Conversational Systems for Complex Routing Problems

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Project goals

- To design a conversational system for complex routing problems, focusing on leisurely pedestrian navigation (e.g. hiking)
    - For example, “I want to go for a short late-morning walk with my dog and stop somewhere for lunch”
- The systems needs to understand the requirements, resolve subjective constraints, and to suggest a route (either build or pick from existing)

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Progress so far

- 📃 Do Sentence Transformers Learn Quasi-Geospatial Concepts from General Text? (GeoExT/ECIR 2024)
- 📃 Quantifying Geospatial in the Common Crawl Corpus (SIGSPATIAL'24)
- 📃 CC-GPX: Extracting High-Quality Annotated Geospatial Data from Common Crawl (SIGSPATIAL'24)

"A wonderful route that begins near the promontory of Rocchette and arrives at the prestigious area of the Poggettone, back panoramic area where you can admire Elba Island, Montecristo and island of Giglio, and finally to the Castle of Punta Ala and Marina di Punta Ala."

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Next goal: Benchmark dataset for hiking planning

- Inspired by *TravelPlanner* (Xie et al., 2024), design a benchmark dataset to test existing models' abilities to plan outdoor activities in zero-shot settings
- Combine existing recorded tracks data, text annotations, land cover, elevation, POIs, path network, various persona preferences, and helper functions (A*, POI search, etc.) into a benchmark
- Test various LLM planning strategies (ReAct, Reflexion, CoT, etc.) on existing popular long-context memory LLMs

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What makes walking outdoors different?

- Unlike urban travel, sparse and sometimes hostile outdoors environments require special focus on physical safety and common-sense constraints:
  - We can’t send families with small children or people with limited mobility through rocky terrain and paths with extreme inclines
  - Similarly, we don’t want to route a hungry hiker to a pub which is closed with the nearest alternative 10 miles away
- Focus on physical safety, physical abilities, diverse yet coherent routes

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Thank you!

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