amazon

Team Name : Innos

TEAM NAME and MEMBER DETAILS

MEMBERS

1. **Abishek Madhav G S**
2. **Gopalakrishnan N**
3. **Abishek Vishva A**

TEAM NAME

Innos

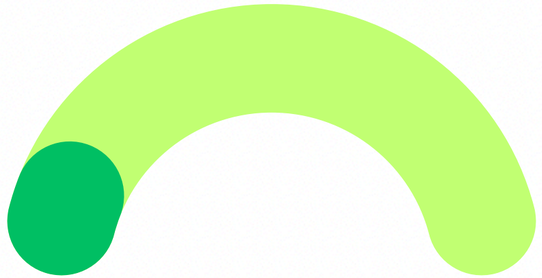
THEME

Enhanced Fire TV Experience

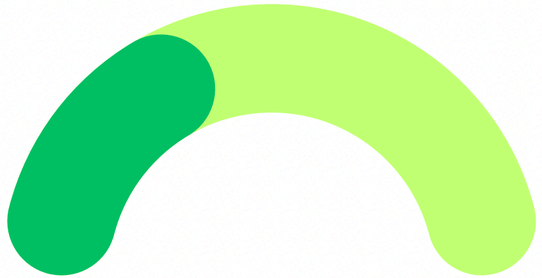
PROBLEM STATEMENT(Part-1)

WHAT?

- In today's streaming landscape, users face an **overwhelming amount of content across multiple OTT platforms**, leading to **"decision fatigue"** where users spend **more time scrolling than watching**.
- **Existing recommendation systems** often rely solely on **viewing history or popularity trends** failing to consider individual context such as user's current mood, day of the week, time of day.
- **Users spend an average of 18 minutes browsing before selecting content**, often abandoning the platform entirely when overwhelmed by choices.



20% of the sessions end without content selection

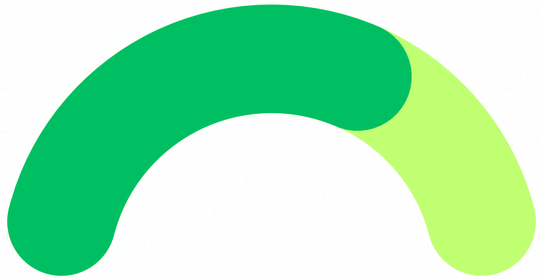


41% increase in browsing time in 4 years

PROBLEM STATEMENT(Part-2)

WHAT?

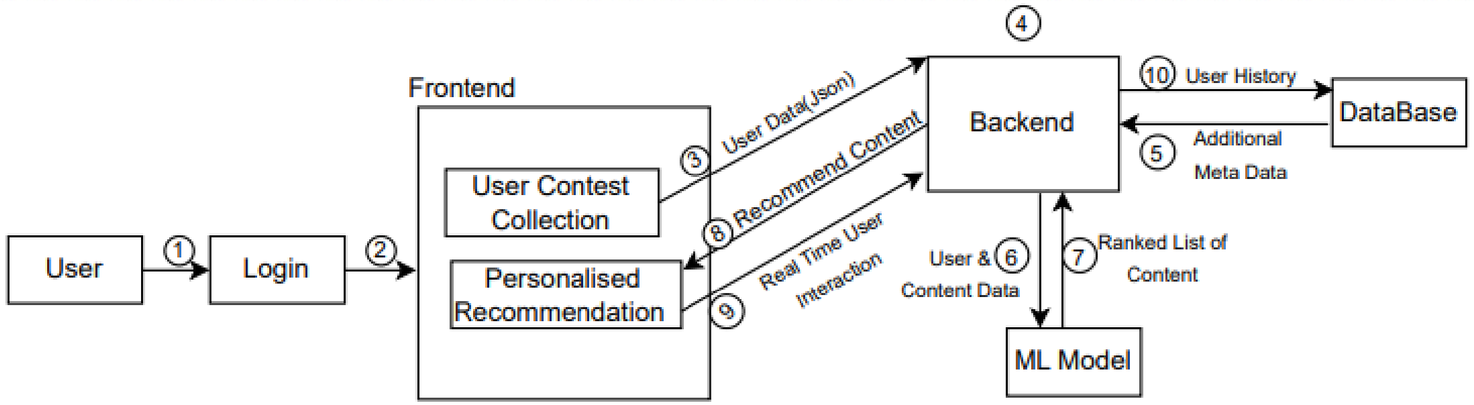
- While streaming has become the dominant mode of entertainment, **the social aspect of watching together has been left behind and users miss the connection, conversation and collaboration of watching together.**
- When social viewing does occur, **the pressure to select content that satisfies all participants often creates anxiety** rather than enjoyment, **turning the experience into a stressful social negotiation.**
- **Existing "Watch Party" features** are:
    - **Limited to same-platform users.**
    - **Often lack interactivity** (no reactions, voting, real-time feedback).
    - **Not optimized for context-based shared experiences.**



