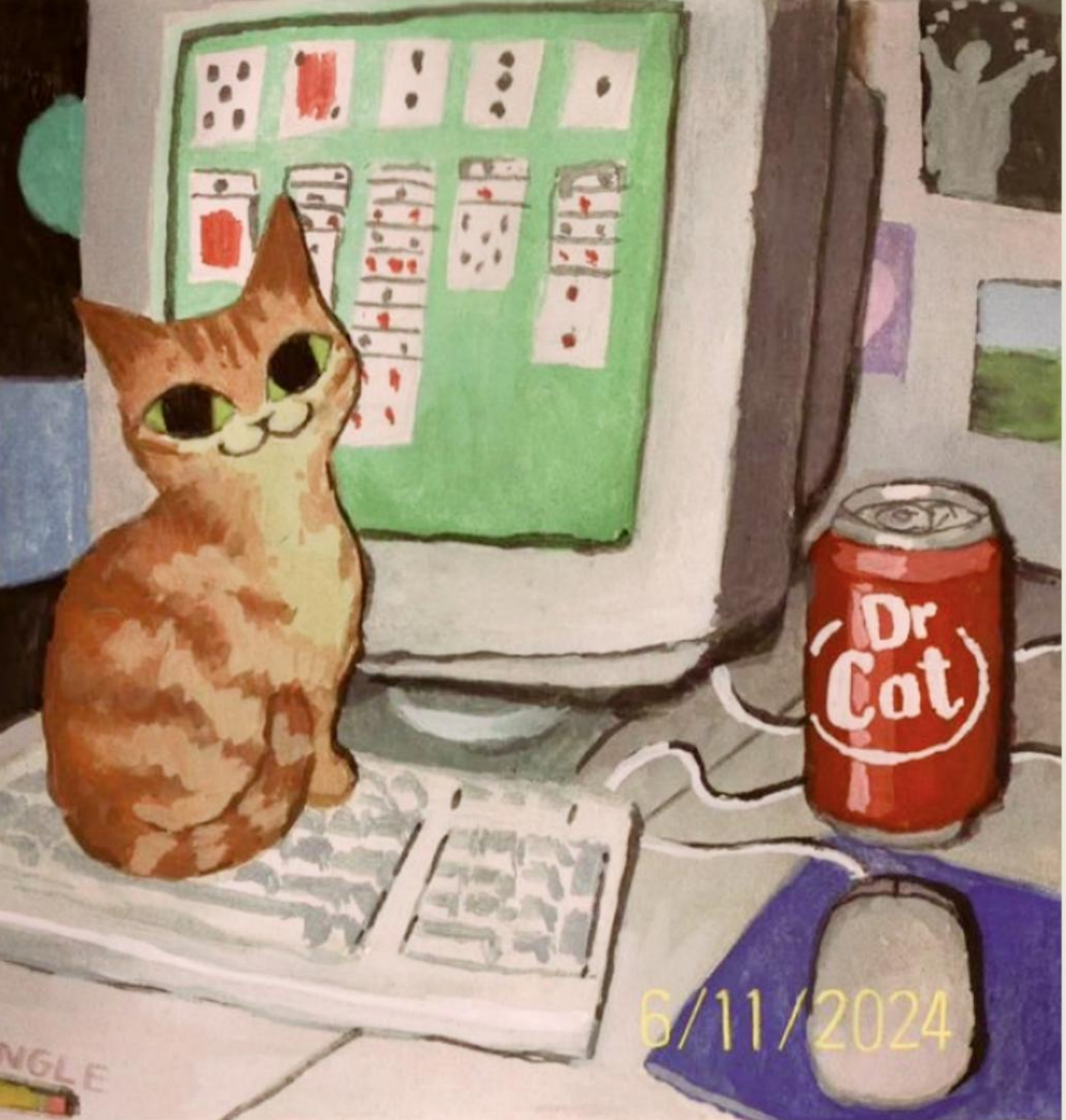
https://git.arts.ac.uk/24010429/Data-Science

https://ual.cloud.panopto.eu/Panopto/Pages/Viewer.aspx?id=1bc78717-4ea7-4996-b037-b2ff005dd9f1



ZhaokeRuan
24010429

AI Companion:

When Your Pet Eats With You

INTRODUCTION

An interactive AI system where **a virtual pet mimics the user's eating behavior** based on real-time camera input and image generation models.

Uses **webcam-based food recognition** and **generates short videos** of animals "eating the same thing" .

