



居酒屋 門前仲町

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はしご酒モデル Restaurant Choice Model

三代目 鳥メロ 豊洲IHビル店

豊洲駅 500m / 居酒屋・ダイニングバー (居酒屋)

清流どり使用◎トリ好きのための居酒屋！

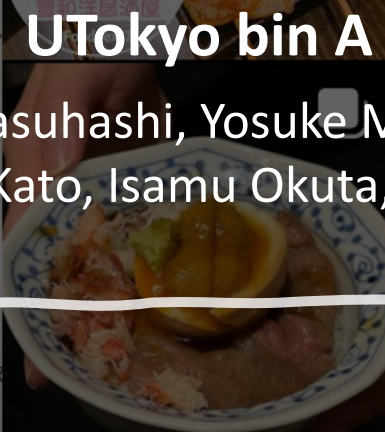
★★★★ 3.03 12件 401件

¥3,000~ ¥3,999

感染症対策 貯まる・使える

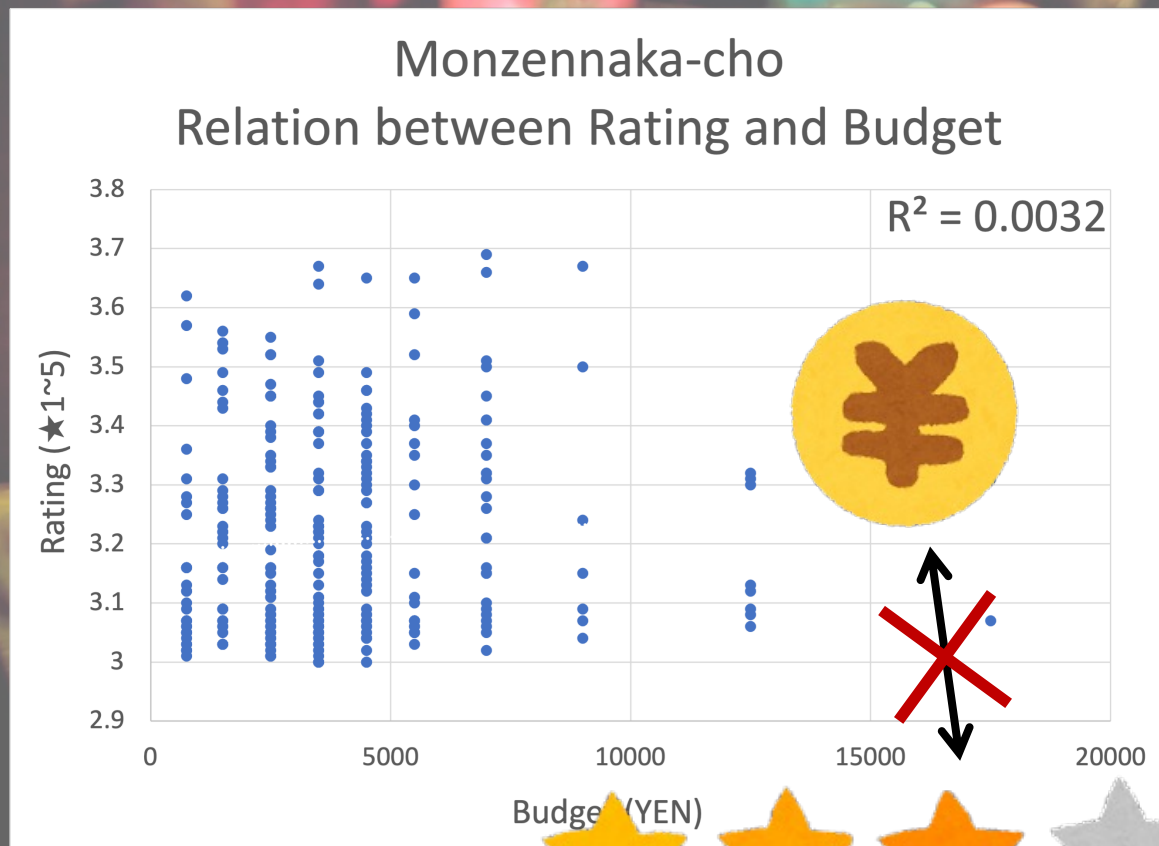
息子のお気に入りのお店です。

平均2週間に1回以上のペースで行っています。決まっ
by 美味しい店調査隊777号(120)