71% of Gen Z prefer watching content socially, even when physically apart

Our Solution (Part-1)

Our Personalized Recommendation System Architecture

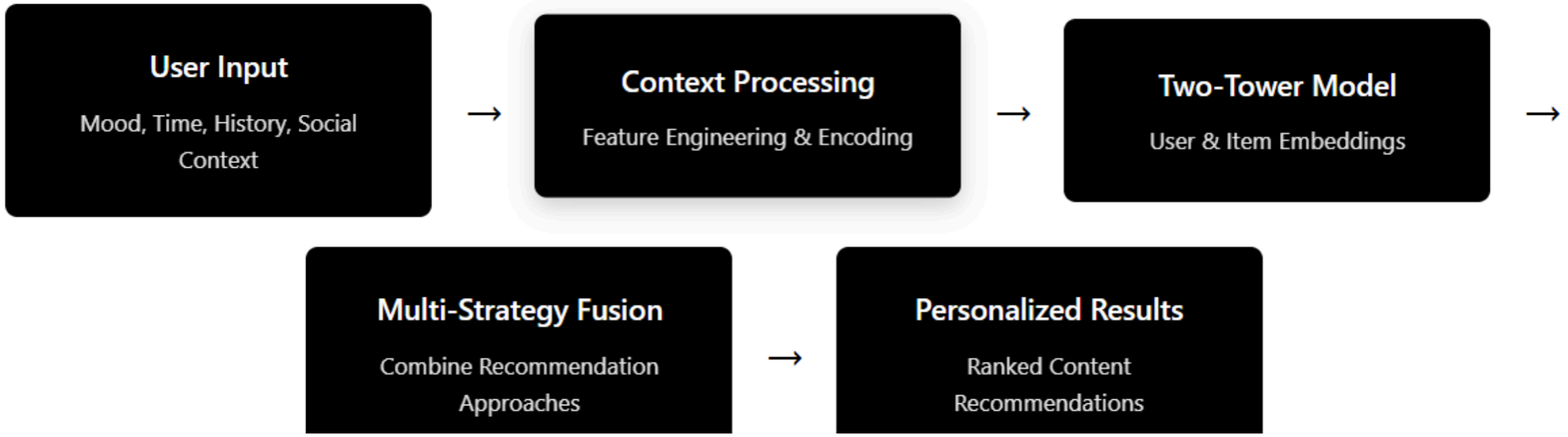


- Our solution delivers highly **personalized content** suggestions by intelligently considering **contextual factors** such as the user's **mood, time of day, day of the week, viewing history, and demographic details** like age group. This ensures that users always receive **relevant and engaging content** tailored to their current preferences and situation.

- Instead of **manually switching** between different OTT platforms or remembering where specific content is available, **users can seamlessly discover content from multiple streaming services in one place. This significantly reduces time spent searching and maximizes time spent enjoying content.**

- To further enhance personalization, the system offers **time-sensitive recommendations**, suggesting **shorter or longer content** based on the **user's availability**. At the **end of each week**, users receive a personalized content recap **highlighting key moments** from what they watched. Additionally, **the UI and app theme dynamically adapt to the user's mood**, creating a more emotionally engaging and immersive experience.

