECTION





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04 THE RESULT

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How did Habituate perform?





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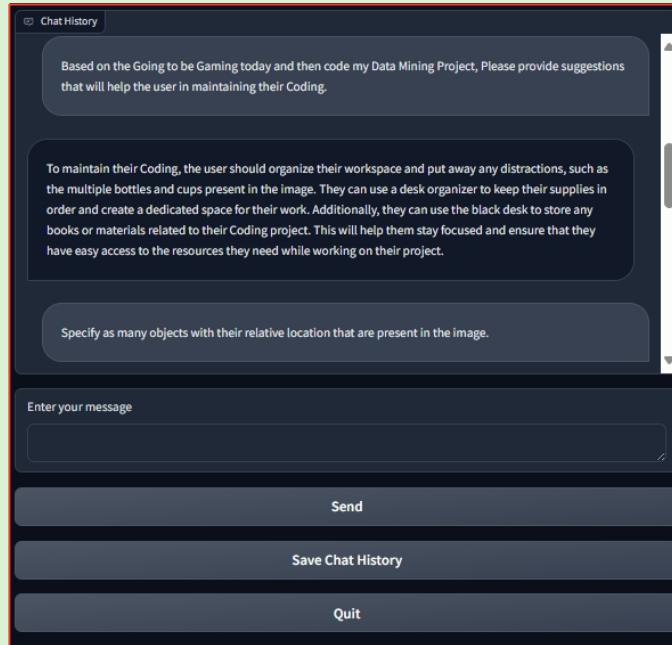
Demo



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Desk Organization Detection and LLM



Once we feed the image into the system and provide it with a caption for context, object detection takes place underneath the hood, and results are sent to the LLM through a chat-like interface, which generates tips for improved focus.



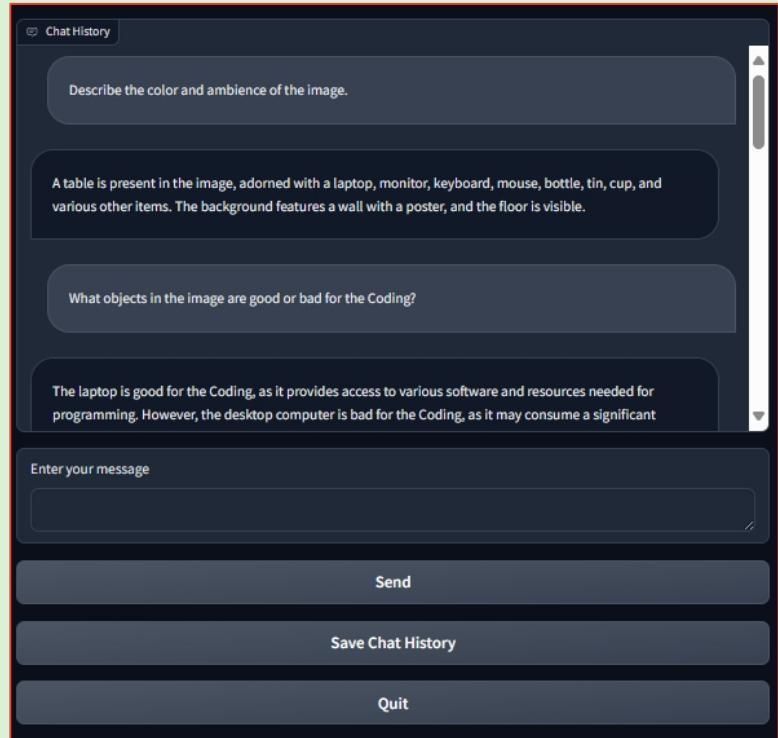
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Desk Organization Detection and LLM

```
 1 image_id "enhanced_image.jpg_23240413040329"
 2 image_path "enhanced_image.jpg"
 3 caption "Going to be Gaming today and then code my Data Mining Project"
 4 timestamp "2024-04-13 04:52:06"
 5 objects_detected [ 16 items
    0 "Keyboard (0.94)"
    1 "Keyboard (0.98)"
    2 "Mouse (0.97)"
    3 "Cup (0.96)"
    4 "Bottle (0.98)"
    5 "Monitor (0.98)"
    6 "Laptop (0.98)"
    7 "Laptop (0.98)"
    8 "Cell phone (0.98)"
    9 "Cup (0.98)"
    10 "Laptop (0.98)"
    11 "By (1.00)"
    12 "Bottle (0.98)"
    13 "Keyboard (0.98)"
    14 "Bottle (0.97)"
    15 "Bottle (0.97)"
  ]
 6 chat_history [ 7 items
    0 [ 2 items
      0 "Describe the color and ambience of the image."
      1 "A table is present in the image, adorned with a laptop, monitor, keyboard, mouse, bottle, tin, cup, and various other items. The background features a wall with a poster, and the floor is visible."
    ]
    1 [ 2 items
      0 "What objects in the image are good or bad for the Coding?"
      1 "The laptop is good for the Coding, as it provides access to various software and resources needed for programming. However, the desktop computer is bad for the Coding, as it may consume a significant amount of power and generate more heat, which could negatively impact the performance and lifespan of the components. Additionally, the desktop computer has a larger footprint, which may make it more difficult to maintain cleanliness and organization."
    ]
  ]
 7 [ 2 items
  ]
```

