Vacay.ai

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Concept

Interests

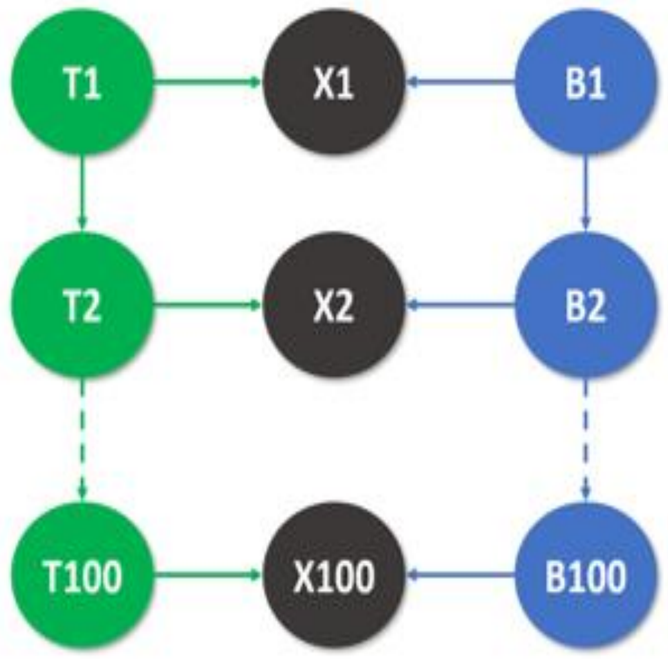
Budget

Time

Optimized Agenda

"Day-Of SMART Concierge"

Time, Budget = CSP



T = *set of times in 10-min increments up to:* **24 x 60 = 1440**

B = *sum of activity & transportation costs:*

Activity Cost =
YELP PriceRange * NormFactor

Transportation Cost =

Task Definition

The Itinerary Optimization problem can be formulated as follows:
Database includes the following information.

$Database_i$ ={

i : Number of the event

N_i : Name of the event

E_i : Event type: such as Lunch, Dinner, Museum

r_i : Event rating (from Yalp)

L_i : Location of the event

d_i : duration of event

$I_i = [t_i^s, t_i^e]$: Time interval during whichi event i should be scheduled

t_i^{end} : Travel time from j to ending point

$\{N(i)\}$: the events reachable from i within 30 minutes

$\{t_{ij} : j \in N(i), t_{ij}$: Travel time from i to j $\}$

}

User Input:

$User\ Database$ ={

Loc_{start} : Starting point

Loc_{end} : Goal point

T_{start} : Starting time

T_{end} : Ending time

$w_i \in [1,5]$: degree of preference to each event type

$T_{lunch} = [t_l^s, t_l^e]$: Lunch time

$T_{dinner} = [t_d^s, t_d^e]$: Dinner time

}

Scheduling = Search

vp : is the set of locations that a user have already visited
t : is current time
L is 0 if a user have not eaten lunch, and 1 otherwise
D is 0 if a user have not eaten dinner, and 1 otherwise

- $s_{start} = (i = Loc_{start}, vp = \{\phi\}, t = T_{start}, D = 0, L = 0)$
- $\text{Actions}((i, vp, t, T, D)) = \{j \in \{N(i) - vp\} \cup \{L_{end}\} : t + t_{ij} + d_j + t_j^{end} \leq T_{end}\}$
- $\text{Succ}((i, vp, t, T, D), j) = (j, vp' = vp \cup \{j\}, t' = t + t_{ij} + d_j, T', D')$