Designed to enhance the emotional and sensory experience of eating alone by **providing AI-generated companionship**.

Why This Project ?

1 Social Background: Eating Alone is a Real Problem

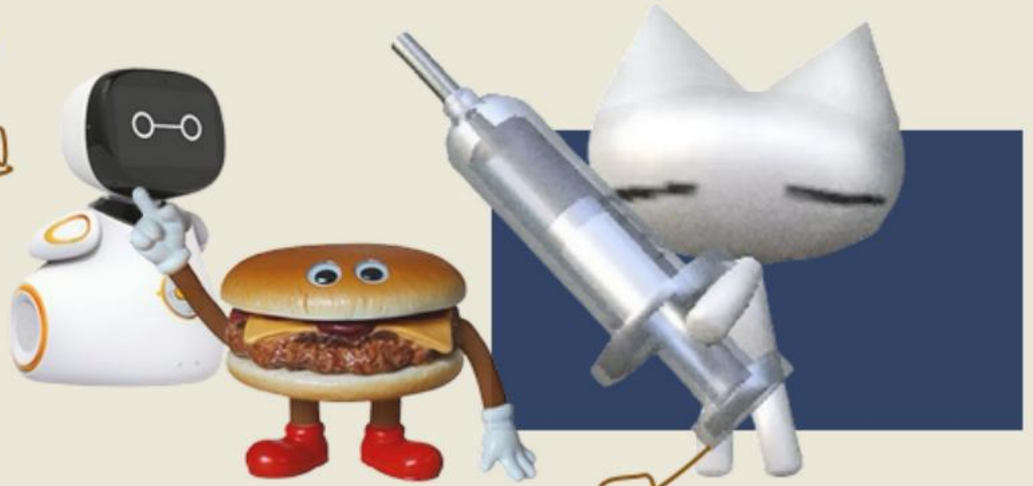
Research shows that **eating alone** can **increase feelings of loneliness**, reduce enjoyment of food, and is even linked to depression and disordered eating.
(Reference: Journal of Nutrition, 2021)

In today's fast-paced urban society, more and more people frequently eat meals by themselves.

Many young people have developed the habit of watching videos while eating as **a form of emotional compensation**.

2 Undervalued Emotional Power of Pets

Pet ownership has grown, but real-time interactivity is still limited in digital forms.



Synchronized behaviors between pets and humans can evoke **strong emotional connections**. Studies in behavioral psychology suggest pets mimicking their owners enhance perceived bonding.

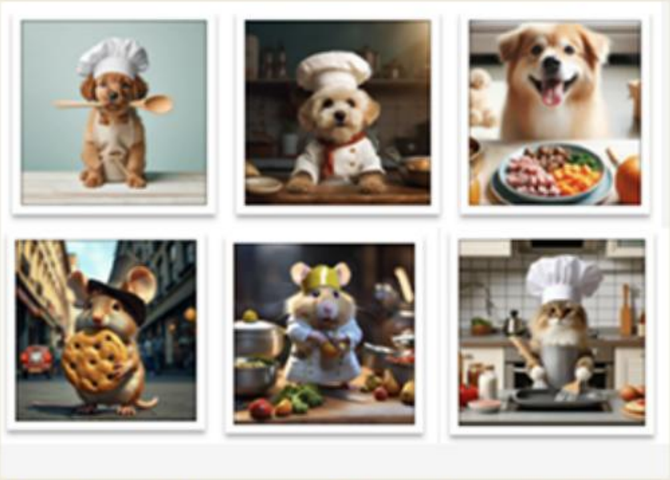
How the System Works

Real-Time Food Detection

"Detected : APPLE"

+prompt

AI Video Generation



Animal Image Random Selection

How the System Works

Tool:
OpenCV + ImageNet classifier (pretrained ResNet)
Process:

- Captures webcam image
- Classifies top-1 label
- Filters with keywords

Real-Time Food Detection

Playback & Interaction

Tool:
cv2.VideoCapture +cv2.imshow()

Tool:
image_selector.py
Process:

- Randomly selects an image from animal_images/
- Animal type is extracted from folder name

Animal Image Selection

AI Video Generation

Tool:

- AnimateDiff for video synthesis
- MotionAdapter to guide motion
- IP-Adapter (optional for image conditioning)

Prompt Engineering:

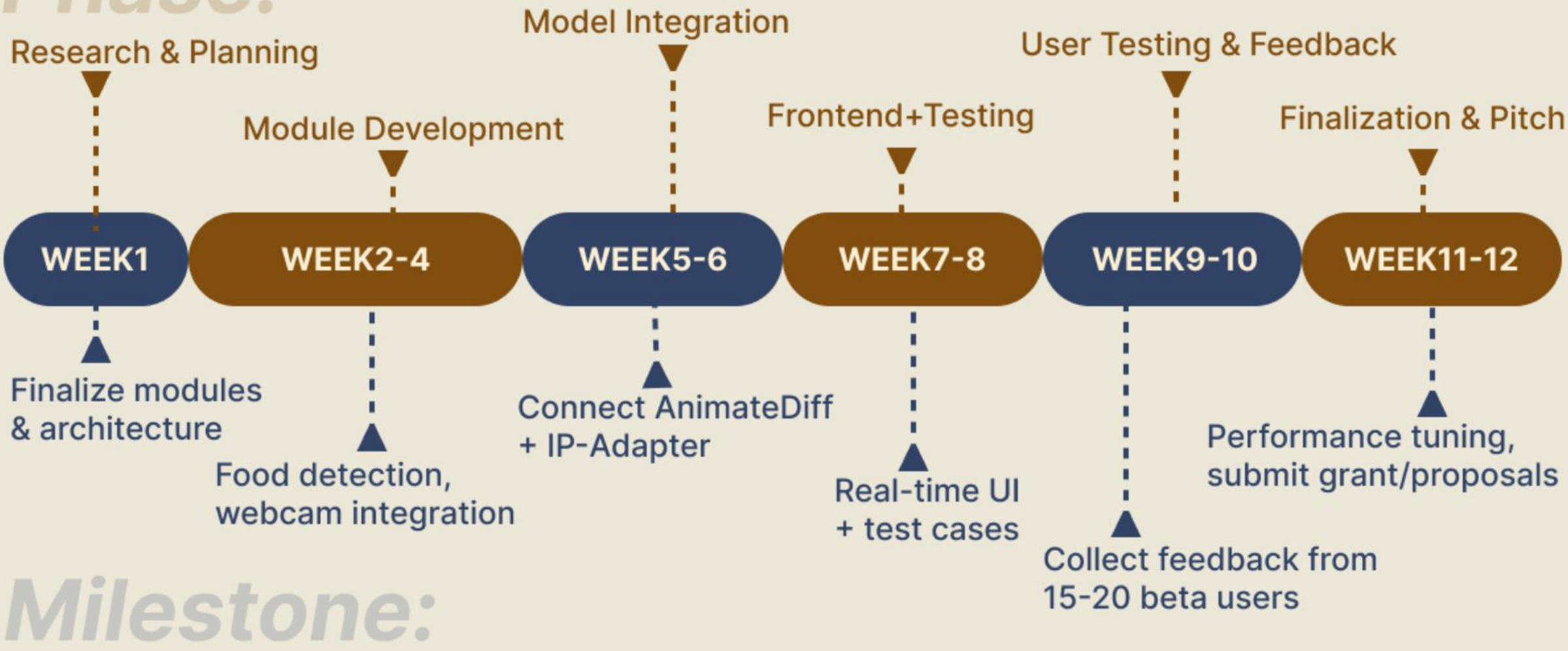
- "A cute {animal_type} eating {food_name}, cozy lighting..."
- Negative prompt to suppress artifacts

Estimated Costs and Needs

Component	Description	Cost（USD）
Cloud GPU (A100, 40GB)	Run AnimateDiff + IP-Adapter (Paperspace/RunPod)	$0.90/hour
Model fine-tuning	HuggingFace	$100/month
Domain/Backend Hosting	For future web-based deployment	$10–15/month
Developer Time	~200 hrs × $25/hr (freelancer)	$5,000
Miscellaneous (UI tools)	Gradio/Streamlit, analytics	$200
Total (3 months pilot)		~$6,000

- *Initial funding goal: $6,000 to cover infrastructure, development, and pilot testing.*

Development Timeline(3-Month Pilot)



Privacy, Safety & Ethics

1 GDPR Compliance:

- All webcam images are processed locally unless user agrees to send data to cloud (e.g., for video generation).
- Explicit user consent required for any uploads or camera access.

2 Ethical AI Use:

- Content moderation filters to avoid inappropriate prompt injection.
- No actual animal imagery abuse — purely generative simulations.

3 Data Security:

- Only processed frames and selected prompts are sent to generate movies. No persistent storage without user control.

4 Inclusive Design:

- Designed to be usable by neurodiverse and socially isolated users.