Our Solution (Part-1)



Data Processing Flow

Input Processing

- Mood to integer encoding
- Time normalization
- Categorical feature encoding
- Numerical feature scaling

Feature Engineering

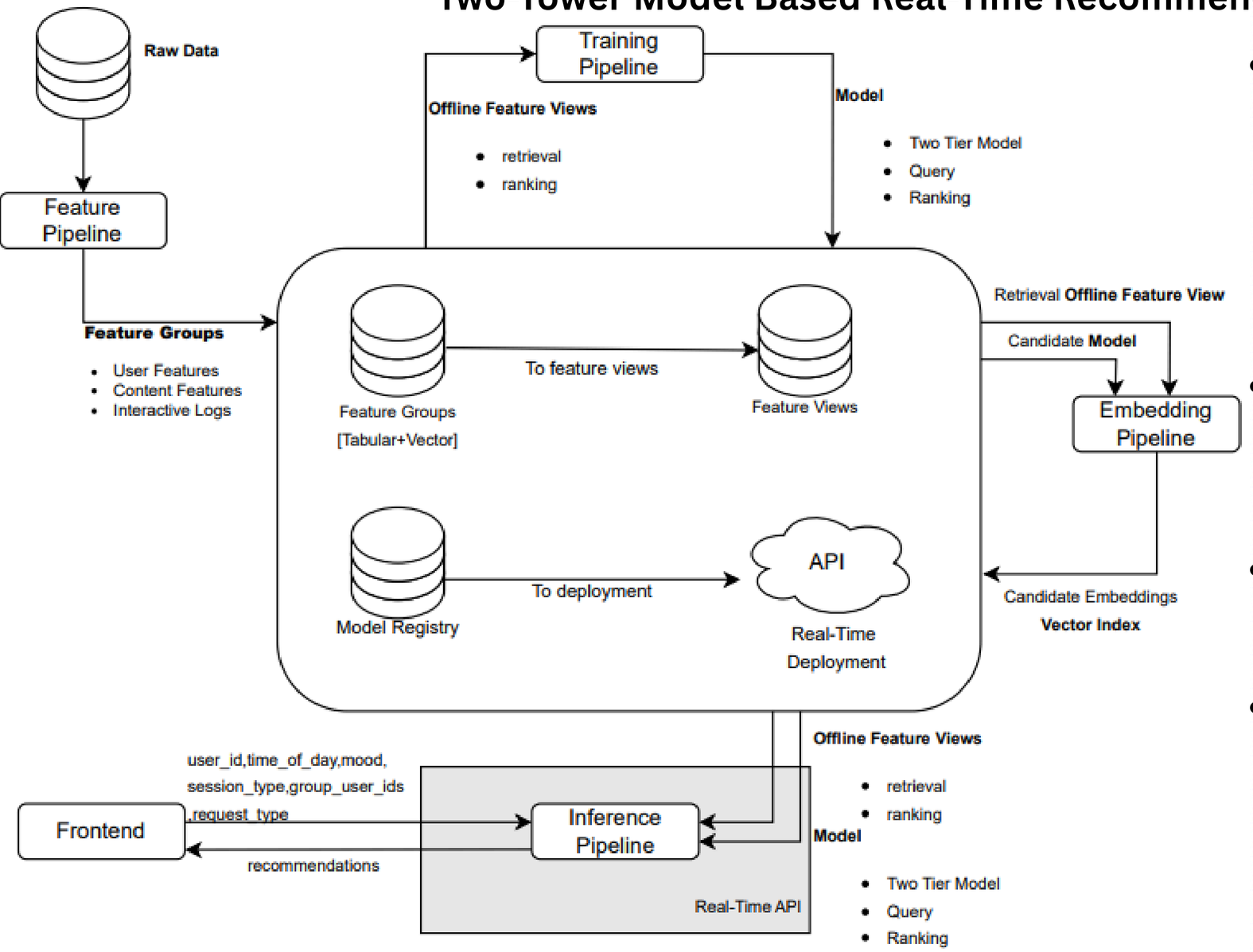
- User behavior analysis
- Content metadata extraction
- Contextual feature creation
- Social context integration

Recommendation Fusion

- Strategy weight balancing
- Duplicate removal
- Score normalization
- Final ranking computation

