Recommendation System

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1. Introduction & Business Goal

Helping Users Discover Movies They'll Love

The Problem

Finding a good movie shouldn't feel like a chore. Yet, users often struggle to pick something they'll enjoy leading to frustration, wasted time, and lower engagement.

The Solution

A smart recommendation system that learns user preferences and suggests movies they're most likely to enjoy.

The Impact

- Higher user satisfaction—less frustration, more great movie nights.
- Increased watch time—users spend less time searching and more time watching.
- Stronger retention—happy users are more likely to stay loyal.

Our goal? A personalized, seamless movie discovery experience.

Data Insights

What We Know About Users and Movies

The Data Behind the System

Our recommendation model is trained on 100,000 ratings from 610 users across 9,724 movies (Movielens dataset).

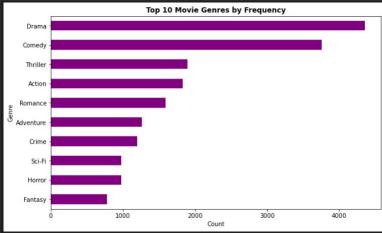
Key Insights:

- Users are generally satisfied the average rating is 3.5/5.
- Some genres dominate Drama, Comedy, and Action are the most popular.
- People's tastes vary one size doesn't fit all, making personalization crucial.

Why This Matters

The more we understand real user preferences, the better we can tailor recommendations to individual tastes.

Visual: Bar chart of the top 10 movie genres—showing what users love most.



How It Works

The Recommendation Engine

For Active Users:

The system learns from past ratings and suggests similar movies.

- Example: A user who loved Toy Story is likely to enjoy Finding Nemo.

For New Users:

Without past ratings, we suggest:

- Popular movies
- Highly rated films in trending genres

This way, even first-time users get meaningful recommendations—no more guessing what to watch!

Results

Better Recommendations, Happier Users

Key Performance Metrics:

- ✓ Improved Accuracy—Our predictions are off by 0.83/5, an improvement from 0.88/5.
- ✓ Better Coverage—The system suggests 25% of the movie catalog, avoiding repetitive recommendations.
- ✓ Cold Start Solution—New users receive immediate, relevant suggestions.

Before vs. After

Before: Users received random movie suggestions.

Before

```
Recommendation for user 1 for CF (not optimized)
Top 5 Movie Recommendations:
    movieId
title
277 318 Shawshank Redemption,
The (1994)
681 899 Singin' in the
Rain (1952)
686 904 Rear
Window (1954)
694 912
Casablanca (1942)
704 922 Sunset Blvd. (a.k.a. Sunset
Boulevard) (1950)
```

Recommendation for user 168
Top 5 Movie Recommendations:

	movieId		title
474	541	Blade Runner	(1982)
510	593	Silence of the Lambs, The	(1991)
680	898	Philadelphia Story, The	(1940)
935	1235	Harold and Maude	(1971)
1616	2160	Rosemary's Baby	(1968)

Before

```
Recommendation for user 168

Top 5 Movie Recommendations:
    movieId

title
46 50 Usual Suspects, The (1995)
277 318 Shawshank Redemption, The (1994)
686 904 Rear Window (1954)
901 1199 Brazil (1985)
924 1223 Grand Day Out with Wallace and Gromit, A
```

__ After

```
Cold Start User Detected (User 150) → Using
Content-Based Filtering
Top 5 Hybrid Movie Recommendations:
    movieId
         97 Hate (Haine, La) (1995)
                    City Hall (1996)
                Unforgettable (1996)
274
        315 Specialist, The (1994)
                Jurassic Park (1993)
418
User 1 has rated enough movies → Using Hybrid
Top 5 Hybrid Movie Recommendations:
     movieId
title
3398 4623
League (1989)
3418
       4649
Summer (2001)
3422
Beverly Hill...
8425 111362
                              X-Men: Days of
Future Past (2014)
8475 112852
Galaxy (2014)
```

Now:

Recommendations are aligned with user preferences.

Why It Matters

Business Impact

The Bottom Line:

- Better retention—Engaging recommendations keep users coming back.
- Higher revenue—Increased watch time leads to more ad views & subscriptions.
- Competitive edge—Platforms with personalized recommendations outperform those with generic suggestions.



Final Thought

This isn't just about an algorithm—it's about creating a smarter, more enjoyable way to discover movies. The result? Happier users, stronger engagement, and a more successful platform.