Introduction to behavior modeling

Motivation

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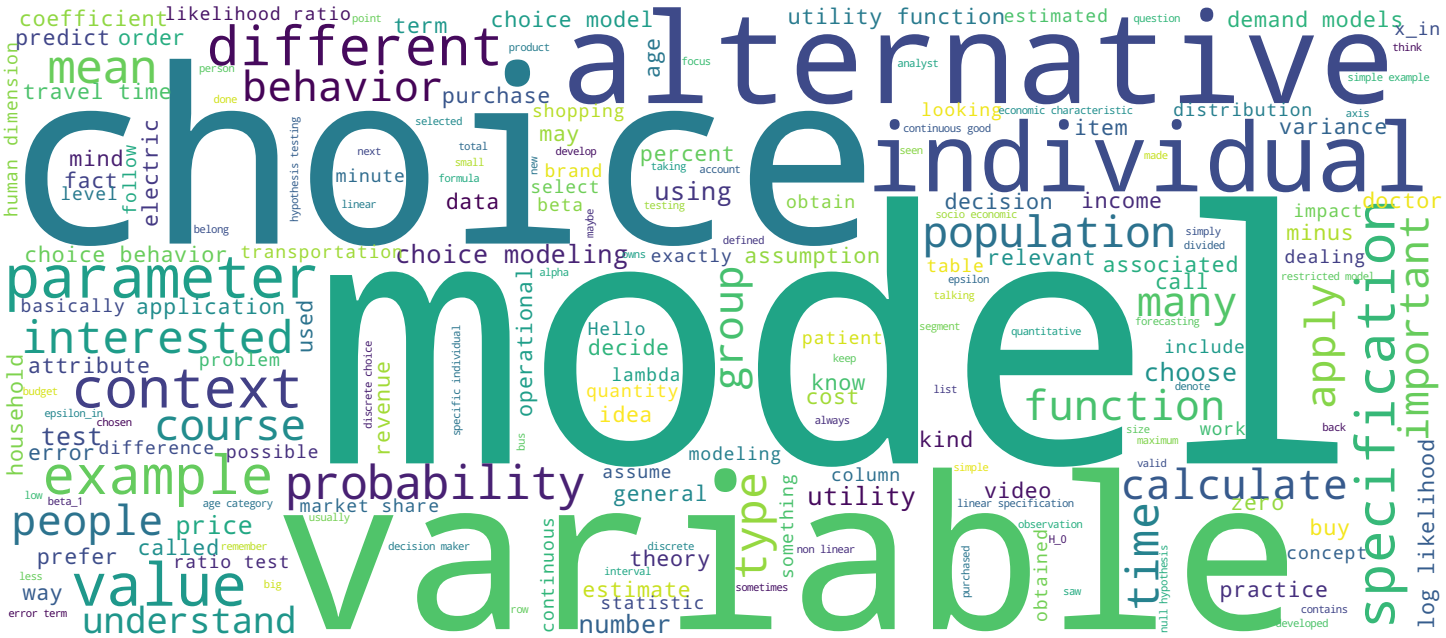
Introduction to choice models

ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE



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Video

EPFL

Motivation

Human dimension in

- engineering
- business
- marketing
- planning
- policy making

Hello we are interested in modeling choice behavior. what I would like to do in this video is to motivate why we want to do so. What type of applications involve the modeling of choice behavior and also why we think it's important. Modeling behavior is important because there is a human dimension in engineering, business, marketing, planning or policy making, and many other disciplines where taking into account the human dimension is really important.

Notes

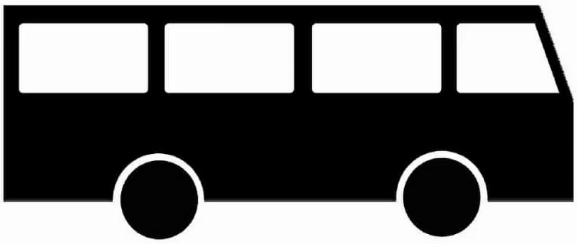
Summary

0m 04s

Applications

Transportation

- Choice of destination
- Choice of transportation mode
- Choice of itinerary
- Choice of vehicle



When we are dealing with human behavior, we are actually dealing, as an analyst, with the concept of demand. Demand is the willingness or ability to purchase a commodity or a service. This is the general definition. But demand is actually one of the two pillars of all the economic analysis. We have supply and demand. And this course about choice modeling is actually about developing demand models that are valid in many applications. The first type of application is transportation. This is actually where I do apply these models. We are talking about travel behavior which are the basis of the demand models in transportation and in this case there are plenty of choices that are relevant to understand the transportation demand. We want to know how people choose their destination, where they go shopping, where they go to work, where they go to perform various activities. We also want to understand how they choose their vehicle. When they buy a car, do they buy an electric car or diesel or do they buy a big car, a small car. How do they choose their actual vehicle. And there are many other choice dimensions in transportation. Transportation is actually one of the first applications that have driven the development of choice modeling. But it's not the only application.

Notes

Summary

0m 39s

Applications

Marketing

- Choice of packaging
- Choice of store
- Choice of product
- Choice of brand

The second most important application of choice modeling is, of course, marketing. Because, there, we want to understand how customers do their choice. So what is the choice of packaging that they prefer when they have to pick up something in a shelf? What is the choice of the store where they will go shopping? What specific product they will purchase and also what is the brand that they will prefer. And of course many of the choices that are relevant in the context of marketing.

Notes

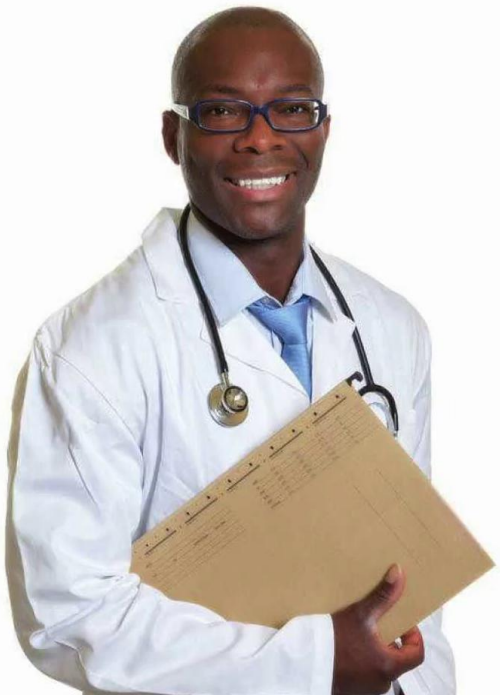
Summary

2m 07s

Applications

Health

- Choice of treatment
- Choice of doctor
- Choice of training for doctors



Another application where choice modeling has been more and more used recently is the context of health. And there are many choices that are done in this context. So the doctor can choose a treatment to give to a patient. A patient can choose a doctor to visit and also a hospital can decide what type of training they ask their doctors to follow. All these types of choices can be modeled with the models that we will see in this course.

Notes

Summary

2m 39s

Applications

Energy

- Choice of appliances
- Choice of energy savings measures
- Choice of heating equipment

Energy is a big topic nowadays. And understanding the way people, meaning households and firms, make choices in terms of energy becomes more and more critical. What type of appliances are purchased by the households? What kind of energy savings measures are implemented by companies? What kind of heating equipment a given household or a given building is selecting, are important things to understand and predict.

Notes

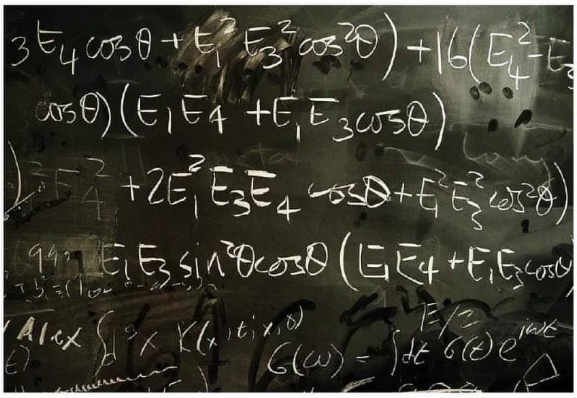
Summary

3m 08s

Motivation

Need for

- behavioral theories
- quantitative methods
- operational mathematical models



So our motivation is to develop theories, methods, and models. We would like behavioral theories with explicit assumptions so that we can actually validate or invalidate our methodology. We want the methods to be quantitative because we would like to do prediction, optimization, and implementation in computers. And we would like our models to be operational because we want to solve real problems.

Notes

Summary

3m 39s

In this course...

Focus

- Individual / disaggregate behavior (vs. aggregate behavior)
- Theory of behavior which is
  - descriptive (how people behave) and not normative (how they should behave)
  - general: not too specific
  - operational: can be used in practice for forecasting
- Type of behavior: choice

In this course, we will focus on individual behavior. We will call it disaggregate behavior. So we are interested in the behavior of specific individuals as opposed to aggregate behavior where we are interested in the average behavior of a population. And the theory of behavior that we will be looking at must be descriptive, meaning that we are interested about how people behave, and not normative. We are not interested how they should behave. It, of course, must be general and relatively abstract. It cannot be developed to a specific context. We would like to apply this theory in the context of transportation, marketing, health, energy and so on. And it's very important that it's operational. It should be used in practice for forecasting. And what I really mean by behavior in this context is actually choice behavior, because we have in mind to develop these demand models, these disaggregate demand models, where choice is really a key behavior that we are interested in.

Notes

Summary

4m 09s

Importance

Daniel L. McFadden

- UC Berkeley 1963, MIT 1977, UC Berkeley 1991
- Laureate of The Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel 2000
- Owns a farm and vineyard in Napa Valley
- "Farm work clears the mind, and the vineyard is a great place to prove theorems"

This field has started in the 70s. And the father of choice model is Professor Daniel McFadden who obtained the Nobel Prize in 2000 for his work on choice modeling. Actually, you know, in addition to be an amazing economist and mathematician, he is also making wine. He owns a farm in Napa Valley and I really love the quotation of him that says: "Farm works clears the mind, and the vineyard is a great place to prove theorems." And I really agree with that.

Notes

Summary

5m 10s