Our Solution (Part-1)

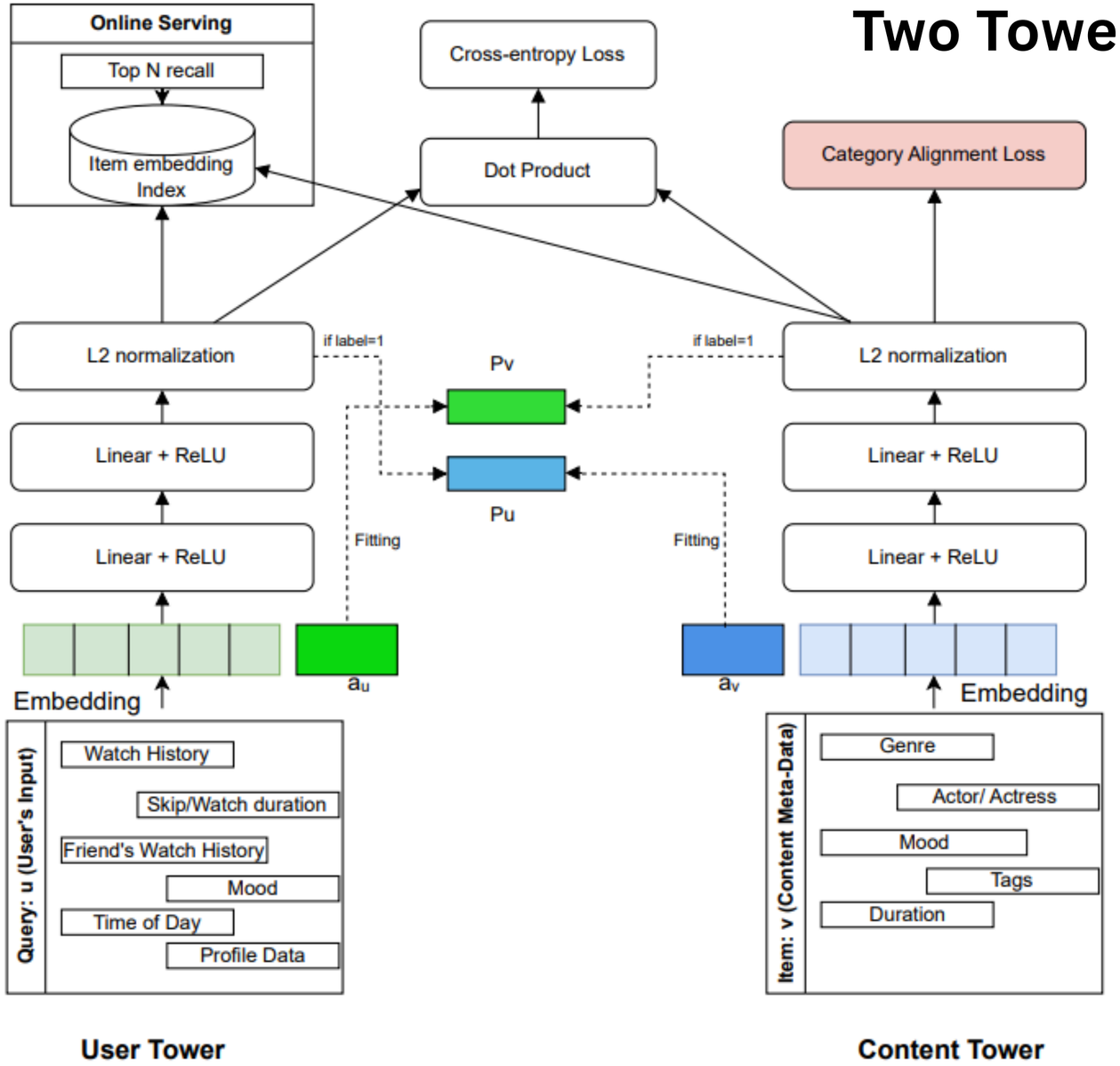
Two-Tower Model Based Real-Time Recommendation System Architecture



- The approach is simple—we aim to **integrate** a personalized AI recommendation model into the existing primary **Fire TV platform**. Using a **Two-Tower neural network**, the model learns embeddings for both **users and content** based on **contextual signals** like mood, time, and viewing history.
- The **user tower** captures behavioral and contextual patterns, while the **content tower** processes metadata such as genre, tags, and duration.
- A **dot product** between these embeddings computes **similarity scores to recommend** the most relevant content.
- **Feature engineering and encoding** ensure raw inputs are transformed into **meaningful vectors**, and a **multi-strategy fusion layer** combines collaborative and content-based methods for accurate final ranking.

