



Community Recipe Sharing Platform

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Abstract— Home cooks and hobbyist chefs generate a large volume of original recipes, but discovering recipes matched to one's available ingredients, dietary preferences, and skill level remains difficult on generic content platforms not purpose-built for structured recipe data. This paper presents a detailed technical treatment of a community recipe-sharing platform that combines structured recipe authoring, ingredient-based search, and a content-based recommendation engine to help users discover relevant recipes from a growing, community-contributed catalogue. Beyond a conventional system description, this paper grounds the recommendation engine in classical information-retrieval and recommender-systems literature, critically reviews food-platform and nutrition-data research, and formalizes the ingredient-overlap and preference-matching scoring function. A prototype was implemented using a React front end, a Node.js/Express backend, and a MongoDB data store integrated with a public nutrition-data reference. Illustrative (simulated) evaluation shows that content-based, ingredient-aware recommendation improves estimated recipe relevance over popularity-only ranking. All reported figures are simulation-based and explicitly labelled as such.

Index Terms— *recipe sharing, content-based recommendation, ingredient matching, food technology, community platforms, information retrieval.*

I. INTRODUCTION

Online recipe sharing has grown into large community catalogues, but generic platforms lack structured ingredient-level data required for precision discovery. Content-based filtering effectively addresses cold-start constraints by analyzing rich item metadata.

Contributions: (1) structured recipe authoring schema, (2) ingredient-aware recommendation engine, (3) automated nutrition data computation via USDA integration, and (4) simulated relevance evaluation.

II. PROBLEM STATEMENT / OBJECTIVES

To rank and surface recipes based on available ingredients, dietary restrictions, and skill levels using transparent scoring function.

- Design structured authoring schemas.
- Implement ingredient-based search.
- Build ingredient-overlap and preference matching recommendation engine.
- Integrate public nutrition references.

III. LITERATURE REVIEW / RELATED WORK

Grounded in recommender systems literature, set-similarity (Jaccard index/TF-IDF), and standardized food composition data sources.

TABLE I: COMPARISON OF EXISTING APPROACHES

Approach	Key Technique	Limitation
Static recipe blogs	Manual, unstructured content	No structured search or filtering by ingredient
General content platforms	Generic tagging/search	Not purpose-built for ingredient-level structure
Popularity-ranked sites	View-count/rating ranking	Ignores individual ingredient availability



Proposed platform

Structured schema + content
recommendation

Requires complete recipe metadata
to rank well

IV. EXISTING SYSTEM & V. PROPOSED SYSTEM

Combines structured authoring, Jaccard-like ingredient set matching, dietary/skill boost scoring, automated nutrition calculations, and community reviews.

VI. SYSTEM REQUIREMENTS & VII. METHODOLOGY

Time complexity of recommendation scoring is $O(n \cdot k)$ for n recipes and k ingredients. Automated nutritional summaries operate in $O(m)$ per ingredient list.

VIII. ARCHITECTURE, IX.

IMPLEMENTATION & X. TESTING

Built using React, Node.js/Express, MongoDB, Python recommendation microservice, and USDA FoodData Central REST API.

XI. RESULTS AND DISCUSSION

Simulated evaluation demonstrated MAP@10 improvement from 0.34 (popularity baseline) to 0.55 (ingredient overlap) and 0.69 (proposed combined scoring), with candidate satisfaction increasing to 4.2/5.0.

TABLE VII: PERFORMANCE / EVALUATION SUMMARY

Ranking Approach	Mean Average Precision @10	Avg. User-Reported Relevance (1-5)
Popularity-only ranking (baseline)	0.34	2.8
Ingredient-overlap only	0.55	3.5
Ingredient overlap + preference match (proposed)	0.69	4.2

XII. ADVANTAGES / LIMITATIONS &

XIII. ETHICAL CONSIDERATIONS

Offers transparent recommendation explanations. Metadata completeness and ingredient synonym normalization remain ongoing challenges.

XIV. CONCLUSION & XV. FUTURE SCOPE

Future work includes automated substitution mapping, multi-recipe meal planning, and collaborative filtering as interaction data grows.