Background

2軒目行こうぜ！

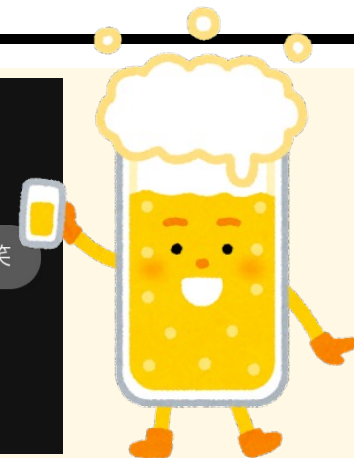
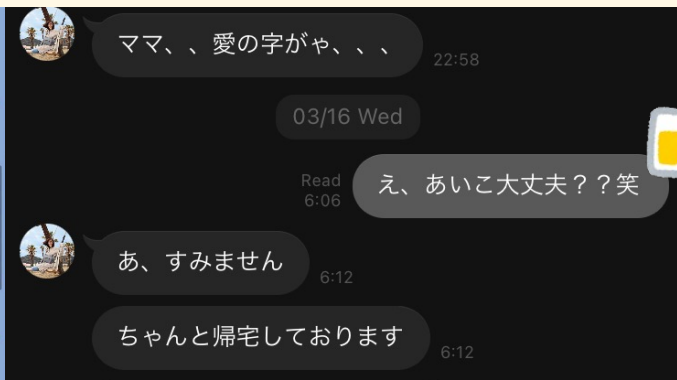
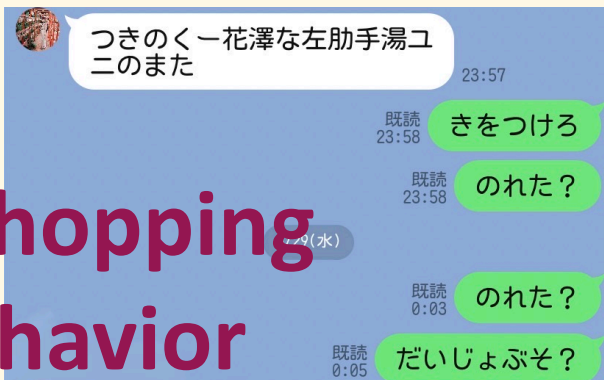


どこに入れば満足
できるかなあ
Which izakaya will
satisfy me?



Motivation

Bar-hopping
behavior



Pure Curiosity

How do we hop from a restaurant to another ?

