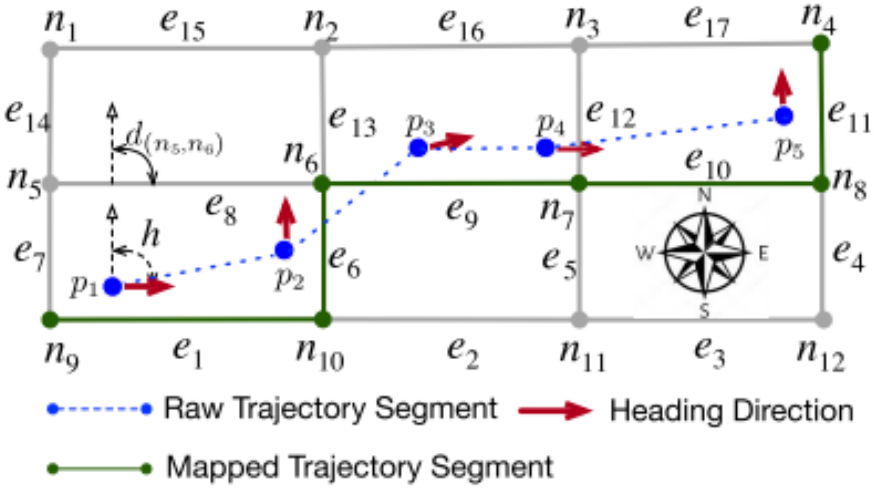
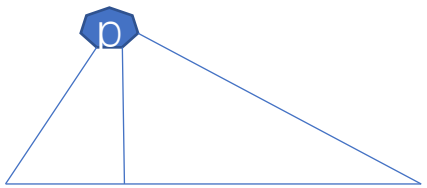
(2020IEEE TRANS)TrajCompressor: An Online Map-matching-based Trajectory Compression Framework Leveraging Vehicle Heading Direction and Change

MAP-MATCHING ALGORITHM USING HEADING DIRECTION:

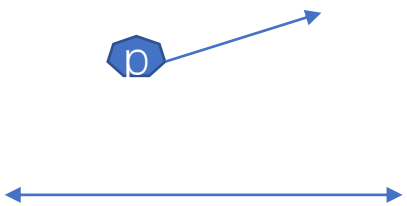


A. Identifying Top-k Candidate Mapped Edges

$$G_1(H_{e_j}^{p_i}) = \frac{1}{\sqrt{2\pi}\sigma_1} e^{-\frac{(H_{e_j}^{p_i})^2}{2\sigma_1^2}} \quad (1)$$



$$G_2(A_{e_j}^{p_i}) = \frac{1}{\sqrt{2\pi}\sigma_2} e^{-\frac{(A_{e_j}^{p_i})^2}{2\sigma_2^2}} \quad (2)$$

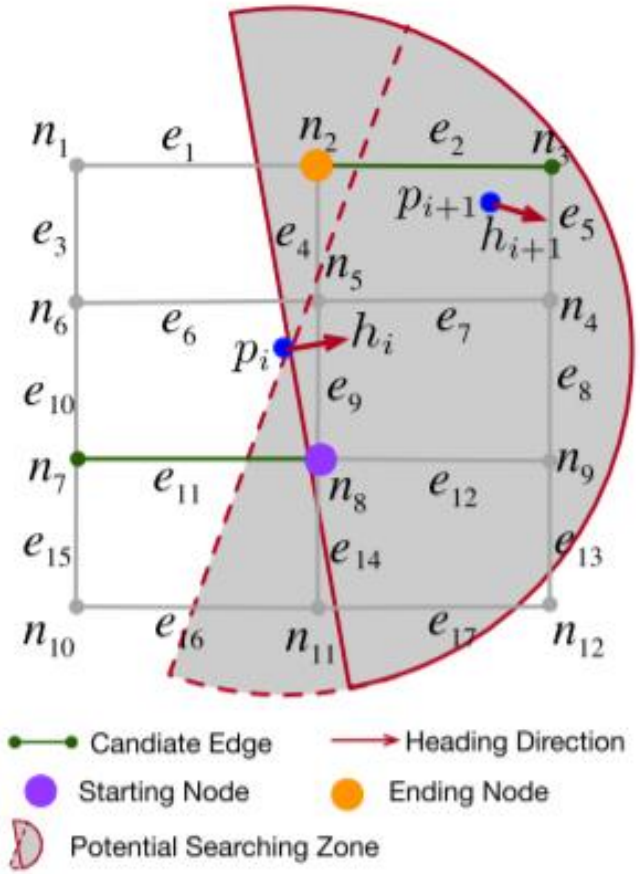


$$G = \sqrt{G_1(H_{e_j}^{p_i}) \times G_2(A_{e_j}^{p_i})} \quad (3)$$

B. Finding Potential Paths

Step 1 (Determining the Potential Searching Zone)

