

A Personalized Meal Recommender System

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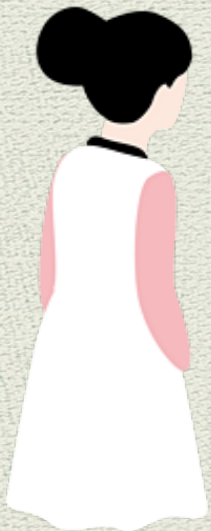


Problem



Help me design a weeknight meal plan.

- ◆ I can only spend totally  dollars on 5 meals.
- ◆  hours is available for cooking on Monday.



Do you mean.....?

Problem

- ◆ Objective: Maximize Ratings for 5 Meals
- ◆ Constraints:
 - Weekly Budget
 - Weekly Schedule
 - Daily Nutrition Requirement
 - Diversity

Model

$$\max \sum_{i=1}^N \sum_{j=1}^5 \text{rating}_i x_{i,j}$$

subject to

$$\sum_{i=1}^N \text{price}_i x_{i,j} \leq \text{budget}, j = 1, \dots, 5$$

$$\sum_{i=1}^N \text{time}_i x_{i,j} \leq \text{available_time}_j, j = 1, \dots, 5$$

$$\sum_{i=1}^N \text{cal}_i x_{i,j} \geq \text{calories_low}, j = 1, \dots, 5$$

$$\sum_{i=1}^N \text{nutrient}_{i,z} x_{i,j} \geq \text{nutrient_low}_z, j = 1, \dots, 5, z = \text{Carbohydrate, Protein, Fat} \dots \dots$$

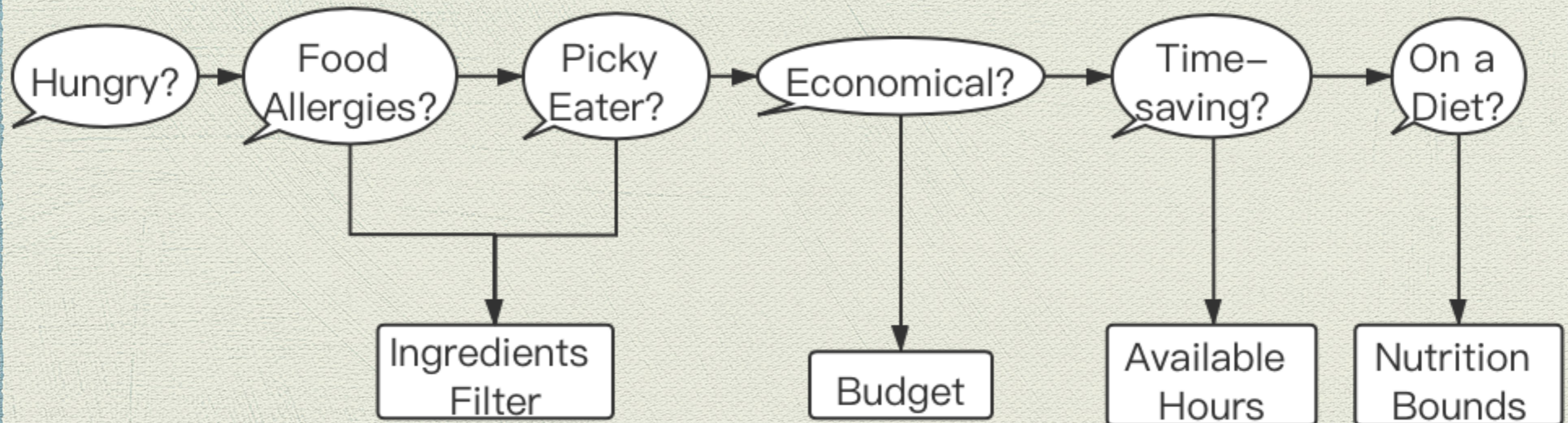
$$\sum_{j=1}^5 x_{i,j} \leq 1, i = 1, \dots, N$$

