```python
In [1]:  import os
         os.environ['Gemini_api_key'] = "AIzaSyACn46fKi55KI_UaFB-sr5Gjp6XkKVsIiY"
         # pip install -q-u- google-Generative ai

         import google.generativeai as genai
         genai.configure(api_key=os.environ['GEMINI_API_KEY'])
```

C:\Users\Vansh\AppData\Local\Packages\PythonSoftwareFoundation.Python.3.13_qbz5n2
kfra8p0\LocalCache\local-packages\Python313\site-packages\tqdm\auto.py:21: TqdmWa
rning: IProgress not found. Please update jupyter and ipywidgets. See https://ipy
widgets.readthedocs.io/en/stable/user_install.html
  from .autonotebook import tqdm as notebook_tqdm

```python
In [2]:  # model = genai.GenerativeModel('gemini-1.5-flash')\
         # model = genai.GenerativeModel('gemini-2.0-flash-exp')
         # model = genai.GenerativeModel('gemini-2.5-pro-exp-0.3-25')

         model = genai.GenerativeModel('gemini-2.5-flash-preview-04-17')
```

```python
In [3]:  response = model.generate_content('WHAT WOULD BE FUTURE SCOPE OF GENERATIVE AI I
         print(response.text)
```

Okay, let's break down the potential future scope of Generative AI by the year 2030. Given the incredibly rapid pace of development in this field, 2030 is a relatively near-term horizon, meaning we can base predictions on current trends and technological trajectories rather than purely speculative futures.

By 2030, Generative AI is expected to move significantly beyond its current capabilities and become deeply integrated into various aspects of life and work. Here are some key areas of its future scope:

1. **Massively Enhanced Creativity and Content Generation:**
    *   **Multimodal Mastery:** GenAI will be significantly better at generating and understanding *multiple types* of content simultaneously – think AI that can write a script, generate the characters and scenes visually, compose the soundtrack, and even animate it, all from a high-level prompt.
    *   **Hyper-Realistic and Customizable Content:** Creating photorealistic images, videos, and audio will become much more commonplace and accessible. Personalized content generation (e.g., tailored marketing materials, educational content, entertainment experiences) will be standard.
    *   **Accelerated Design Cycles:** From industrial design and architecture to fashion and graphic design, GenAI will be an indispensable co-pilot, rapidly generating variations, prototypes, and simulations.

2. **Revolutionizing Work and Collaboration:**
    *   **Ubiquitous AI Co-Pilots:** AI assistants will become standard tools across almost all knowledge work domains – writing code (beyond current tools), drafting complex reports, creating detailed presentations, analyzing data, and even strategic planning support.
    *   **Automated Task Generation and Execution:** AI will not just generate text or images, but potentially sequences of actions or entire workflows based on user goals (e.g., "Plan and execute a marketing campaign for product X").
    *   **Transforming Specific Industries:**
        *   **Software Development:** AI generating large portions of code, identifying bugs, writing tests, and even managing project pipelines.
        *   **Marketing & Advertising:** Personalized ad creation at scale, automated content calendars, generating entire campaign assets.
        *   **Customer Service:** More sophisticated AI agents capable of handling complex queries and generating personalized responses.
        *   **Research & Development:** Rapid hypothesis generation, simulating experiments, analyzing vast datasets, accelerating discovery in fields like material science and drug discovery.

3. **Hyper-Personalization Across Experiences:**
    *   **Education:** AI tutors generating personalized learning materials and lesson plans adapted to individual student needs and learning styles.
    *   **Healthcare:** Generating synthetic patient data for training, assisting in creating personalized treatment plans based on vast medical knowledge.
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    *   **E-commerce:** Highly personalized product recommendations, descriptions, and even generated product variations based on user taste.

4. **Advanced Human-Computer Interaction:**
    *   **More Natural Interfaces:** Interactions will become more conversational and intuitive, with AI understanding complex context and nuance in language and visual inputs.
    *   **Ambient AI:** GenAI capabilities will be integrated into various devices and environments, providing proactive assistance and generating relevant information or content seamlessly.

5. **Enabling New Forms of Research and Simulation:**

     *   Generating synthetic datasets for training other AI models, especially in domains where real data is scarce or sensitive (e.g., healthcare, finance).
     *   Creating detailed simulations of complex systems (climate, economic models, biological processes) to test scenarios and generate insights.