Open Data



Search
Model

choice
behavior
in a city

linked to
ratings



Deep learning
& image recognition



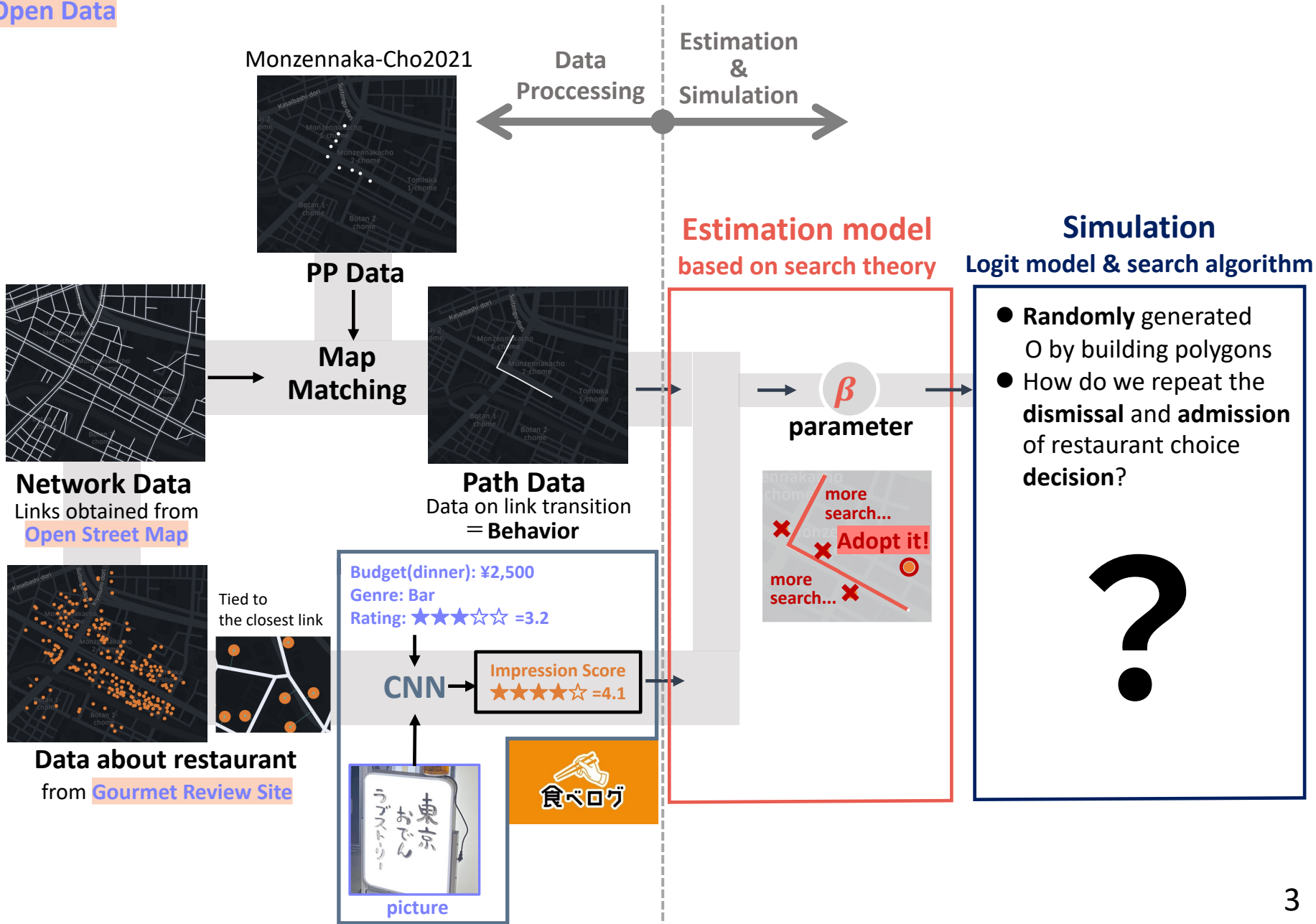
image

text



Framework

✖ Open Data



Formulation

Formulation and estimation method of proposed model

買い手がたまたま見かけた**飲食店**の価格が p のとき、買い手の状態の価値 (= 満足度) V は

When a buyer happens to see a restaurant at a price of p , the buyer's state value V is

$$V = \max \left\{ v - \beta_0 p, -\beta_1 x_1 + \frac{1}{n} \sum_{j=1}^n (v_j - \beta_0 p_j) \right\}$$

サーチを停止し、この飲食店に入店したときの余剰
Surplus when the search is stopped.

コスト + そのエリアのお店に入店したときの期待効用
Cost + expected utility of entering a store in the area

v : impression score
 p : average budget of the store
 x_1 : the link distance

$$V' = v - \beta_0 p - \left\{ -\beta_1 x_1 + \frac{1}{n} \sum_{j=1}^n (v_j - \beta_0 p_j) \right\} + \varepsilon$$

Error term (normal distribution)

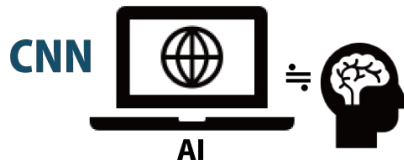


Binary probit model

Maximum Likelihood Estimation



input
around 1000 pics
and their review score



Before visit

Soso?



Impression score
2.6
★★★★☆☆

After visit

GAP between
impression score & "real" score.

visit



"real" score
3.0
★★★★☆☆



Better than
that impression!

