



SJMMA 2021 A 题

城市动态出行指数

2020 年新冠疫情爆发后，无论是国内城市间的交通出行还是国际出访都按下了暂停键。随着我国疫情防控取得了出色的成效，国内城市间的商务出行、休闲旅行等都在逐步恢复中。面对不同的出行类型、出行时间和出行目的地，请你的团队设计一个出行指数模型，用于指导民众的城际出行。模型构建过程中可以考虑以下几个问题：

问题一：请设计适用于我国国内城市间的出行指数数学模型，基于你们的模型，可给出具体的出行指导意见。模型需要考虑到如下几个因素，你也可以纳入更多的考量因素：

1. 天气情况：出行目的地的天气状况，包括气温、风速、是否有降水、是否有发布预警等；天气预报；生活指数，包括感冒指数、紫外线指数、穿衣指数等关系人体舒适度的指标；
2. 空气质量：出行目的地的空气质量状况，包括 AQI 指数、空气质量等级等；空气质量预测预报结果；
3. 交通状况：出行目的地的交通拥挤状况，不同交通方式的可达性等；

问题二：根据用户出行的紧急程度、用户的年龄/性别/健康状况、出行的时间段等，给出个性定制的出行指数及建议；如果用户当前的出行选择，模型输出结果为不适宜出行，则需给出适宜出行的时段及建议。

提交 你的团队所提交的报告应包含 1 页“总结摘要”，其正文不可超过 20 页（总页数限于 21 页）。附录和参考文献应置于正文之后，不计入 21 页之限。



SJMMA2021 Problem A

Dynamic Inter-city Travel Index

Since the outbreak of the Crown-19 epidemic in 2020, both domestic inter-city travels and international travels had been paused. Due to the outstanding achievements in preventing and controlling the epidemic in China, business travels and leisure travels between domestic cities are gradually being restored. Your team is required to design a travel index model to guide people's inter-city travels, considering different types of trips, travel times and travel destinations. The following problems should be considered in the model:

Problem 1: Please design a mathematical model of the travel index applicable to the inter-city travels in China. Your model should output specific travel guidance. The following factors should be taken into account in your model and you may incorporate additional considerations.

1. Weather conditions: weather conditions at the travel destination, including temperature, wind speed, precipitation, weather warnings, etc.; weather forecasts; life indices, including cold and flu index, UV index, clothing index and other indicators related to human comfort.
2. Air quality: air quality at the travel destination, including AQI index, air quality level, etc.; air quality forecast results.
3. Traffic conditions: traffic congestion at the travel destination, accessibility of different transportation modes, etc.

Problem 2: Based on the urgency of the user's travel, the user's age/gender/health status, the time period of travel, etc., give a personalized travel index and suggestions. If the model outputs negative results for the user's current travel choice, the suitable time for travel should be suggested.



Submission Your solution paper should include a 1-page Summary Sheet. The body cannot exceed 20 pages for a maximum of 21 pages with the Summary Sheet inclusive. The appendices and references should appear at the end of the paper and do not count towards the 21 pages limit.