Challenges and Considerations by 2030:

Alongside this expansive scope, 2030 will also see significant focus on addressing key challenges:

*   **Ethics and Regulation:** Addressing issues of bias in generated content, copyright ownership, deepfakes and misinformation, and the ethical implications of automation and job displacement. Regulations will likely be more established.
*   **Reliability and Explainability:** Improving the accuracy and truthfulness of generated output (reducing "hallucinations") and increasing the ability to understand *why* an AI generated a particular output.
*   **Security:** Protecting against adversarial attacks that could manipulate generative models to produce harmful content or exploit vulnerabilities.
*   **Resource Intensity:** Finding ways to make training and running large generative models more computationally and energy efficient.
*   **Skill Adaptation:** The workforce will need to adapt, focusing on skills that involve managing, guiding, evaluating, and building upon AI-generated outputs, rather than solely manual content creation.

In Summary:

By 2030, Generative AI is set to transition from an exciting, novel technology to a fundamental, pervasive layer of digital infrastructure. Its scope will encompass transforming creative processes, automating complex tasks, enabling unprecedented levels of personalization, and accelerating scientific discovery. It won't just be a tool for generating text or images, but a powerful engine for innovation and efficiency across virtually every sector, while simultaneously forcing society to grapple with significant ethical, economic, and regulatory questions.

```python
In [4]: import pathlib
        import textwrap

        import google.generativeai as genai
        from IPython.display import display, Markdown

        def to_markdown(text):
            text = text.replace('.', '.')
            return Markdown(textwrap.indent(text, '> ', predicate=lambda _: True))
```

```python
In [5]: for m in genai.list_models():
            if 'generate content' in m.supported_generation_methods:
                print(m.name)
```

```python
In [6]: # model = genai.GenerativeModel('gemini-2.5-pro-exp-03-25')
        model = genai.GenerativeModel('gemini-2.5-flash-preview-04-17')
        # model = genai.GenerativeModel('gemini-2.0-flash-exp-image-generation')
```

```python
In [7]: %%time
        to_markdown(response.text)
        response.prompt_feedback
        response.candidates
```

CPU times: total: 0 ns
Wall time: 413 µs

```
Out[7]: [content {
          parts {
            text: "Okay, let\'s break down the potential future scope of Generative AI
          by the year 2030. Given the incredibly rapid pace of development in this field,
          2030 is a relatively near-term horizon, meaning we can base predictions on curr
          ent trends and technological trajectories rather than purely speculative future
          s.\n\nBy 2030, Generative AI is expected to move significantly beyond its curre
          nt capabilities and become deeply integrated into various aspects of life and w
          ork. Here are some key areas of its future scope:\n\n1.  **Massively Enhanced C
          reativity and Content Generation:**\n    *   **Multimodal Mastery:** GenAI will
          be significantly better at generating and understanding *multiple types* of con
          tent simultaneously – think AI that can write a script, generate the characters
          and scenes visually, compose the soundtrack, and even animate it, all from a hi
          gh-level prompt.\n    *   **Hyper-Realistic and Customizable Content:** Creatin
          g photorealistic images, videos, and audio will become much more commonplace an
          d accessible. Personalized content generation (e.g., tailored marketing materia
          ls, educational content, entertainment experiences) will be standard.\n    *
          **Accelerated Design Cycles:** From industrial design and architecture to fashi
          on and graphic design, GenAI will be an indispensable co-pilot, rapidly generat
          ing variations, prototypes, and simulations.\n\n2.  **Revolutionizing Work and
          Collaboration:**\n    *   **Ubiquitous AI Co-Pilots:** AI assistants will becom
          e standard tools across almost all knowledge work domains – writing code (beyon
          d current tools), drafting complex reports, creating detailed presentations, an
          alyzing data, and even strategic planning support.\n    *   **Automated Task Ge
          neration and Execution:** AI will not just generate text or images, but potenti
          ally sequences of actions or entire workflows based on user goals (e.g., \"Plan
          and execute a marketing campaign for product X\").\n    *   **Transforming Spec
          ific Industries:**\n        *   **Software Development:** AI generating large p
          ortions of code, identifying bugs, writing tests, and even managing project pip
          elines.\n        *   **Marketing & Advertising:** Personalized ad creation at s
          cale, automated content calendars, generating entire campaign assets.\n
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          lex queries and generating personalized responses.\n        *   **Research & De
          velopment:** Rapid hypothesis generation, simulating experiments, analyzing vas
          t datasets, accelerating discovery in fields like material science and drug dis
          covery.\n\n3.  **Hyper-Personalization Across Experiences:**\n    *   **Educati
          on:** AI tutors generating personalized learning materials and lesson plans ada
          pted to individual student needs and learning styles.\n    *   **Healthcare:**
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          zed treatment plans based on vast medical knowledge.\n    *   **Entertainment:*
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          ntuitive, with AI understanding complex context and nuance in language and visu
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          arch and Simulation:**\n    *   Generating synthetic datasets for training othe
          r AI models, especially in domains where real data is scarce or sensitive (e.
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          tems (climate, economic models, biological processes) to test scenarios and gen
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          expansive scope, 2030 will also see significant focus on addressing key challen
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```

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  }
  role: "model"
}
finish_reason: STOP
index: 0
]

In [8]:
```python
for chunk in response:
    print(chunk.text)
    # print("_"*5)
```

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MULTIMODEL(IMAGE-TEXT GENERATOR)

In [9]:
```python
import PIL.Image
img = PIL.Image.open(r"C:\Users\Vansh\Downloads\iim banglore.jpg")
img
```