Details of the detected objects in the workspace along with the caption and chat history are stored in a JSON file to provide some background information for future tip generation and long-term habit tracking. Chats will be continually saved in the JSON.





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FOOD DETECTION

Upload Image



Chat History

Image processed and saved to JSON.

What am I eating for dinner?

For dinner, I am having a meal that includes rice, meat, and vegetables. The meat appears to be chicken, and the vegetables are carrots. The meal is served in a white tray.

Enter Image Caption

I ordered Chinese takeout today.

Enter your message

What am I eating for dinner?

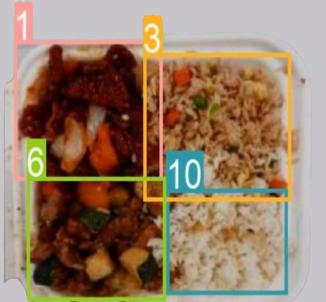
▼ root

▼ 0

- image_id "uploaded_image.jpeg_20240412145034"
- image_path "uploaded_image.jpeg"
- caption "I ordered Chinese takeout today."
- timestamp "2024-04-12 14:50:34"

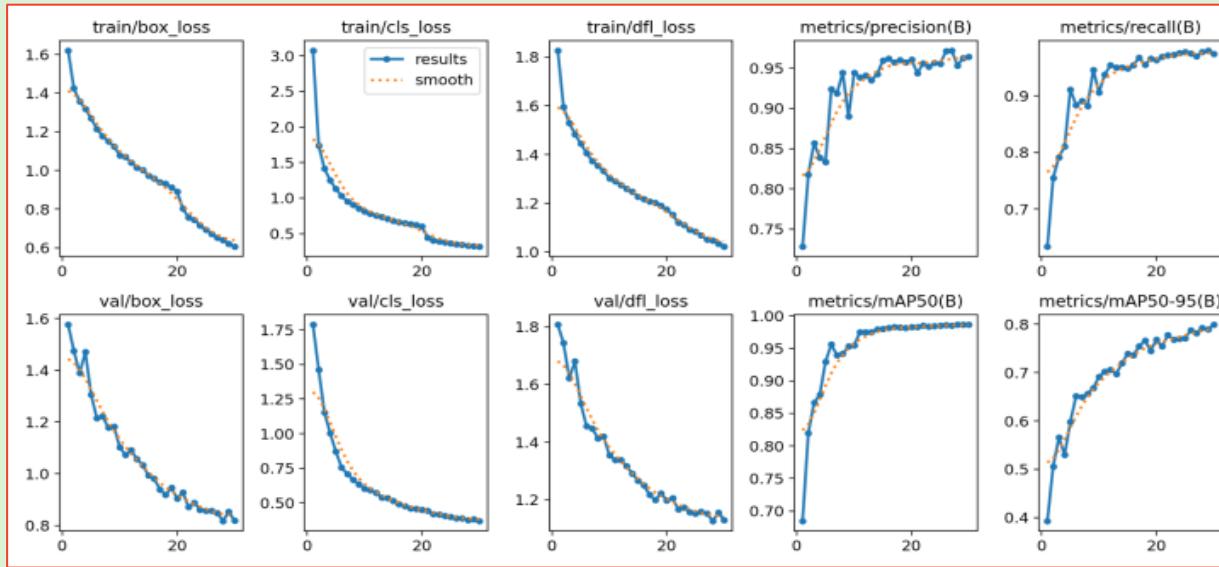
▼ objects_detected [4 items]

- 0 "Kung Pao Chicken"
- 1 "Beijing Beef"
- 2 "White Steamed Rice"
- 3 "Fried Rice"



Similarly, the same actions can be performed for the food detection, with the results being stored in a JSON file. YOLOv5 performs well in terms of object detection, but the VLM is weak in identifying the exact nature of the food and providing detailed insights.