$$\sum_{i=1}^N \sum_{j=1}^5 x_{i,j} = 5$$

$$x_{i,j} \in \{0,1\}$$

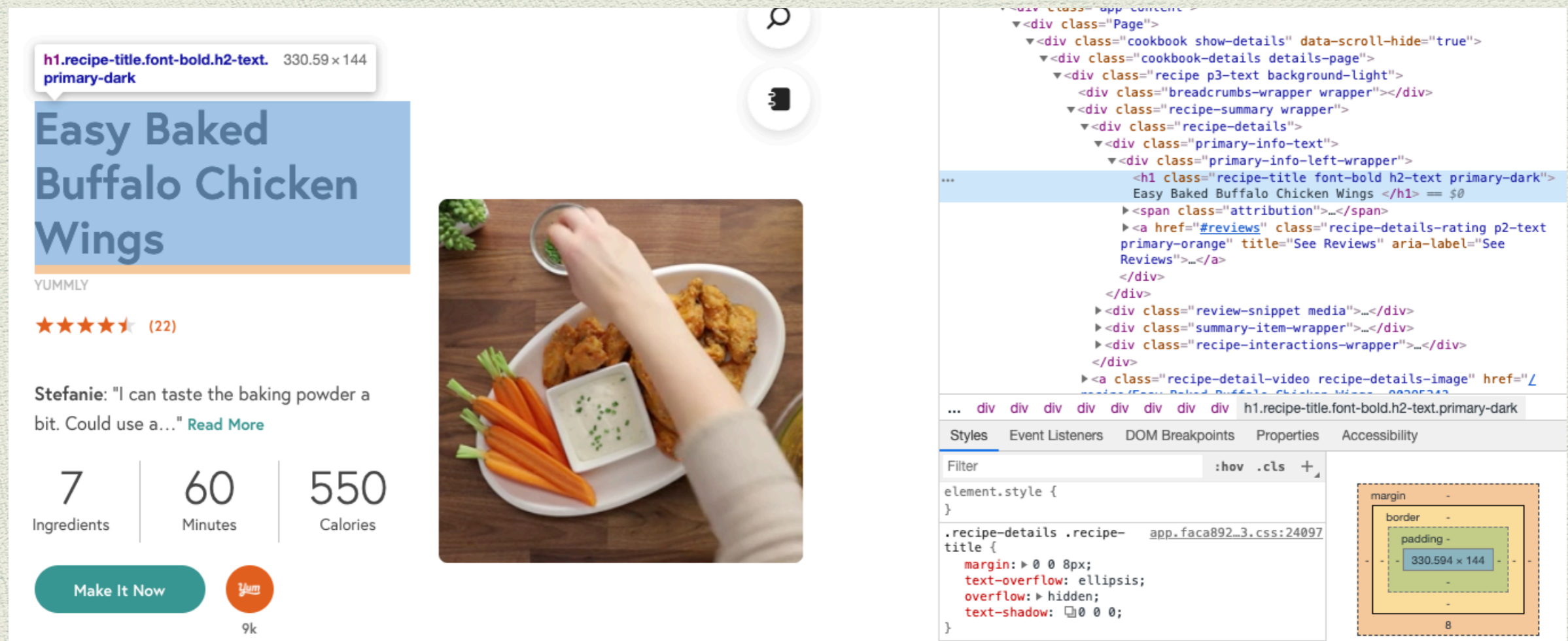
Implementation

1. Determine values of RHSs by interviewing a friend



Implementation

2. Collect and store related recipes data with web scraping



The image shows a recipe page for "Easy Baked Buffalo Chicken Wings" from YUMMLY. The recipe has a 4.5-star rating (22 reviews) and a user review from Stefanie. Key statistics include 7 ingredients, 60 minutes, and 550 calories. A "Make It Now" button and a Yum logo with "9k" are also visible.

The browser developer tool on the right shows the following HTML structure for the title:

```
<h1 class="recipe-title font-bold h2-text primary-dark">Easy Baked Buffalo Chicken Wings </h1>
```

The CSS styles for the title are:

```
.recipe-details .recipe-title { margin: > 0 0 8px; text-overflow: ellipsis; overflow: > hidden; text-shadow: > 0 0 0; }
```

The developer tool also shows a box model diagram for the title element with a width of 330.594 x 144 pixels.

Implementation

3. Construct and fill recipes-user-rating matrix

4. Solve by Integer Programming

Thank you

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