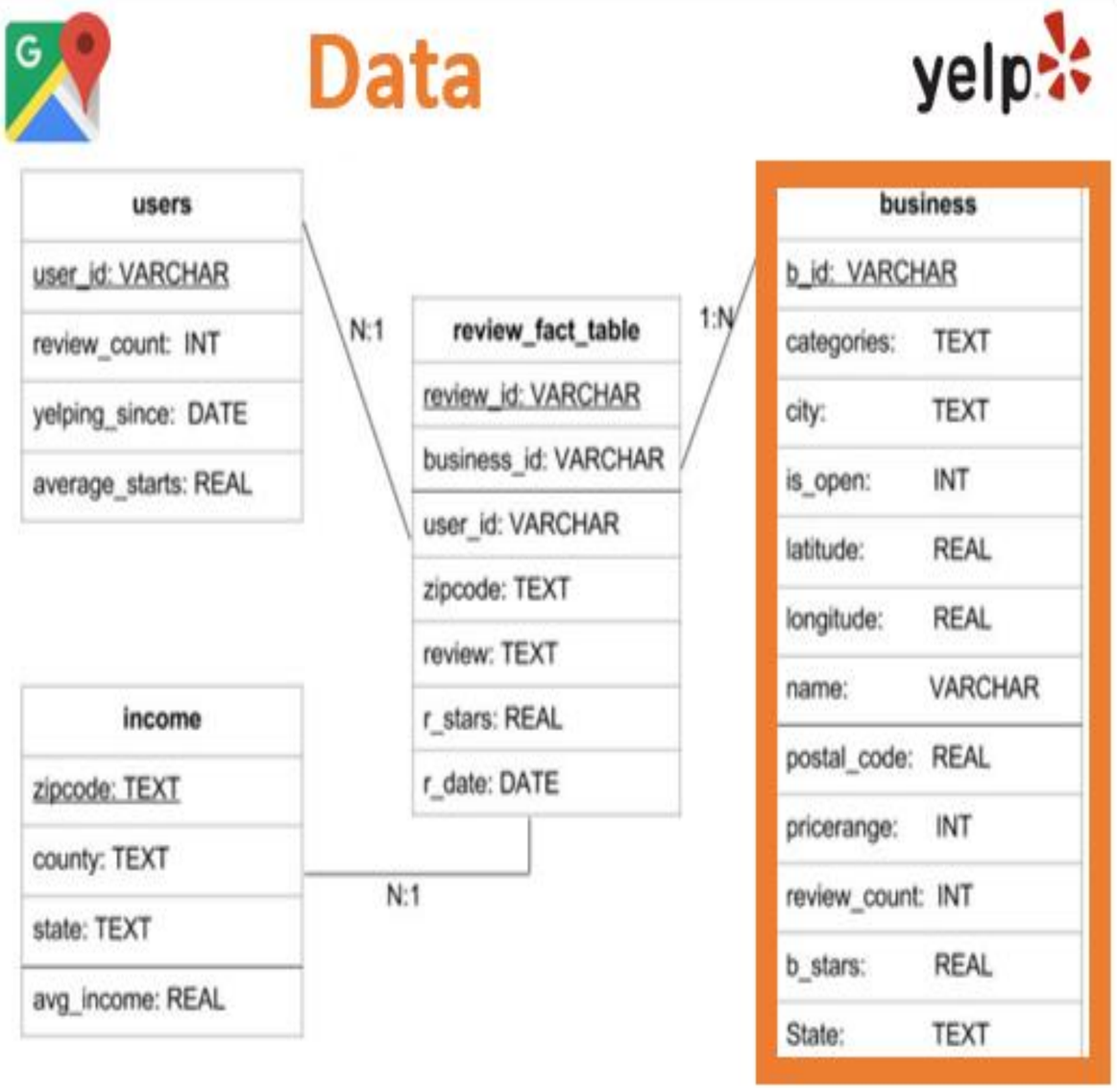
$$T'(orD') = 1 \text{ (if T(orD)=1)}$$
$$T'(orD') = 1 \text{ (if T(orD)=0 and } E_j = \text{Lunch(or Dinner))}$$

- $\text{Cost}((i, vp, t, T, D), j) =$

$$-\frac{w_j\, r_j}{\sqrt{\frac{w_j^2 + r_j^2}{2}}} \ (L = 1 \text{ or } L = 0 \wedge\ E_j = \text{Lunch}),\ \ \infty \text{ (Otherwise)}, \text{ if } t_l^s \leq t \leq t_l^{end}$$
$$-\frac{w_j\, r_j}{\sqrt{\frac{w_j^2 + r_j^2}{2}}} \ (D = 1 \text{ or } L = 0 \wedge\ E_j = \text{Dinner}),\ \ \infty \text{ (Otherwise)}, \text{ if } t_d^s \leq t \leq t_d^{end}$$
$$-\frac{w_j\, r_j}{\sqrt{\frac{w_j^2 + r_j^2}{2}}} \text{ Otherwise}$$

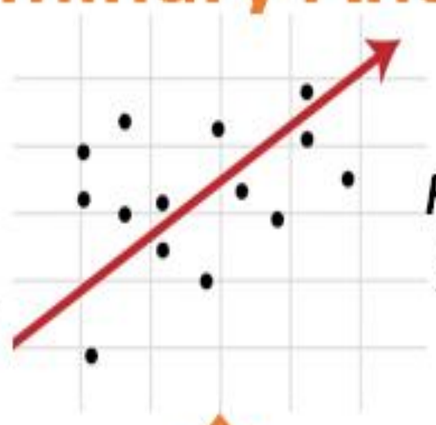
- $\text{IsEnd}((i, vp, t, T, D)) = [i = Loc_{end}]$

Data

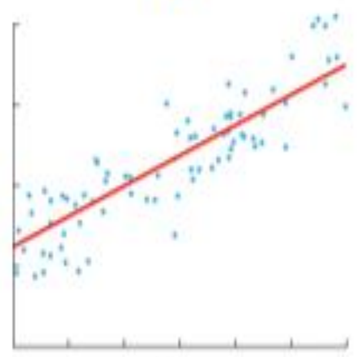


Preliminary Analysis

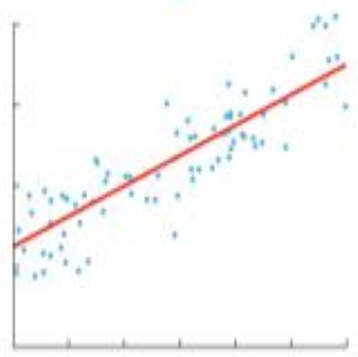
Weighted Average Least Squares



Hierarchical Regression



Estimated Time vs. Actual Time Residual



Estimated Budget vs. Actual Cost Residual