MemeGen AI

An AI-Powered Content Personalization Engine

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Problem Statement

The Content Creation Gap

- **High Demand, High Effort:** 92% of Gen Z and Millennials consume memes daily. However, creating *relevant*, *personal* memes from your own videos or photos is a complex, multi-step process requiring technical skill and creative time.

- **Impersonal Content:** Brands and individuals struggle to create content that feels authentic. The internet is saturated with repetitive meme formats.

- **Missed Opportunity:** Every user's photo gallery and video library is a goldmine of untapped, personal content that could drive engagement if creation were frictionless.

Our Proposed Solution

MemeGen AI: Your Personal Content Co-pilot

- An intelligent, automated pipeline that transforms personal media into high-impact, shareable content in seconds.

- **Zero-Effort Creation:** From YouTube videos, personal video files, or photos.

- **AI-Powered Ideation:** Automatically identifies funny, ironic, or impactful moments and suggests witty captions.

- **Multi-Format Output:** Generates both static image memes and short video clips.

We are democratizing content creation.

The Intelligent Workflow (Part 1 - Video)

- **Input (YouTube URL / .mp4) -> [Module 1: Ingestion & Analysis] -> [Module 2: AI Ideation] -> [Module 3: Asset Extraction] -> [Module 4: Creation] -> Output (.jpg / .mp4 Memes)**

- **Ingestion & Analysis (processPipeline.py):**
  - The system downloads the video.
  - **Verbal Core:** Transcribes the audio with precise timestamps using a speech-to-text model.
  - **Visual Core:** Scans for scene changes (foundational for future visual analysis).
  - **Output:** A single, structured JSON summary of the video's content.

- **AI Ideation (memeDetection.py):**
  - The transcript is fed to a Large Language Model (GPT-3.5-Turbo).
  - The LLM is prompted with a specific goal: **"Find moments that are funny, awkward, ironic, or emotionally charged."**
  - **Output:** A JSON file of "meme-able moments," complete with timestamps, a rationale, and a suggested witty caption.

The Intelligent Workflow (Part 2 - Photo & Creation)

- **Input (.jpg / .png) -> [Module 1: Image Understanding (BLIP)] -> [Module 2: Creative Captioning (LLM)] -> [Module 3: Creation] -> Output (.png Meme)**

- **Image Understanding (Photomeme.py):**
  - The image is analysed by the **BLIP** model to generate a factual, descriptive caption (e.g., "a cat sleeping on a keyboard").

- **Creative Captioning (Photomeme.py):**
  - This factual description is sent to a creative LLM (GPT-4o-mini) with a new prompt: **"Turn this description into a short, funny meme."**
  - This two-step process ensures captions are both relevant and creative.

- **Final Creation Stage (memeOutput.py):**

- The system uses **FFmpeg** for precise video slicing and frame extraction.

- **Pillow** and **OpenCV** are then used to programmatically render the captions onto the images and video frames, matching the classic meme aesthetic

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Full Architecture Diagram-

•**Frontend:** A simple interface for the user to provide the source media (YouTube link, video, or photo).

•**Backend:** An automated pipeline that analyses the media, uses AI for ideation, and programmatically renders the final meme using libraries like OpenCV and Pillow.
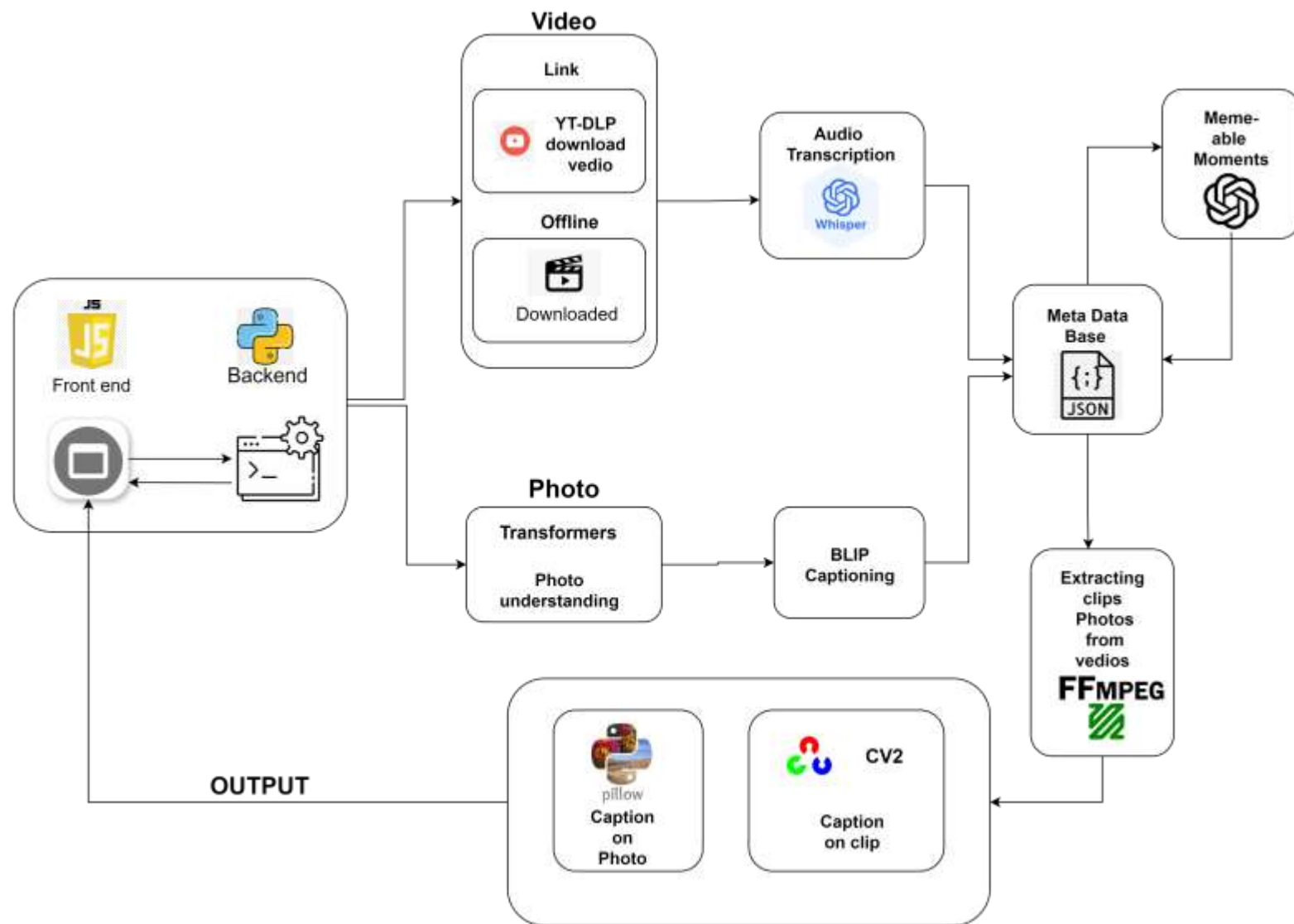
Relevance to the Samsung Ecosystem

Beyond a Hackathon: A Feature for Galaxy AI

- MemeGen AI is not a standalone app; it's a proof-of-concept for a feature that can be deeply integrated into the Samsung ecosystem to drive user engagement.

- **Samsung Gallery Integration:** Imagine a "Create Meme" button directly in the Gallery app. Users can instantly turn their own photos and videos into shareable content without leaving the Samsung environment.

- **On-Device AI Power:** The processing pipeline can be optimized to run on the NPU of flagship Galaxy devices, making content creation instantaneous and private. This is a perfect showcase for the power of **Galaxy AI**.

- **Marketing & Social Media Synergy:** Samsung's own marketing teams can use this tool to generate hyper-relevant, engaging social media content in minutes, reacting to trends at lightning speed.

Benefits & Value Proposition

Time, Cost, and Creative Efficiency

Metric	Manual Creation	MemeGen AI	Improvement
Time to Create (Video)	10-15 Minutes	< 40 Seconds	>95% Faster
Technical Skill Req.	Video Editing Software	Zero	Democratized
Cost Per Meme (API)	N/A	~0.002$	Highly Scalable

Target Audience:

Gen Z & Millennials: The primary consumers and creators of meme culture.

Content Creators & Social Media Managers: A powerful tool to increase output and engagement.

Casual Users: Anyone who wants to share a funny moment with friends and family effortlessly.

Technology Stack

Backend & Orchestration:
- Python, Flask, Gunicorn

AI & Machine Learning:
- OpenAI (GPT-3.5, GPT-4o-mini) via OpenRouter
- Hugging Face Transformers (for Salesforce BLIP)
- PyTorch

Media Processing:
- FFmpeg (The gold standard for video)
- OpenCV (Advanced computer vision tasks)
- Pillow (PIL) (Robust image manipulation)

Architecture:
- Asynchronous Task Processing (via Threading)
- RESTful API for future frontend integration

LLM Monitoring & Responsibility
Building with Responsible AI

We don't just use LLMs; we manage them.

- **Cost & Performance Tracking:** All API calls are logged, allowing us to monitor costs in real-time (~0.002 per call) and track model latency. The app.py` task manager is the foundation for this.

- **Output Validation:** We programmatically check if the LLM output is valid JSON. If parsing fails (memeDetection.py), the error is logged, and the task can be retried, ensuring pipeline resilience.

- **Prompt Engineering & Safety:** Our prompts are carefully engineered to request creative and witty content while implicitly avoiding harmful or inappropriate suggestions. The next step is to add a content moderation layer.

Future Extensions
The Roadmap: Evolving Content Creation

•**Advanced Visual Analysis:** Integrate object detection and facial emotion recognition to find funny moments even without audio cues.

•**Bixby Integration:** "Hey Bixby, make a meme from the video I just took." Voice-activated, hands-free content creation.

•**Style Transfer & Customization:** Allow users to choose different meme formats, fonts, or even apply
 artistic styles to their creations.

•**Real-time Meme Generation:** Apply the pipeline to live streams on Twitch or YouTube, allowing creators to
 capture and share moments as they happen.

Thank You & Q&A

Thank You

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