

# RecAI: Emotion-Based Place Recommendations

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Made with GAMMA

# The Problem: Bridging Emotion and Location

 **Nearby Places**  
Automatically fetches all nearby places based on the user's device location.

 **Personalized Recommendations**  
Delivers tailored place suggestions based on individual preferences and emotional states.

 **Emotion & Challenges**  
Effectively handles user emotions and complex recommendation challenges.

RecAI is a recommender system that takes a user's current mood as input, converting it into an emotional vector. Simultaneously, it fetches nearby places, transforms them into descriptions and categories, and classifies an emotion for each place using a reference dataset and sequence transformers. Through cosine similarity and ranking algorithms, RecAI recommends top places for the user to visit.





# Problem Solved: Emotion-Based Place Recommendation System

## Discovering Places Through Feelings, Not Keywords

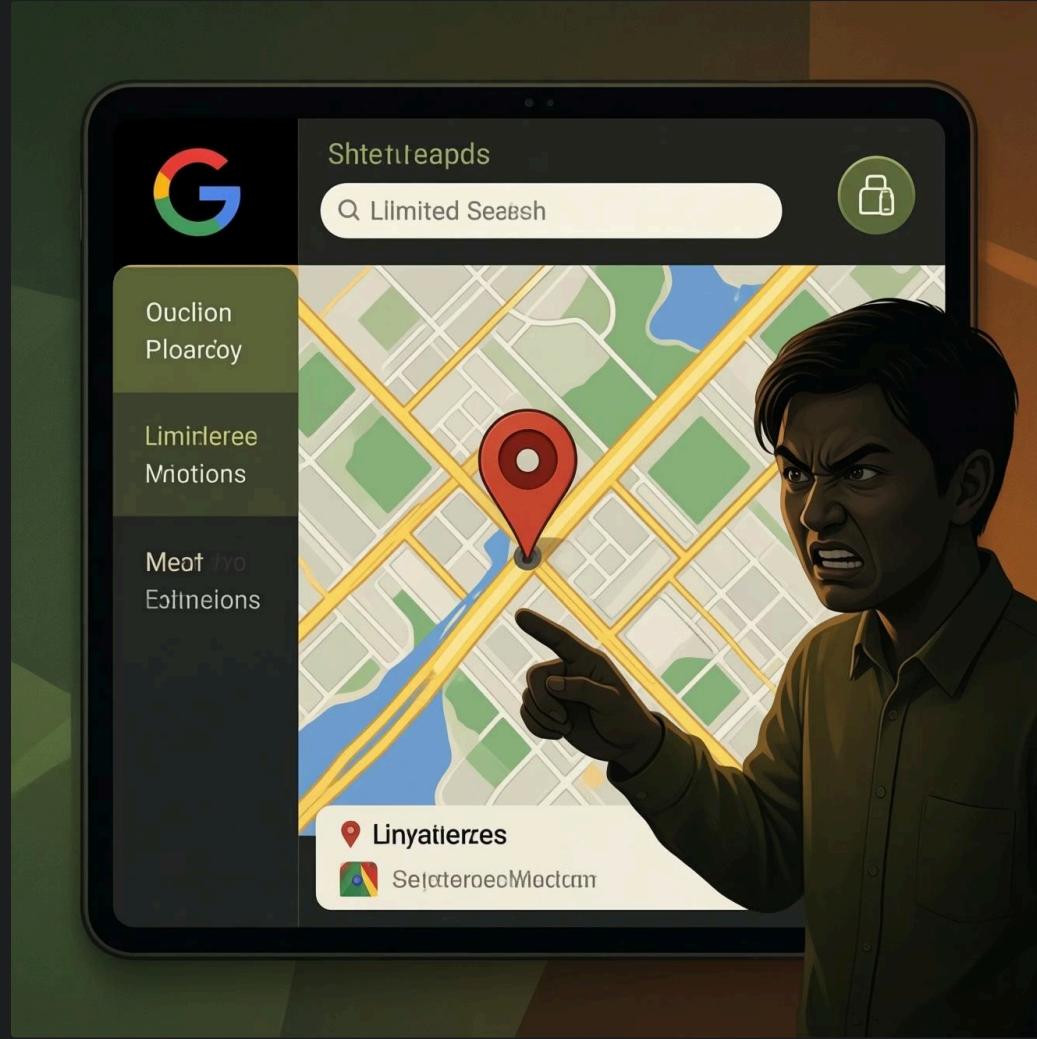
RecAI eliminates the cognitive burden of translating emotions into search terms, allowing users to find places based on how they truly feel.

## The Missing Link

This system bridges the gap between emotional states and real-world environments, linking feelings like "peaceful," "creative," or "energized" directly to matching locations.

People think in feelings, not rigid categories. Existing search platforms fail to understand emotions, providing binary results based solely on keywords. RecAI innovates by directly connecting emotional states to suitable real-world environments, offering a more intuitive and empathetic discovery experience.

# Current Market Limitations: Why Existing Systems Fall Short



## Google Maps/Search

- Demands specific categories from users.
- Offers no emotional filtering or empathy-driven suggestions.
- Results are binary: matches keyword or doesn't.

Existing platforms, while powerful for keyword-based searches, fundamentally miss the human element of emotional context. This gap leaves users to manually translate their feelings into search queries, often leading to suboptimal or uninspiring results.



## Current AI Assistants (ChatGPT, Gemini)

- Can't pull local, real-time place data.
- Provide broad suggestions without context.
- Lack integration with mapping or user emotional profiles.

# Who Benefits & What Makes It Unique



## Travelers & Tourists

Explore by mood (e.g., "I feel adventurous") for emotion-driven cultural discovery.



## Local Residents

Break daily routines with mood-matched spots and enhance wellness through local emotional engagement.



## Mental Health & Wellness

Support stress, anxiety, and depression management; integrate with therapy for emotional regulation.



## Businesses & Urban Planning

Understand the emotional appeal of spaces and design emotion-aware environments.



# Project Outcome Demonstrated

## System Performance

- **Real-time Processing:** Successfully fetches and analyzes 50-100+ places within a 10km radius.
- **Context-Aware Analysis:** Enhanced place understanding through multi-source data fusion, eliminating neutral-emotion places and focusing on meaningful matches.

## User Experience Results

- **Intuitive Interface:** Clean emotion selection with visual cards (20 categories).
- **Location-Based:** Automatic geolocation integration with OpenStreetMap data.
- **Personalized Output:** Ranked recommendations with emotion match scores and explanations.

## Technical Achievements

- **Multi-Modal Data Integration:** OSM tags + descriptions + categories + AI analysis.
- **Scalable Architecture:** FastAPI backend with MongoDB storage, responsive frontend.
- **Debug & Monitoring:** Built-in testing endpoints for emotion analysis validation.

## Demonstrated Capabilities

- **Emotion-to-Place Mapping:** "Spirituality" → Temples, "Adventure" → Hiking spots.
- **Contextual Understanding:** Differentiates cafes by atmosphere, restaurants by cuisine type.
- **Quality Filtering:** Prioritizes places with rich contextual information over basic listings.

# Objectives: The Vision Behind RecAI



## Bridge Emotions & Environments

Create a seamless link between how people feel and where they should go.



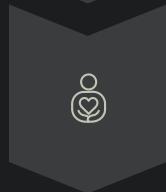
## Simplify Discovery

Remove the need for users to translate feelings into categories or keywords.



## Enhance Mental Wellness

Support emotional well-being through environment-based recommendations.



## Enable Context-Aware Exploration

Deliver personalized, mood-matching suggestions in real time.



## Innovate Search Through Emotion AI

Replace rigid keyword systems with emotionally intelligent, semantic search.

# Methodology, Data, Tools, & Tech Stack

## Core Methodology

- **Context-Aware Emotion Analysis:** Combines place names, categories, descriptions, and OpenStreetMap tags.
- **Semantic Similarity Matching:** Uses transformer-based embeddings to match user emotions with place characteristics.
- **Multi-Factor Scoring System:** Weighs exact emotion matches, coverage scores, and contextual relevance.

## Data Pipeline

- **Real-time Data Fetching:** Overpass API → OpenStreetMap places within 10km radius.
- **Enhanced Context Creation:** Combines multiple data sources for rich place descriptions.
- **Emotion Prediction:** AI-powered analysis using sentence transformers.
- **Intelligent Filtering:** Multi-criteria recommendation ranking.

## Model & Technologies

- **Primary Model:** all-mpnets-base-v2 SentenceTransformer (768-dimensional embeddings).
- **Reference Dataset:** df\_result.xlsx with pre-labeled emotion mappings.
- **Backend:** FastAPI with MongoDB for real-time processing.
- **Frontend:** Modern HTML5/CSS3 with responsive design.

## Key Tools & Libraries

- **Data Sources:** OpenStreetMap (Overpass API), MongoDB Atlas.
- **ML Framework:** Sentence Transformers, PyTorch, Pandas.
- **APIs:** FastAPI, CORS middleware, geolocation services.
- **Deployment:** Uvicorn server with auto-reload capabilities.

## Emotion Mapping System

- **20 Emotion Categories:** From Joy/Happy to Spirituality/Education.
- **Smart Fallback:** Rule-based emotion detection for unknown places.
- **Dynamic Scoring:** Confidence-weighted recommendation ranking.

# Implementation: The User Journey

01

## User Selects Mood

User visits `frontpage.html` and selects up to 3 emotions.

03

## Data Transmission

Frontend sends location + emotions to the backend through an API call.

05

## Recommendations Generated

Personalized recommendations are generated in JSON format.

Development was conducted using VS Code and Colab, with a virtual project environment and necessary extensions. Uvicorn served as the backend deployment on localhost.

02

## Geolocation Fetch

Browser fetches real-time geolocation using the Geolocation API.

04

## Backend Processing

Backend processes data using the ML model and places dataset.

06

## View Suggestions

User is redirected to `recommended.html` to view suggestions.

# Results, Observations, & Future Work

## Results

- Successfully built a working recommendation system combining mood detection and real-time location.
- FastAPI backend processes requests quickly with smooth frontend integration.
- Sentence-BERT model provides accurate mood-based place suggestions.



## Future Work / Improvements

- Cloud deployment for global accessibility and scalability.
- User profiles to store preferences and history for better recommendations.
- Integration with Google Maps API for real-time navigation.
- Support for multi-language interface to reach a wider audience.

## Observations

- Recommendation accuracy depends on the quality of the mood-place dataset.
- Some moods overlap, causing similar suggestions.
- Cloud deployment is needed for scalability and wider access.
- Smooth geolocation access relies on browser permissions.

Thank You For Your Time