

COMP8420 Assignment 2 Report

Github Link (Code): https://github.com/TahaAhmed2000/COMP8420_NLP_Assignment_2.git

Title: Personalized Travel Assistant using Gemini API and Local LLM

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1. Introduction

This project presents a personalized travel assistant that generates tailored travel itineraries based on user input. The system is powered by large language models (LLMs) to understand user preferences and produce human-like trip plans. A Flask-based frontend collects user details, which are processed using either:

- **Gemini API (cloud-based LLM)**, or
- **DistilGPT2 (local Hugging Face model)**

2. LLM Setup

Two models were configured to meet the assignment criteria:

2.1 Gemini API (Cloud-Based)

- Model: `gemini-2.0-flash` via `google.generative ai`
- Accessed using API key via Python SDK
- Integrated as backend to handle real-time prompt queries
- Demonstrated strong fluency, contextual understanding, and structured output

2.2 Local LLM (DistilGPT2)

- Model: `distilgpt2` from Hugging Face
- Deployed locally using the `transformers` library

- Used for comparison purposes and offline evaluation
- Limited coherence and context retention, but worked for short generations

3. Assistant Dialogue System

A dialogue system was implemented via a web UI where users provide:

- Name
- Current location
- Destination
- Travel dates
- Interests
- Budget
- Model choice (Gemini API or Local LLM)

GlobeTrack — Plan Smart. Travel Far.

Crafting unique travel experiences just for you.

Your Name

Current Location

Destination

Interests (e.g., food, museums)

Travel Dates (e.g., 21-26 Apr11)

Budget (e.g., AUD 5000)

Select Model:

Gemini API

Local GPT2 (distilgpt2)

Plan My Trip

The backend constructs a prompt with these details and sends it to the selected LLM.

Example Prompt:

Create a travel itinerary on the dates 21st to 26th April for a user named Alex who wants to visit Tokyo from Sydney with a budget of AUD 5000. Their interests include: food, anime, and nature. The itinerary should include daily plans, attractions, local cuisine, and tips.

GlobeTrack — Plan Smart. Travel Far.

Crafting unique travel experiences just for you.

Alex

Sydney

Tokyo

food, anime, and nature.

21st to 26th Apr11

5000

Select Model:

Gemini API

Local GPT2 (distilgpt2)

Plan My Trip

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3.1. Using Gemini API:

Your Personalized Itinerary

Okay, here's a potential itinerary for Alex's Tokyo trip from April 21st to 26th, keeping in mind their interests in food, anime, nature, and budget of AUD 5000 (this is a generous budget and allows for comfortable travel and experiences). This assumes the AUD 5000 covers flights, accommodation, activities, and food. I'll allocate costs assuming return flights are around AUD 1500, leaving AUD 3500 for everything else.

Important Notes:

- **Currency Conversion:** This itinerary is based on current exchange rates (approximately 1 AUD = 100 JPY). Always double-check the current rate before your trip.
- **Transportation:** Purchase a Japan Rail Pass *before* you leave Australia if you plan on extensive travel outside of Tokyo. For central Tokyo, a Suica or Pasmo card (reloadable transportation cards) is essential. These can be purchased and loaded at most train stations. Google Maps is your best friend for navigating the Tokyo train system.
- **Accommodation:** I'm estimating around AUD 100-200 per night for a comfortable and well-located hotel or Airbnb. This could be reduced by staying in hostels or budget accommodations.
- **Reservations:** For popular restaurants, themed cafes, or specific experiences (like the Ghibli Museum), book well in advance!
- **Pocket Wifi/eSIM:** Highly recommended for easy navigation and communication. Can be rented at the airport or purchased online.
- **Language:** While many people in tourist areas speak some English, learning basic Japanese phrases (hello, thank you, excuse me) will greatly enhance your experience.
- **Flexibility:** This is a suggested itinerary. Feel free to adjust it based on your preferences and energy levels.

Estimated Budget Breakdown (AUD):

Estimated Budget Breakdown (AUD):

- Flights: 1500
- Accommodation (5 nights): 750 (150/night average)
- Food & Drink: 750 (150/day average)
- Activities & Entrance Fees: 500
- Transportation (Suica card & occasional taxis): 250
- Shopping & Souvenirs: 250

Itinerary:

Day 1: April 21st (Sunday) - Arrival & Shinjuku Exploration

- **Morning:**
 - Depart from Sydney (SYD). (Adjust flight time based on availability and price)
- **Evening:**
 - Arrive at Narita (NRT) or Haneda (HND) Airport.
 - Take the Narita Express or Limousine Bus to Shinjuku (approx. 1.5-2 hours, costs around JPY 3,000-4,000). From Haneda, it's closer and cheaper.

- **Evening:**

- Arrive at Narita (NRT) or Haneda (HND) Airport.
- Take the Narita Express or Limousine Bus to Shinjuku (approx. 1.5-2 hours, costs around JPY 3,000-4,000). From Haneda, it's closer and cheaper.
- Check into your hotel/Airbnb in Shinjuku. Shinjuku is a great base due to its excellent transportation links and variety of attractions.
- **Dinner:** Explore Shinjuku's restaurant scene. Try *Ramen* at Ichiran Shinjuku Central East Entrance (famous for its individual booths) or *Yakitori* (grilled skewers) at Omoide Yokocho (Memory Lane) for a more local experience. (Budget: JPY 2,000-3,000)
- **Evening Activity:**
 - Visit the Tokyo Metropolitan Government Building for free panoramic views of the city (especially stunning at night).
- **Tips:**
 - Purchase your Suica/Pasmo card at the airport.
 - Download Google Translate and a train navigation app (like Japan Official Travel App).
 - Be prepared for crowds, especially during peak hours.

Day 2: April 22nd (Monday) - Anime Immersion & Shibuya Crossing

- **Morning:**

- **Breakfast:** Grab a pastry and coffee at a local bakery or convenience store (Konbini). (Budget: JPY 500-1,000)

Day 2: April 22nd (Monday) - Anime Immersion & Shibuya Crossing

- **Morning:**
 - **Breakfast:** Grab a pastry and coffee at a local bakery or convenience store (Konbini). (Budget: JPY 500-1,000)
 - **Anime Focus:** Head to Akihabara, the electric town, for your anime fix.
 - Explore Animate and Mandarake for manga, anime figures, and collectibles.
 - Visit a themed cafe like the Gundam Cafe or the AKB48 Cafe (if you're a fan). Be sure to book in advance.
 - Check out arcades like Sega and Taito Station.
- **Lunch:** Try a themed lunch at one of the Akihabara cafes or grab some *curry rice* from a local restaurant. (Budget: JPY 1,500-2,500)
- **Afternoon:**
 - Travel to Shibuya.
 - Experience the iconic Shibuya Crossing, the world's busiest intersection.
 - Take photos from the Starbucks overlooking the crossing (get there early to snag a good spot).
 - Visit the Hachiko statue (a symbol of loyalty).
- **Dinner:** Shibuya has countless options. Consider trying *Okonomiyaki* (savory pancake) at a restaurant in the area. (Budget: JPY 2,000-3,000)
- **Evening:**
 - **Dinner:** Shibuya has countless options. Consider trying *Okonomiyaki* (savory pancake) at a restaurant in the area. (Budget: JPY 2,000-3,000)
 - **Evening:**
 - Enjoy Shibuya's nightlife. Explore the trendy shops and bars.
 - Consider visiting the Shibuya Sky observation deck for another impressive view of the city (book tickets in advance).
 - **Tips:**
 - Akihabara can be overwhelming. Focus on the areas that interest you most.
 - Be aware of your belongings in crowded areas.
 - Shibuya Crossing is best experienced during peak hours (weekdays) for the full effect.

Day 3: April 23rd (Tuesday) - Culture in Asakusa & Ueno Park

- **Morning:**
 - **Breakfast:** Try a traditional Japanese breakfast at your hotel or a local restaurant. (Budget: JPY 1,000-2,000)
 - **Asakusa:** Take the train to Asakusa, Tokyo's oldest temple district.
 - Visit Senso-ji Temple, Tokyo's oldest temple.
 - Walk through Nakamise-dori, a street lined with traditional shops selling souvenirs, snacks, and crafts.

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-
- **Lunch:** Enjoy *Tempura* (deep-fried seafood and vegetables) at one of Asakusa's many restaurants. (Budget: JPY 2,000-3,000)
-
- **Afternoon:**
 - **Ueno Park:** Head to Ueno Park, a large public park that is home to several museums, a zoo, and a beautiful pond.
 - Visit the Tokyo National Museum (for Japanese art and history), the Tokyo Metropolitan Art Museum, or the Ueno Zoo. Choose based on your interests.
 - Relax by Shinobazu Pond.
-
- **Dinner:** Ueno has a wide range of dining options. Consider trying *Unagi* (grilled eel) which is a local speciality. (Budget: JPY 2,500-3,500)
-
- **Evening:**
 - Explore the Ameya Yokocho market near Ueno Station for street food and shopping.
 - **Tips:**
 - Asakusa can get crowded, especially on weekends. Go early in the morning to avoid the biggest crowds.
 - Ueno Park is a great place to relax and escape the hustle and bustle of the city.

Day 4: April 24th (Wednesday) - Day Trip to Hakone (Nature & Views)

- **Full Day:**
 - **Hakone:** Take a day trip to Hakone, a mountain resort town known for its stunning views of Mount Fuji, hot springs, and natural beauty.
 - Take the Odakyu Romancecar from Shinjuku Station to Hakone-Yumoto Station (approx. 1.5 hours). Consider buying a Hakone Free Pass for discounted transportation within Hakone.
 - Cruise across Lake Ashi, surrounded by beautiful scenery (weather permitting).
 - Ride the Hakone Ropeway, which offers views of volcanic hot springs and Mount Fuji (again, weather permitting).
 - Visit the Hakone Open-Air Museum, which features contemporary sculptures set against the backdrop of nature.
 - Enjoy a traditional Japanese lunch in Hakone. (Budget: JPY 2,500-3,500)

- **Dinner:** Have dinner back in Shinjuku after returning from Hakone. (Budget: JPY 2,000-3,000)

- **Evening:**
 - Relax and reflect on your day.
 - **Tips:**
 - Check the weather forecast before you go to Hakone. Mount Fuji is often obscured by clouds.
 - Wear comfortable shoes, as you'll be doing a lot of walking.
 - The Hakone Free Pass can save you money on transportation within Hakone.

Day 5: April 25th (Thursday) - Harajuku Fashion & Ghibli Museum (or Alternative)

- **Morning:**

- **Breakfast:** Enjoy a trendy brunch in Harajuku. There are many cafes with colorful and Instagrammable food. (Budget: JPY 1,500-2,500)

- **Harajuku:** Explore Harajuku, known for its unique street style and youth culture.

- Walk down Takeshita Street, a pedestrian street lined with quirky shops, crepe stands, and colorful fashion boutiques.
 - Visit Meiji Jingu Shrine, a peaceful oasis dedicated to Emperor Meiji and Empress Shoken.

- **Lunch:** Grab a quick and delicious crepe on Takeshita Street. (Budget: JPY 500-1,000)

- **Afternoon:**

- **Ghibli Museum (Mitaka):** If you were lucky enough to secure tickets well in advance (highly recommended!), visit the Ghibli Museum, a whimsical museum dedicated to the works of Studio Ghibli.

- Take the JR Chuo Line to Mitaka Station, then take a short bus ride to the museum.

- **Alternative (If No Ghibli Tickets):**

- Visit the Nezu Museum, which houses a collection of pre-modern Japanese and East Asian art in a beautiful garden setting.
 - Explore the Yanaka Ginza district, a traditional shopping street with a nostalgic atmosphere.

Day 6: April 26th (Friday) - Departure

- **Morning:**

- **Breakfast:** Enjoy a final Japanese breakfast. (Budget: JPY 1,000-2,000)
- Depending on your flight time, you might have time for some last-minute shopping or sightseeing.
- Head to Narita (NRT) or Haneda (HND) Airport via the Narita Express, Limousine Bus, or train.

- **Afternoon:**

- Depart from Tokyo back to Sydney (SYD).

Food Recommendations Beyond the Itinerary:

- **Sushi:** Try a sushi restaurant in Tsukiji Outer Market (a bustling area with seafood vendors and restaurants) or a conveyor belt sushi restaurant (Kaiten-zushi) for a more affordable option.
- **Tonkatsu:** Enjoy a crispy and juicy pork cutlet at a Tonkatsu restaurant.
- **Udon/Soba:** Try different varieties of Udon (thick wheat noodles) or Soba (thin buckwheat noodles) at a noodle shop.
- **Ramen:** Experiment with different styles of ramen (Tonkotsu, Shoyu, Miso) from various shops.
- **Japanese Sweets:** Try mochi, dorayaki, or matcha-flavored desserts.
- **Street Food:** Explore the many street food stalls in areas like Ameya Yokocho or Nakamise-dori.

Additional Tips for Alex:

- **Learn basic Japanese phrases:** Knowing a few key phrases will be helpful and appreciated.
- **Carry cash:** While credit cards are becoming more widely accepted, many smaller shops and restaurants still prefer cash.
- **Be aware of Japanese customs:** Bowing is a common greeting, and it's polite to slurp your noodles.
- **Be respectful of shrines and temples:** Dress modestly and remove your shoes when required.
- **Enjoy the experience!** Tokyo is a fascinating and diverse city with something to offer everyone.

This itinerary is a starting point. Customize it based on your interests, budget, and time. Have an amazing trip to Tokyo, Alex!

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3.2. Using DistilGpt2:

Your Personalized Itinerary 📅

Plan a trip for Alex from Sydney to Tokyo on 21st to 26th April with a budget of 5000. Interests include: food, anime, and nature. . Day 1: I'll tell ya. - BERNE MALEM (MOST READ IN THE WORLD)
Dramatic 2 : BERNE MALEM! BERNE MALEM! - BERNE MALEM! - BERNE MALEM! - BERNE MALEM! - BERNE MALEM! - BERNE MALEM! - BERNE MALEM! - BERNE MALEM!
Funny 1 : A special story for the UK (which will never be available to the world)... If we hadn't been watching an animated comedy, I might have probably skipped the day.
... So, let's give you the official synopsis of the event:
Dramatic 2: A special story for the UK (which will never be available to the world). If we hadn't been watching an animated comedy, I might have probably skipped the day.
... So, let's give you the official synopsis of the event:
Ritual 2: A normal story about an everyday life.
Ritual 3: A mundane story about an everyday life.
This story will be a very different story involving a regular life, but if you follow the rules of the story and you become a character you will also have a larger sense of adventure.
These are the rules for a normal life, but if you follow the rules of the story and you become a character you will also have a larger sense of adventure.
Please note that the rules of the story and you become a character you will also have a larger sense of adventure. As many people have assumed that it would be impossible to get into the game, the character that is not on the main stage will be played, so we will definitely have to make changes to make certain rules for a normal life. So we can actually use a lot of techniques to bring the character to the game.
Bentiful 1 : A normal story about an everyday life.
Bentiful 2 : A normal story about an everyday life.
Bentiful 3 : A normal story about an everyday life.

The main story will be a story about an everyday life.
The main story will be a story about an everyday life.
The main story will

4. LLM Output Comparison

Aspect	Gemini API	DistilGPT2
Coherence	Excellent	Moderate
Structure (Day-wise plan)	Well-formed	Linear text
Personalization	High	Generic
Response Time	Fast	Fast
Deployment Complexity	Easy (via API)	Easy (via transformers)

Gemini's output was better aligned with travel planning use cases, offering structured day-wise breakdowns and personalized content.

5. Frontend Implementation

- Technology: **Flask (Python)**
- Form-based input collection with real-time model switching
- Custom styling for a clean, travel-themed UI
- Markdown output rendered with styling for readability

```
app.py > ...
1  from flask import Flask, render_template, request
2  from backend import generate_itinerary as generate_gemini_itinerary
3  from local_model import generate_local_itinerary
4  import markdown
5
6  app = Flask(__name__)
7
8  @app.route("/", methods=["GET", "POST"])
9  def home():
10     itinerary = ""
11     if request.method == "POST":
12         name = request.form["name"]
13         present = request.form["present"]
14         destination = request.form["destination"]
15         interests = request.form["interests"]
16         dates = request.form["dates"]
17         budget = request.form["budget"]
18         model_choice = request.form.get("model")
19
20         if model_choice == "local":
21             raw_itinerary = generate_local_itinerary(name, present, destination, interests, dates, budget)
22         else:
23             raw_itinerary = generate_gemini_itinerary(name, present, destination, interests, dates, budget)
24
25         itinerary = markdown.markdown(raw_itinerary)
26
27     return render_template("index.html", itinerary=itinerary)
28
```

6. Design Justification

Only Gemini was used for the main dialogue system due to:

- Superior response quality

- Better integration with Markdown rendering
- Practicality in a real-world deployment scenario

```

backend.py > generate_itinerary
1  import google.generativeai as genai
2
3  genai.configure(api_key = 'AIzaSyDEIIIdMaX1qY_qNDgJmRmkJLRVmXnudhjo')
4
5  model = genai.GenerativeModel('gemini-2.0-flash')
6
7  def generate_itinerary(name,present, destination, interests,dates,budget):
8      prompt = f"""
9      Create a travel itinerary on the dates {dates} for a user named {name} who wants to visit {destination} from
10     the current location {present} with a budget of {budget}.
11     Their interests include: {interests}.
12     The itinerary should include daily plans, attractions, local cuisine, and tips.
13     """
14     response = model.generate_content(prompt)
15     return response.text
16

```

However, a local model was tested and compared to meet assignment requirements.

```

local_model.py > ...
1  from transformers import pipeline
2
3
4  generator = pipeline("text-generation", model="distilgpt2")
5
6  def generate_local_itinerary(name, present, destination, interests, dates, budget):
7      prompt = (
8          f"Plan a trip for {name} from {present} to {destination} on {dates} "
9          f"with a budget of {budget}. Interests include: {interests}. Day 1:"
10      )
11      result = generator(prompt, max_length=500, do_sample=True, top_k=50)[0][["generated_text"]]
12      return result
13

