



House Rental Application

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Abstract— Finding a rental property that matches a tenant's budget, location preference, and amenity requirements is a time-consuming process on generic classifieds platforms that offer limited structured filtering and no personalized ranking. This paper presents a detailed technical treatment of a house-rental application that combines structured property listings, faceted search, and a content-based recommendation engine to help prospective tenants discover relevant properties from a growing listing catalogue, while providing landlords with inquiry-management and listing-performance analytics. Beyond a conventional system description, this paper grounds the recommendation engine in classical information-retrieval and recommender-systems literature, critically reviews prior work on housing-search platforms and location-based filtering, and formalizes the multi-attribute matching function combining budget, location, and amenity preference. A prototype was implemented using a React front end, a Node.js/Express backend, and a MongoDB data store with geospatial indexing for location-based search. Illustrative (simulated) evaluation shows that multi-attribute content-based matching improves estimated listing relevance over filter-only search.

All reported figures are simulation-based and explicitly labelled as such.

Index Terms— house rental, real estate search, content-based matching, geospatial search, faceted filtering, recommender systems.

I. INTRODUCTION

Rental property search suffers on generic classifieds platforms due to lack of multi-attribute ranking. This paper proposes a unified framework combining faceted filters with content-based feature vector scoring.

II. PROBLEM STATEMENT / OBJECTIVES

Develop structured property schemas, implement geospatial proximity filtering, build multi-attribute matching (budget, location, amenities), and provide landlord management portals.

III. LITERATURE REVIEW & IV. EXISTING SYSTEM

Reviews multi-criteria decision making, vector-space retrieval models, and spatial database indexing in real estate platforms.

TABLE I: COMPARISON OF EXISTING APPROACHES

Approach	Key Technique	Limitation
Generic classifieds platforms	Basic keyword/category listing	Limited structured filtering; no personalized ranking
Facet-filter-only rental sites	Price/bedroom/location filters	Does not rank within the filtered set
Agent-mediated search	Human-mediated matching	High cost; limited scale
Proposed platform	Multi-attribute content-based matching	Requires complete listing metadata to rank well



V. PROPOSED SYSTEM & VII. METHODOLOGY

Combines linear decaying budget score, geospatial distance calculations, and Jaccard amenity overlap into a unified weighted ranking score.

VIII. ARCHITECTURE, IX. IMPLEMENTATION & X. TESTING
Implemented with React UI, Express REST server, MongoDB geospatial indexes, AWS S3 image storage, and Node.js scoring modules.

XI. RESULTS AND DISCUSSION

Multi-attribute matching achieved MAP@10 of 0.71 and tenant relevance of 4.2/5.0, significantly outperforming filter-only search (0.41 MAP@10, 3.0 relevance) and proximity-only ranking (0.58 MAP@10).

TABLE VII: PERFORMANCE/EVALUATION SUMMARY

Search Approach	Mean Average Precision @10	Avg. Tenant-Reported Relevance (1-5)
Filter-only search (baseline)	0.41	3.0
Filter + location-proximity ranking	0.58	3.6
Filter + full multi-attribute matching (proposed)	0.71	4.2

XII. ADVANTAGES / LIMITATIONS & XIII. ETHICAL CONSIDERATIONS

Improves discovery relevance. Explicitly excludes protected demographic traits from matching algorithms to enforce Fair Housing compliance.

XIV. CONCLUSION & XV. FUTURE SCOPE

Future features include virtual tours, learned personalized attribute weights, and Fair Housing auditing tools.