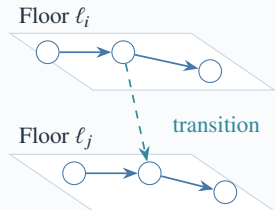


(a) Mobility graph

Cross-floor graph $G = (V, E)$

Source s and destination t .



Node attributes

ID, longitude, latitude, floor

Edge attributes

Length, mode, slope, width,
indoor / sheltered, facility ID

Immutable base graph

Query-specific adjacency
from policy evaluation.

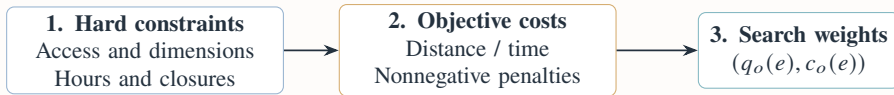
Query context

Constraints u , objective o

Weather w , events A_τ

(b) Policy evaluation

Evaluate each edge against the current context before search.



$$E_\tau = \{e \in E : \text{allowed}(e, u, A_\tau)\}$$

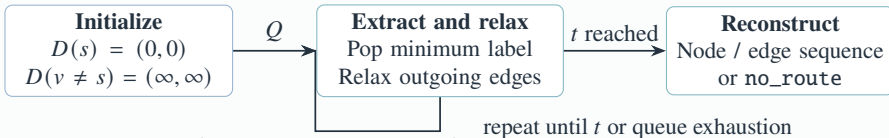
Blocked edges never enter the adjacency list.

q_o : exposed / outdoor length, or zero

c_o : base cost + policy penalties

(c) Lexicographic Dijkstra

Compare exposure first when required; compare secondary cost next.



$$P^* = \arg \min_{P: s \rightsquigarrow t}^{\text{lex}} \left(\sum_{e \in P} q_o(e), \sum_{e \in P} c_o(e) \right)$$

Replanning Update current anchor or event overlay; rerun search on the remaining journey.