```

7. Result & Demonstration

- Users can generate itineraries using both models
- Frontend dynamically displays results

- Markdown is rendered into styled HTML

8. Tools & Libraries Used

- Flask
- Google Generative AI SDK
- Hugging Face Transformers
- Markdown
- HTML/CSS (for frontend styling)

8.1. HTML Code:

```
templates > index.html > html > body
1  <!DOCTYPE html>
2  <html lang="en">
3
4  <head>
5      <meta charset="UTF-8">
6      <title>GlobeTrack 🌐</title>
7      <link rel="stylesheet" href="{{ url_for('static', filename='style.css') }}">
8  </head>
9
10 <body>
11     <header>
12         <h1>🌐 GlobeTrack – Plan Smart. Travel Far.</h1>
13         <p>Crafting unique travel experiences just for you.</p>
14     </header>
15
16     <main>
17
18         <form method="POST">
19             <input type="text" name="name" placeholder="Your Name" required>
20             <input type="text" name="present" placeholder="Current Location" required>
21             <input type="text" name="destination" placeholder="Destination" required>
22             <textarea name="interests" placeholder="Interests (e.g., food, museums)" rows="2"></textarea>
23             <textarea name="dates" placeholder="Travel Dates (e.g., 21–26 April)" rows="2"></textarea>
24             <input type="text" name="budget" placeholder="Budget (e.g., AUD 5000)" required>
25
26             <label><strong>Select Model:</strong></label><br>
27             <input type="radio" name="model" value="api" checked> Gemini API<br>
28             <input type="radio" name="model" value="local"> Local GPT2 (distilgpt2)<br><br>
29
30             <button type="submit">Plan My Trip</button>
31         </form>
32
33         {% if itinerary %}
34         <section class="output">
35             <h2>Your Personalized Itinerary 📅</h2>
36             <div class="itinerary-text">{{ itinerary | safe }}</div>
37         </section>
38         {% endif %}
39     </main>
40
41     <footer>
42         <p>©copy; 2025 GlobeTrack. Designed for COMP8420 Assignment 2.</p>
43     </footer>
44 </body>
45
46 </html>
```

8.2. CSS Styling:

```
static > # style.css > header
1  body {
2      font-family: 'Segoe UI', sans-serif;
3      background: linear-gradient(to right, #f0f8ff, #d4edda);
4      margin: 0;
5      padding: 20px;
6      color: #333;
7  }
8
9
10 header {
11     /* background-color: #1e90ff; */
12     background-color: black;
13     padding: 30px;
14     color: white;
15     text-align: center;
16     box-shadow: 0 4px 8px rgba(0, 0, 0, 0.1);
17 }
18
19 form {
20     max-width: 600px;
21     margin: 40px auto;
22     background: white;
23     padding: 30px;
24     border-radius: 12px;
25     box-shadow: 0 4px 12px rgba(0, 0, 0, 0.1);
26 }
27
28 form input,
29 form textarea {
30     width: 100%;
31     padding: 12px;
32     margin: 12px 0;
33     border: 1px solid #ccc;
34     border-radius: 6px;
35 }
36
37 form button {
38     background-color: #28a745;
39     color: white;
40     padding: 14px 20px;
41     border: none;
42     border-radius: 6px;
43     cursor: pointer;
44     width: 100%;
45     font-size: 16px;
46 }
47
```



```

48 form button:hover {
49     background-color: #218838;
50 }
51
52 .output {
53     max-width: 90%;
54     margin: 20px auto;
55     padding: 20px;
56     background: #ffffff;
57     border-left: 6px solid #007bff;
58     border-radius: 8px;
59     font-family: 'Segoe UI', sans-serif;
60     white-space: pre-wrap;
61     word-break: break-word;
62     overflow-wrap: break-word;
63     overflow-x: auto;
64     line-height: 1.6;
65 }
66
67 .output .itinerary-text {
68     font-family: 'Segoe UI', sans-serif;
69     font-size: 16px;
70     color: #333;
71 }
72
73
74
75 footer {
76     text-align: center;
77     padding: 20px;
78     background: #f8f9fa;
79     font-size: 14px;
80     color: #666;
81 }

```

9. Reflection

This assignment deepened my understanding of LLM integration, prompt engineering, and real-world NLP app deployment. Comparing a commercial API with an open-source model provided valuable insight into trade-offs between power, cost, and flexibility.