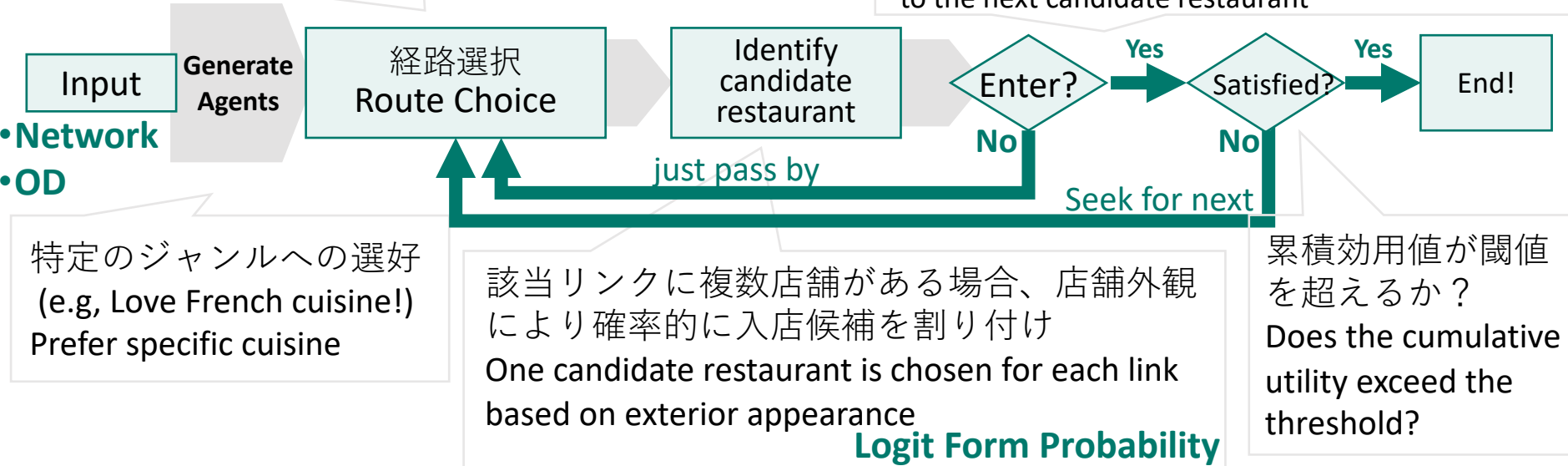
Simulation

Sequential Logit

各交差点で、沿道の店舗をもとに選択
Route choice based on the restaurant along the streets

Search Theory

外観、予算、距離をもとに入店する/
しないを判断
Decide based on exterior, budget, and distance
to the next candidate restaurant



Simulation

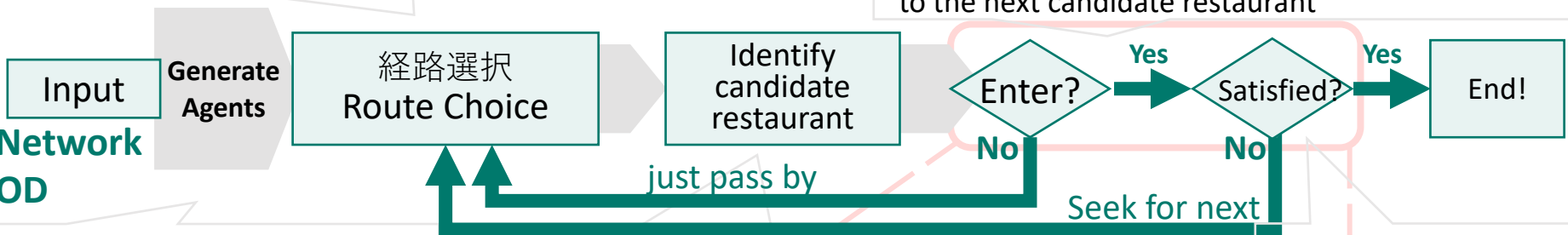
Sequential Logit

各交差点で、沿道の店舗をもとに選択
Route choice based on the restaurant along the streets

Search Theory

外観、予算、距離をもとに入店する/
しないを判断

Decide based on exterior, budget, and distance
to the next candidate restaurant



特定のジャンルへの選好
(e.g, Love French cuisine!)
Prefer specific cuisine

該当リンクに複数店舗がある場合、店舗外観
により確率的に入店候補を割り付け
One candidate restaurant is chosen for each link
based on exterior appearance

Logit Form Probability

累積効用値が閾値
を超えるか?
Does the cumulative
utility exceed the
threshold?