```
In [10]:  # model = genai.GenerativeModel('gemini-1.5-flash')\
          # model = genai.GenerativeModel('gemini-2.0-flash-exp')
          # model = genai.GenerativeModel('gemini-2.5-pro-exp-0.3-25')
          model = genai.GenerativeModel('gemini-2.5-flash-preview-04-17')
```

```
In [11]:  response = model.generate_content(img)
          to_markdown(response.text)
```

Out[11]:

> The logo in the image is the logo of the **Indian Institute of Management Bangalore (IIMB)**.

```
In [12]:  import PIL.Image
          img1 = PIL.Image.open(r"C:\Users\Vansh\Downloads\harvard university.jpg")
          img1
```

Out[12]:

In [13]:
```python
response1 = model.generate_content(img1)
to_markdown(response1.text)
```

Out[13]:

> A scenic, sunny view depicts a river with a four-person crew boat rowing
> across it. Along the far bank of the river, there is a green lawn with trees,
> some still with bare branches and others with emerging green leaves, and a
> paved path where a few people are walking. Behind the trees are large,
> traditional red brick buildings with multiple stories and numerous windows.
> Rising prominently behind the buildings is a tall white tower topped with a
> distinctive green dome and featuring an arched opening. In the foreground
> on the right, a branch with delicate pink or white blossoms adds a touch of
> color. The sky above is clear and bright blue.

In [42]:
```python
response = model.generate_content(["Write a script for a 5-second Instagram reel
response.resolve()
```

In [44]:
```python
to_markdown(response.text)
```

Okay, here is a script for a 5-second Instagram Reel based on the image, designed to be quick, engaging, and relevant for potential viewers interested in IIMB or similar aspirations.

Instagram Reel Script: IIMB Aspiration

Reel Duration: 5 seconds

Visuals:

- **0-5 seconds:** Display the provided image of the IIMB entrance clearly. Keep it static or add a very subtle, slow zoom/pan if desired, but static is fine for 5 seconds.

Audio:

- A popular, trending audio clip that is motivational, aspirational, or slightly dramatic/building (choose something currently trending on Instagram Reels for best results). *Crucially, use trending audio.*

Text Overlay (appears quickly, stays on screen):

- **Text:**
  - (Appears around 0.5 - 1 second mark)
  - **Line 1:** Aiming for this view.
  - **Line 2:** [Optional, smaller text below Line 1] IIM Bangalore

Caption Suggestions:

- Manifesting dreams. ✨ #IIMB #MBA #Aspiration #CampusLife #DreamBig #IndianInstituteOfManagement #Bangalore #StudyGoals
- Putting in the work for views like this. 🙏 #IIMBangalore #FutureLeaders #BusinessSchool #EducationGoals #InstaReels #Motivation #IIMB
- The goal. The destination. 🏆 #IIMB #BusinessSchool #AimHigh #Management #StudentLife #Goals #India

Why this works for 5 seconds and views:

1. **Instant Recognition:** If someone knows IIMB, they recognize it immediately.
2. **Aspiration:** The text "Aiming for this view" is highly relatable to anyone with academic or career goals, especially those targeting top institutions. It taps into a common desire.
3. **Trending Audio:** Using popular audio is key to Instagram's algorithm and putting your Reel in front of more people.
4. **Short & Sharp:** 5 seconds is enough to see the iconic image, read the short text, and get the feeling. It loops easily, increasing view time.
5. **Relatable Theme:** The theme of "working towards a goal" is universal.

> This script is simple, relies heavily on the strong visual and trending audio, and uses relatable text to connect with the audience quickly.

In [ ]:

In [ ]:

In [ ]:

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In [ ]:

In [ ]:

In [ ]: