**Multirec²sys: A multimodal recommender system for recipes.**

Victor E. Trejo Reyes (vet6013@rit.edu)

Co-Advisors: Reynold Bailey, Ph.D. and Cecilia O. Alm, Ph.D.

Rochester Institute of Technology

**CS Computer Graphics & Applied Perception Lab**

---

**Goal and Contributions**

- Building systems for recommending recipes using textual and visual evidence (text and dish pictures).
- Modeling with text data in various ways (terms, expanding terms using WordNet, topics).
- Integrating textual and visual data.
- Performing comprehensive simulations.
- Developing a web application with visualization bells and whistles.

**Combination Process**

Figure 1: Combining the different modalities with a linear combination of the similarity of each.

\[ \sum w_i \cdot \text{score}_i \]

**Evaluation and Results**

- Evaluated each system with 30 simulated users who like food satisfying certain conditions: ingredients, cooking techniques, dish type.

<table>
<thead>
<tr>
<th>Users</th>
<th>Ingredients</th>
<th>Dish</th>
<th>Cooking Tech.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alex</td>
<td>chicken</td>
<td>soup</td>
<td>-</td>
</tr>
<tr>
<td>Taylor</td>
<td>rice</td>
<td>chili</td>
<td>simmering</td>
</tr>
<tr>
<td>Ariel</td>
<td>pepperoni</td>
<td>-</td>
<td>baking</td>
</tr>
</tbody>
</table>

- Metrics considered: Mean Average Precision (MAP) and Mean Reciprocal Rank (MRR).
- Addressed the cold-start issue by initially recommending the 30 most popular items overall, then learning user preferences over 1 iteration.

**Motivation**

- **Why food recipes?**
  People enjoy eating food and also preparing it. Many people browse the Internet looking for recipes. However, it is difficult to navigate and filter through the wide range of sites and search options available.

- **Why a multimodal recommender system?**
  A recipe could be chosen for the taste of its ingredients, its cooking techniques, or its visual appearance and presentation. (Does the dish look appealing?)

**Topics**

Figure 2: Top 10 words for two topics: sweets/baking and seasoning/dressing ingredients.

**Recommended Systems**

**Selected references**