FOOD DETECTION



In terms of performance, YOLOv5 was trained for 100 epochs on a 36-class dataset. The train and validation loss constantly decrease, with increasing precision - this indeed is a successful model for this app.



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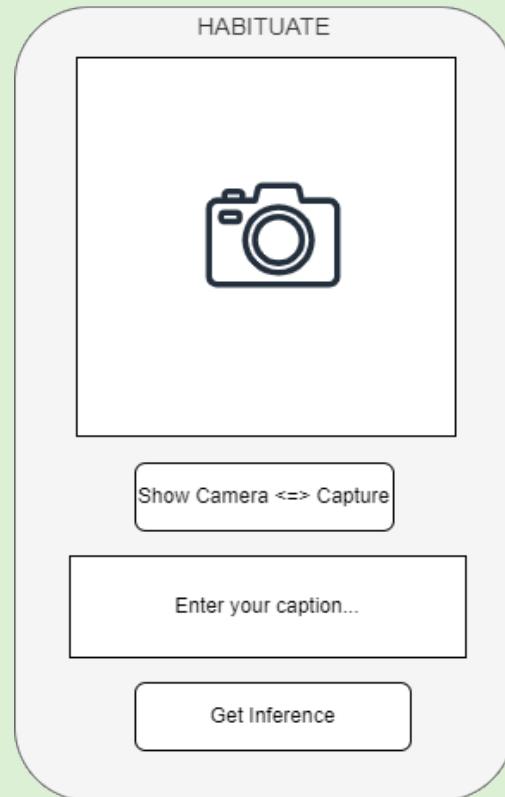


FUTURE WORK - WEB AND MOBILE OFFERING

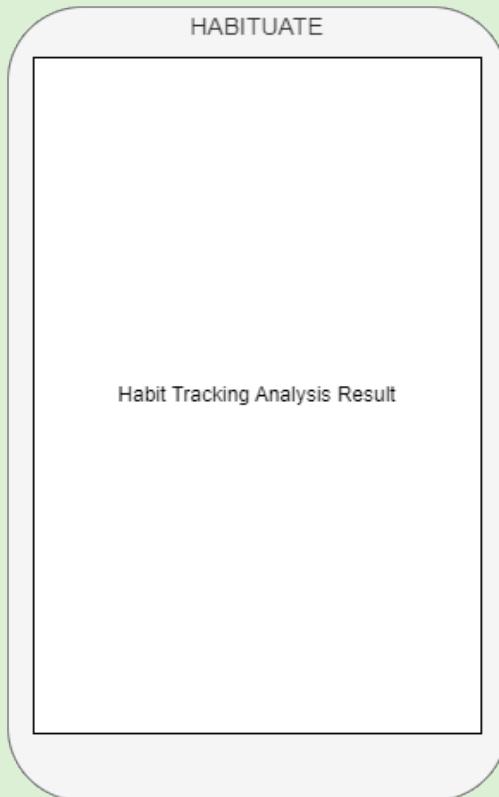
We are creating an app! The future plan is to create Django servers to host the app so you can track your habits real-time.

We also intend to improve the tip generation component for food detection using LLMs specially trained to give nutritional advice.

Screen 1



Screen 2





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REFERENCES

- [1] Sarbadhikari, Suptendra Nath, and Jyotika Maggo Sood. "Gamification for nurturing healthy habits." *The National Medical Journal of India* 31, no. 4 (2018): 253-254.
- [2] Gowthamani, R., K. Sasi Kala Rani, M. Indira Priyadarshini, M. Rohini, Grace Ebenezer, and Emma Thomas. "Web Based Application for Healthy Habit Development Through Gamification with ML." In *2022 4th International Conference on Smart Systems and Inventive Technology (ICSSIT)*, pp. 1338-1345. IEEE, 2022.
- [3] Mike Jalonen. 2023. It's time to be habit driven.... Habit Driven. <https://habitdriven.ai/>

THANKS!

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We are happy to answer any questions.