Step 2 (Finding Paths Within the Potential Searching Zone)



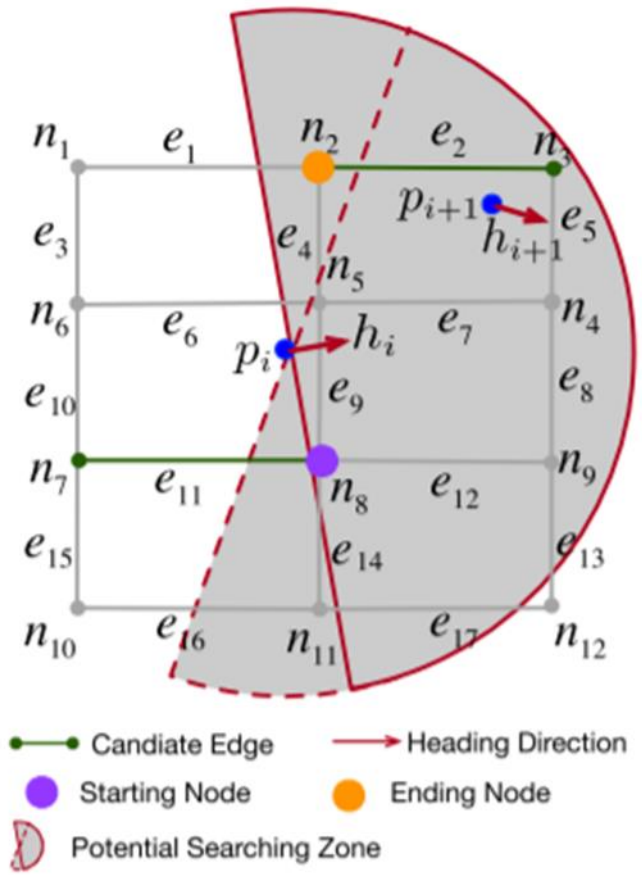
heading-direction-guided

$$dist(n_c, n_e) < dist(n_i, n_e) \quad (4)$$

$$dist(n_c, n_s) > dist(n_i, n_s) \quad (5)$$

$$\min(|h_i - d(n_i, n_c)|, |h_{i+1} - d(n_i, n_c)|) \leq 90° \quad (6)$$

$$P_{\tau_{mi}} = \sum_{i=1}^{l} G(p_i, e_j^{p_i}) \quad (7)$$

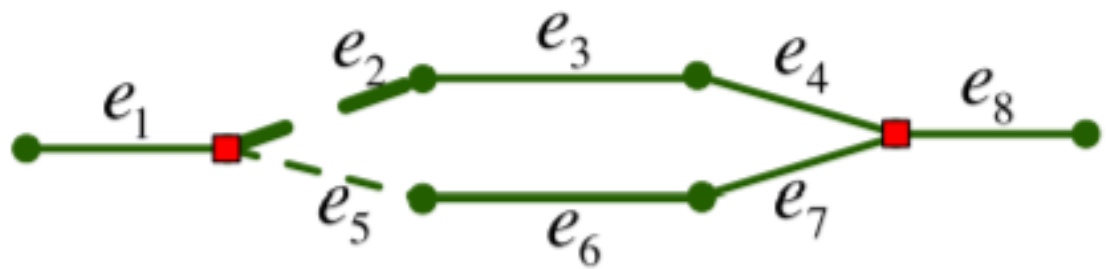


Clockwise Compression Framework (CCF)

Heading Changes Compression (HCC)

Algorithm 1 $HCC(\tau_m, G(N, E))$

1: $\tau_c = e_1$;
2: **for** $i == 2$ to $|\tau_m| - 1$ **do**
3: $s = identifyNode(e_i, e_{i+1})$;
4: **if** $isIntersection(s, G(N, E))$ **then**
5: **if** $\sim isGoStraight(e_i, e_{i+1})$ **then**
6: $\tau_c = \tau_c \cup e_{i+1}$;
7: **end if**
8: **end if**
9: **end for**
10: $\tau_c = \tau_c \cup e_{|\tau_m|}$;



$\tau_{m1} = \langle e_1, e_2, e_3, e_4, e_8 \rangle$ $\tau_{m2} = \langle e_1, e_5, e_6, e_7, e_8 \rangle$