Plan for Visual char and lip sync of Maya

🟣 **Step 1. Create Your Character**

- **Design or Generate** your avatar:
  - Tools: **Figma, Illustrator, Blender, or AI art** (Stable Diffusion, MidJourney).
  - Style: flat cartoon, 2D sprite, or even 3D rigged character.
- Break down into **animation-ready assets**:
  - Idle pose (neutral face).
  - Mouth states (closed, half-open, open).
  - Expressions (happy, sad, thinking, excited).

👉 Save as **PNG sequences** or export to **Lottie JSON** (for React/web).

🟣 **Step 2. Animation Pipeline**

You have two main choices:

🔹 **2D Sprite Switching (Simple)**

- Like old-school cartoons: swap mouth images depending on sound.
- Easy to do in **pygame** (Python) or **Canvas/React** (Web).

🔹 **Lottie Animations (Modern Web)**

- Create animations in After Effects → export with **Bodymovin** → play in React with lottie-react.
- Much smoother and scalable.

🟣 **Step 3. Lip Sync to AI Audio**

Right now, your AI speaks with Edge TTS.
To sync the lips:

1. **Get phoneme timing from TTS**:
   - Edge TTS supports --rate + --word-timing JSON metadata.
   - It gives timestamps of words/phonemes.
2. **Map phonemes → mouth shapes**:
   - Example mapping:
     - A, E, I → open wide mouth.
     - O, U → round mouth.
     - Consonants → half-open.
     - Silence → closed.
3. **Animate in sync with playback**:
   - While audio plays, trigger mouth sprite changes or play the right Lottie frame.

🟣 **Step 4. Integrate With Your AI Loop**

Modify your MayaAI.speak() method:

```
async def speak_with_avatar(self, text: str):
  # 1. Generate speech + phoneme timings
  communicate = edge_tts.Communicate(text, voice=TTS_VOICE)
  with tempfile.NamedTemporaryFile(delete=False, suffix=".mp3") as tmp_file:
    audio_path = tmp_file.name
    submaker = await communicate.save(audio_path)  # contains word timings
```

```
    # 2. Start playing audio
    playsound(audio_path, block=False)

    # 3. While playing, animate character
    for word in submaker:  # iterate through timings
        phoneme = word.get("phoneme", "")
        self.avatar.animate_mouth(phoneme)  # switch sprite / lottie frame
        await asyncio.sleep(word["duration"])

os.unlink(audio_path)
```

🟣 **Step 5. Deployment Choice**

- **Python desktop**:
  Use **pygame** for avatar + audio playback.
- **Web (React)**:
  Best for scaling → Lottie animations + web audio API.

🟣 **Step 6. AI Personality Layers**

You already have **Maya personality** in get_system_prompt().
To add *different characters like Lily*:

- Make multiple profiles (Lily, Maya, Zari) with **unique tone + animation set**.
- Switch based on user selection.