

Europe Travel Efficiency

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Abstract

The objective of this project was to better manage European travel plans by limiting the time to 28.8 hours and cost to \$500 used in transportation while attending as many conferences as possible. The input variables used were the intracity time and expense; the response variables were the total time and expense. Design constraints were implemented, ensuring that the model was practical while defining the project scope. Only the fastest route, clockwise & counterclockwise, were studied. There are 5 variables (5 cities) and each segment has 2 choices: flight or train. Based on research, taking a train would be better when travelling <500km while taking a flight is preferred when travelling >1,000km (both are possible choices when the distance is in between). Based on the costs & durations, only the Paris-Munich route is debatable on which transportation to use. The predictive DOE model (based on multiple regression model that was built on mean time & expense) shows that Paris-Munich by train is more desirable than flight. The robust design: Monte Carlo simulation shows that there is an 8% risk of not meeting the \$500 budget. By raising the importance of time, the new optimal route can meet time & expense requirements.

Keywords

Europe, Travel, DOE, Monte-Carlo, Predictive Modeling

Biography

Mason Chen is currently a student at Stanford OHS and serves as the student ambassador and webmaster for STEAMS. Having started STEAMS since its inception in 2014, he has held various roles such as President of the Student Chapter from 2017 to 2019. Through STEAMS, he has published more than 20 conference proceeding papers as first, second, or third author. As first author, he has won numerous awards including the Best Conference Proceeding Paper Award in the 2018 JMP Discovery Summit as well as finishing 1st Place three times for the STEM presentation competition at IEOM conferences. He has also certified the IBM SPSS Statistics Level I, II, Modeler Level I, and IASSC Yellow Belt, Green Belt, and Black Belt.