Route choice
→ according to
appearance

Search theory

$$v_1 - p_1 - \{-k + \int V dF(p')\} > 0$$

Search theory

$$v_2 - p_2 - \{-k + \int V dF(p')\} > 0$$

entering 1st restaurant

entering 2st restaurant

Individual Satisfaction



tabe-log rating1 40%
<< upper limitation

tabe-log rating1 + rating2
>> upper limitation



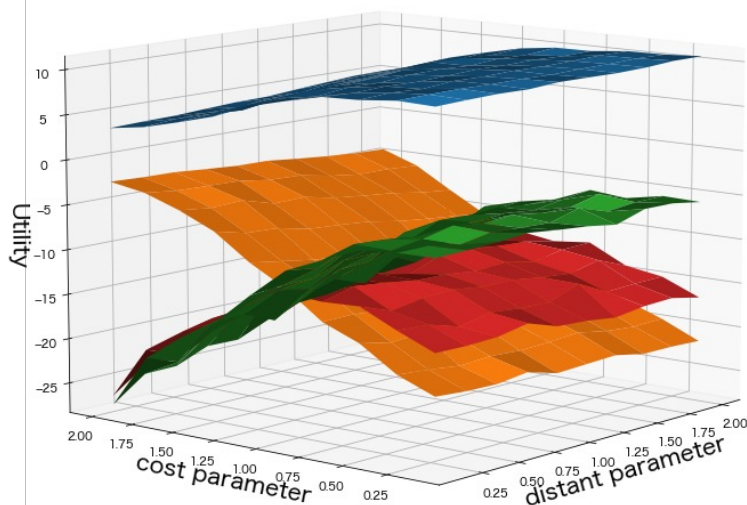
END 6

Simulation Result

サーチパラメータ（探索方針）を変更した時の期待効用
Expected utility of changing search parameters (search policy)

期待効用の成分ごとの変化

Variation in Expected Benefits by Component

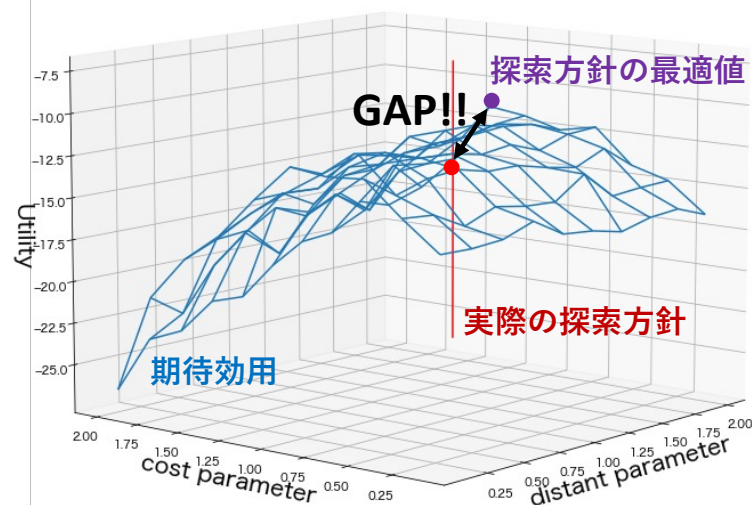


$$V' = v - \beta_0 p - \beta_1 x_1$$

店の満足度 支払額 総探索コスト

最適方針と実際の方針のずれ

Misalignment between optimal policy and actual policy



- 実現されている探索方針は最適解に乖離

The realized search policy is misaligned with the optimal solution.

※ サーチパラメータを変化させている。

※ 同時に、推定されたパラメータは個々のエージェントの認知を表す項として採用した。

The search parameters were varied.

At the same time, the estimated parameters were employed as terms representing the individual agent's cognition.