Term-02 Week-04 Learning Guide

Assignment: Face Locking Feature

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1. Scenario

An enrolled face appears in the camera frame, and immediately, things change.
The system recognizes the face and *locks onto it*. From that moment on, the camera is no longer just detecting faces. It starts *tracking everything that face does*.
As the face moves left or right, the system follows the movement.
If the person blinks, the blink is detected.
If the person smiles or laughs, the expression is noticed and recorded.
Even if other faces appear, the system stays focused on the selected identity.
Even if recognition briefly fails, the lock remains stable.
This behavior is called "***face locking***", that is "recognizing *who* the person is, then tracking *what that person does over time*".

Your task this week is to build this behavior on top of your existing face recognition project.

2. Assignment Goal

Extend your previous **Face Recognition with ArcFace ONNX and 5-Point Alignment** project

(https://www.researchgate.net/publication/399996476_Face_Recognition_with_ArcFace_ONNX_and_5-Point_Alignment)

by adding a **Face Locking** feature.

When a specific enrolled identity appears in the camera frame, the system must:

- lock onto that face
- track it consistently across frames
- detect simple face actions
- record a history of the observed actions over time

3. What You Must Implement

3.1) Manual Face Selection

Choose one enrolled identity to lock (e.g. "Gabi" or "Fani").

Only this identity should be tracked.

3.2) Face Locking

When the selected face appears and is confidently recognized:

- lock onto it
- display clearly that the face is locked
- do not jump to other faces

3.3) Stable Tracking

After locking:

- continue tracking the same face as it moves
- tolerate brief recognition failures
- release the lock only if the face disappears for some time

3.4) Action Detection (While Locked)

Detect and record at least the following actions:

- face moved left
- face moved right
- eye blink
- smile or laugh (simple detection)

Perfect accuracy is not required. Clear, explainable logic is enough.

3.5) Action History Recording

While the face is locked, your system must record a *timeline of actions* to a file.

File naming format (mandatory):

<face>_history_<timestamp>.txt

Example:

gabi_history_20260129112099.txt

Each record in the file must include:

- timestamp
- action type
- brief description or value

4. Constraints

- Start from your existing working project
- CPU-only execution
- No retraining of models
- Do not remove or break the recognition pipeline

5. Submission

- Create a **new GitHub repository** named "**Face Locking"** for clarity
- Push the complete project to this repository
- Your **README.md** must clearly explain:
    - how face locking works
    - which actions are detected
    - how history files are named and stored

Submission will be done via a **Google Form** that will be shared later.

6. Final Note

This assignment moves your system from **recognition** to **behavior tracking**.

If your system can:

- lock onto the correct identity
- stay locked over time
- track movements and expressions
- and explain *why* it behaves that way

then you have built a real-world intelligent vision feature.

Good luck — and enjoy building Face Locking.