In many cases of route planning, driver utilities are governed by deadlines, such as catching flight, attending important business meeting, fire rescue and organ delivery, all of which need arriving on time or early with the maximum chance. These critical cases render the LET (least expected travel time) and mean-risk model based SSP (stochastic shortest path) impractical in real applications. Therefore, the probability tail model is proposed to find a path that maximizes the probability of reaching destination before a deadline. This model is promising in that it integrates travel time, risk and deadline. In this project, we aim to maximize the probability of arriving on time or early for both single independent vehicle and multiple cooperative vehicles, which will not only increase the performance of the whole transportation network, but also offer premium personalized routing services to users.

**ALGORITHMS AND DATASETS.**

**ALGORITHMS.**

- **Arriving on Time or Early**
  - **Single Independent Vehicle**
    - Cardinality Minimization
    - Lagrange Multiplier Method
    - Q-Learning Method
  - **Multiple Cooperative Vehicles**
    - Multi-agent Systems

**DATASETS.**

- Beijing: 129,607 nodes, 294,868 links; travel times of taxis;
- Munich: 51,517 nodes, 115,651 links; travel times of BMW cars;
- Singapore: 6,476 nodes, 10,225 links; travel times of BMW cars.
CONCLUSION.

NUMERICAL RESULTS AND BENEFITS.

- High accuracy to find the path with highest probability of arriving on time or early; acceptable computation time.
- Premium and personalized routing services to users!

PUBLICATIONS.


