A Personalized Meal Recommender System

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Content

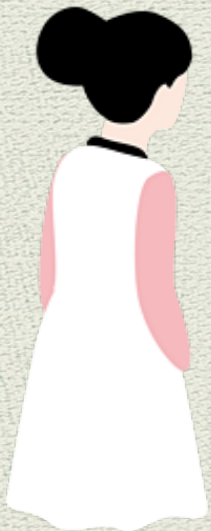- Problem

- Model

- Implementation

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

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

subject to

$$\sum_{i=1}^{N} price_i x_{i,j} \leq budget, j = 1,...,5$$

$$\sum_{i=1}^{N} time_i x_{i,j} \leq available\_time_j, j = 1,...,5$$

$$\sum_{i=1}^{N} cal_i x_{i,j} \geq calories\_low, j = 1,...,5$$

$$\sum_{i=1}^{N} nutrient_{i,z} x_{i,j} \geq nutrient\_low_z, j = 1,...,5, z = Carbohydrate, Protein, Fat......$$
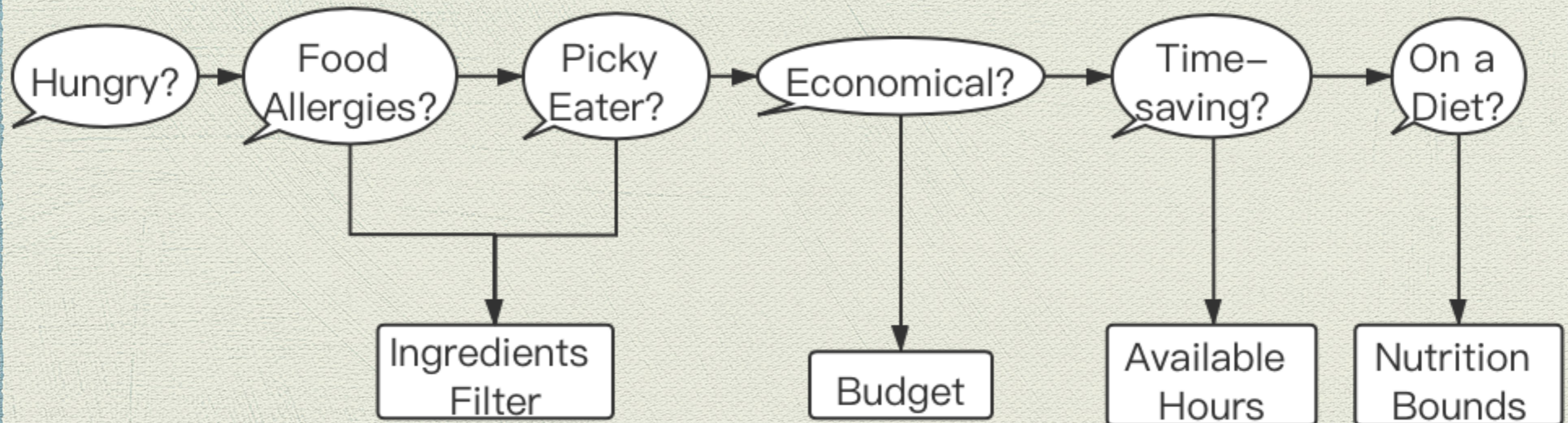
$$\sum_{j=1}^{5} x_{i,j} \leq 1, i = 1,...,N$$

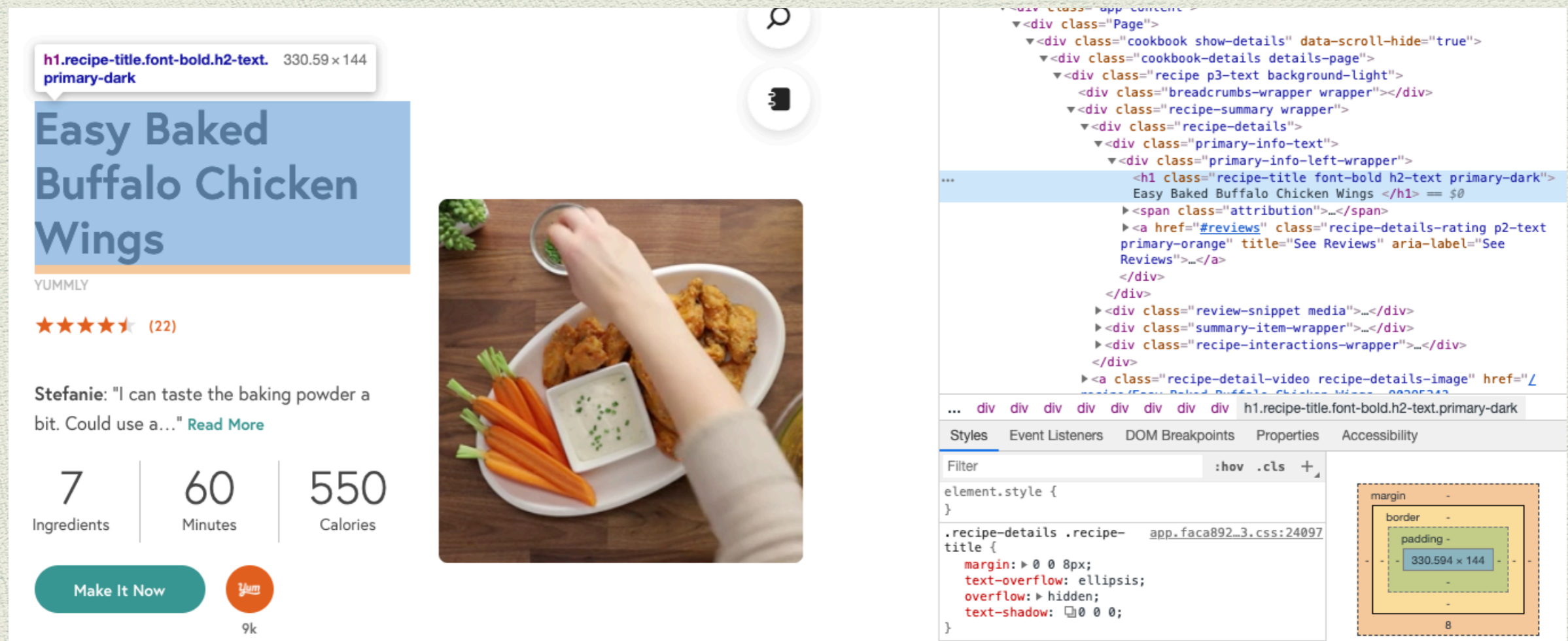$$\sum_{i=1}^{N} \sum_{j=1}^{5} x_{i,j} = 5$$

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

Implementation

1. Determine values of RHSs by interviewing a friend

Implementation

2. Collect and store related recipes data with web scraping

Implementation

3. Construct and fill recipes-user-rating matrix

4. Solve by Integer Programming

Thank you

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