Problem Statement Title: Personalized Product Recommendation
Team Name: Code Vikings

Team members details

Team Name	Code Vikings		
Institute Name/Names	Pranveer Singh Institute Of Technology		
Team Members >	**1 (Leader)**	**2**	
Name	Vaibhav Gupta	Sukriti Singh	
Batch	B-Tech(CSE) 2020-2024	B-Tech(CSE) 2020-2024	

Deliverables/Expectations for Level 2 (Idea + Code Submission)

In response to the evolving landscape of personalized user experiences, we present a project proposal to develop a cutting-edge Personalized Product Recommendation System tailored for Flipkart. The proliferation of products and choices often overwhelms users on e-commerce platforms. Our project addresses this challenge by creating a personalized product recommendation system that understands user preferences and provides tailored suggestions aligned with their interests.

Goals:

1. **Innovative Recommendation System:** To develop an advanced recommendation system utilizing state-of-the-art techniques to offer personalized product suggestions. This system will harness the power of data-driven insights, machine learning, and AI to provide users with personalized product suggestions that resonate deeply with their preferences and behavior
2. **User Engagement Enhancement:** To elevate user engagement by delivering relevant and timely recommendations, creating a more satisfying shopping experience. Our approach aims to captivate users, keeping them actively engaged, and ultimately fostering a more immersive and enjoyable interaction with Flipkart's platform.
3. **Business Impact:** To positively impact Flipkart's business metrics, including conversion rates, average order value, and customer retention.

The crux of our project lies in addressing the personalized product recommendation problem. A critical challenge in the world of online retail. With the vast array of choices available, users often struggle to discover products that truly resonate with their interests. This gap in personalized discovery not only dampens user satisfaction but also hampers business growth by limiting conversions and engagement. Our solution holds immense significance for Flipkart, as it endeavors to bridge this gap by deploying an intelligent recommendation system that intuitively understands user preferences, leading to a more relevant and enriching shopping experience.

This Project Proposal and PowerPoint Document introduces our vision for the Product Recommendation System which is personalized. By aligning our goals with Flipkart's objectives, our aim is to create a recommendation engine that transforms the way users explore products, significantly improving user satisfaction and contributing to Flipkart's business success. Through effective implementation and collaboration, we anticipate achieving remarkable results in the field of personalized e-commerce recommendations.

Glossary

- **SVD:** Singular-Valued Decomposition
- **CTR:** Click Through Rates
- **AOV:** Average Order Value
- **AI:** Artificial Intelligence

Use-cases

- **P0 (Highest Impact):**

1.Personalized Product Recommendations: Providing tailored product suggestions to users based on their preferences and behavior. This is about tailoring recommendations to user preferences, making their experience unique.

2.New User Onboarding: Addressing the cold start challenge by offering initial recommendations to new users based on demographic data and initial interactions. This ensures a personalized experience from the beginning.

- **P1: Embracing Variety (High Impact):**

1.Diverse Recommendations: Ensuring a variety of recommendations that cater to different user preferences. This enhances user satisfaction by presenting both popular and niche items, broadening their exploration.

2.Real-Time Recommendations: Generating recommendations in real-time as users interact with the platform. This instantaneous response enhances user experience and engagement by providing timely suggestions.

- **P2 (Moderate Impact):**

  1. **Contextual Recommendations:** Tailoring recommendations based on contextual factors such as time, location, and device. This adds relevance to suggestions, aligning them with users' immediate needs and surroundings.

  2. **Enhancing Long-Term Engagement:** Implementing time-sensitive decay mechanisms to keep recommendations relevant over time. This maintains a dynamic and engaging experience for users, even if their preferences evolve further in the future.

Solution statement/ Proposed approach

1. Addressing the Cold Start Challenge:

•**Problem:** Greeting new users with limited interaction history requires innovative strategies. Welcoming new users to Flipkart is like meeting someone new – we don't have much information about their likes and dislikes yet.

•**Solution:** Harness demographic data by collecting age, gender and location of users and on the basis of which we get to know the users a little bit. Then by looking at what they've done, our model starts to suggest things they might enjoy. This way, right from the beginning, we can give new users a taste of personalized recommendations. We have blended content-based filtering and collaborative filtering together. This mix helps us give new users suggestions that they might really like.

2. Dealing with Not Enough Data Solving the Empty Spaces :

•**Problem:** When we don't have much info about what users like, it's like solving a jigsaw puzzle with missing pieces. How can we understand their preferences better?

•**Solution:** Deploy advanced matrix factorization techniques, like Singular Value Decomposition (SVD), to infill gaps in data. Our aim is to pay attention to little hints, like when users click on things, by harnessing Click Through Rates(CTR), Average Order Value(AOV), CleverTap and Customer Journey .

3 . Creating Exciting Recommendations for Everyone:

Problem: Enabling recommendations that delight users with a spectrum of wide preferences. We want to make sure our suggestions bring joy to people with different tastes.

Solution: Employ matrix factorization with Singular Value Decomposition technique to seamlessly weave in variety without compromising popularity. We want to keep things fresh. This way, our suggestions have a bit of everything – something for the crowd and something that stands out.

4. Contextual Refinement for Personal Touch:

Problem: Elevating recommendations with the power of context, encompassing time, location, and user device.

Solution: We’re aiming to weave a layer of context into our recommendations. This means we're considering when and where the user is shopping. If it's summer, the model will suggest swimsuits. If you're on a phone, the model will show mobile-friendly options. Enrich the recommendation strategies with contextual awareness. Integrate time-sensitive decay mechanisms for historical interactions culminating in a deeply personalized experience.

Limitations

1. **Limited Data Can Limit Accuracy:** The system needs lots of good information about what people like to give good suggestions. If there isn't enough data, the suggestions might not be as good.

2. **New Users Might Get Generic Suggestions:** When someone is new, the system doesn't know much about them yet. This means the suggestions might not be very personalized right away.

3. **Privacy Concerns:** Sometimes, collecting information about what people like can be like peeking into their private stuff. Finding a balance between personalization and privacy is important.

4. **Seeing Only What You Like:** If the system only shows things you already like, you might miss out on trying new things or finding unexpected treasures.

5. **Stereotypes Can Sneak In:** Sometimes, the system might accidentally suggest things based on things it already knows, even if they're not accurate or fair.

Future Scope

1.AI Advancements: The field of artificial intelligence is evolving rapidly. We're poised to incorporate cutting-edge AI techniques that can better understand user preferences, leading to even more accurate and relevant recommendations.

1.Deep Learning Exploration: Deep learning, a subset of AI, holds promise in unraveling intricate patterns in user behavior. This can pave the way for even deeper personalization and insights.

2.Multi-Modal Recommendations: Imagine recommendations not only based on past clicks but also considering images, voice commands, and more. The future might see us venturing into multi-modal recommendation systems for a holistic user experience.

3.Experiential Personalization: Tailoring recommendations to not only what users like but also to their mood, current needs, and experiences. This could result in a highly personalized and emotionally resonant shopping journey.

4.Ethical AI: Striking the right balance between personalization and ethical considerations is crucial. We'll continue refining our approach to ensure transparency, fairness, and user control over their data.


Flipkart
GRiD
5.0
Thank You