

The Vibe Map — At Scale

Background:

Human perception of space — what feels calm, chaotic, vibrant, or eerie — is shaped by countless variables. Can we train a machine to learn how *humans experience places*?

Your task is to design a machine learning system that learns the **"vibe"** or **affective mood** of a location based on context, spatial features, and sparse human inputs. This challenge evaluates your ability to **design real-world ML pipelines, think creatively with data, and model subjective phenomena** — something no out-of-the-box AI can do.

Your Mission:

Build a system that predicts the **vibe** of locations within a city, using your own field-collected data, open-source geospatial datasets, and any novel features you can create. You're encouraged to explore unsupervised or semi-supervised learning, weak supervision, and creative proxy labels.

This is **not** a Kaggle-style competition — we're looking for creativity, systems thinking, and explainability, not leaderboard scores.

What We Expect:

1. Data Design & Collection (You choose the scope):

- Use any city you're familiar with (or currently live in).
- Combine **your own "vibe" labels** (subjective annotations) with public/open data like:
 - OpenStreetMap (e.g. type of area: commercial, park, residential)
 - Geo-tagged photos (Flickr/Instagram APIs)
 - Foot traffic or mobility data (Google Maps Popular Times, if accessible)
 - Satellite imagery (optional)

- Time of day, weather, noise complaints, crime stats, etc.

2. Feature Engineering:

- Extract and synthesize spatial features:
 - Distance to roads, parks, bars
 - Density of places per type (restaurants, schools)
 - Temporal features (rush hours, weekends)
 - Image or sound embeddings (optional but great)

3. Modeling Task:

- Train a classifier or embedding model to predict **vibe category** or learn a **vibe embedding space**.
- If you can, integrate multiple sources of supervision (e.g., weak labels, clustering + manual labels, user feedback loops).
- Consider transfer learning, contrastive learning, or zero-shot generalization to unseen areas.

4. System Design & Architecture:

- Outline how this could scale to an app or product.
 - What APIs are needed?
 - How would you store and update vibe labels?
 - What's the inference latency requirement?
 - How would you collect continuous feedback?

5. Explainability & Insights:

- Surface *why* the model thinks a place has a certain vibe.

- Which features matter? How do they interact?
- Where does the model fail, and why?

6. Bonus (for fun but telling):

- Create an interactive map or demo that visualizes vibe predictions across a neighborhood.
- Add an "exploration mode" — show what parts of the city feel similar to a given vibe (e.g., "show me all areas that feel like lazy Sunday morning").

What We're Really Evaluating:

- Can you design an **ML pipeline from scratch** for a messy, subjective, real-world problem?
- Can you **extract meaning** from unstructured or geospatial data?
- Can you **balance creativity and rigor**?
- How well do you think about **human feedback**, iteration, and downstream usage?

Submission:

- GitHub repo with clean, documented code.
- Short write-up (max 2 pages) or video explaining:
 - Your approach
 - What worked and didn't
 - How this could evolve in a production environment