Architecture

Two Tower Model



User Tower

Input Features:

- User ID, Age Group
- Current Mood
- Time Context (Hour, Day, Weekend)
- Session Duration
- Social Activity Level
- Group Watch Status
- Recent Genre Preferences
- Average Rating Given

Processing:

- Embedding Layers
- Feature Normalization
- Dense Neural Networks
- Batch Normalization
- Dropout Regularization
- L2 Normalization

Content Tower

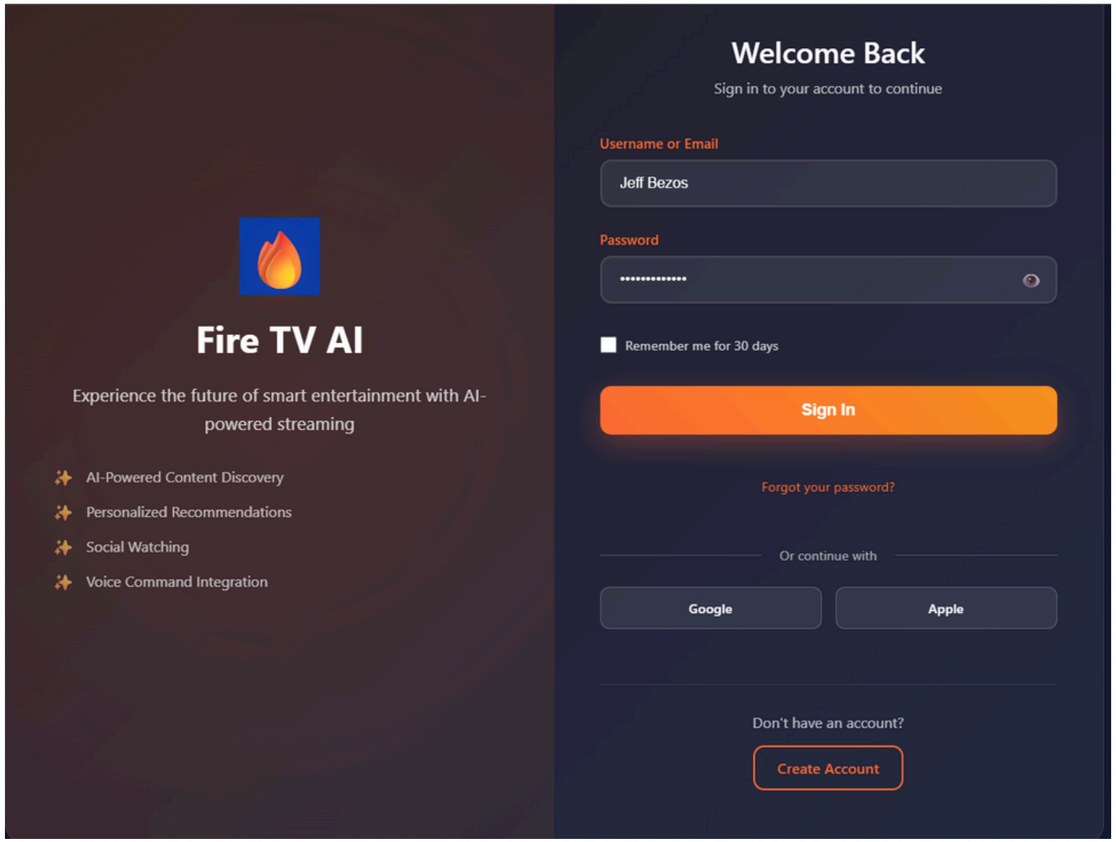
Input Features:

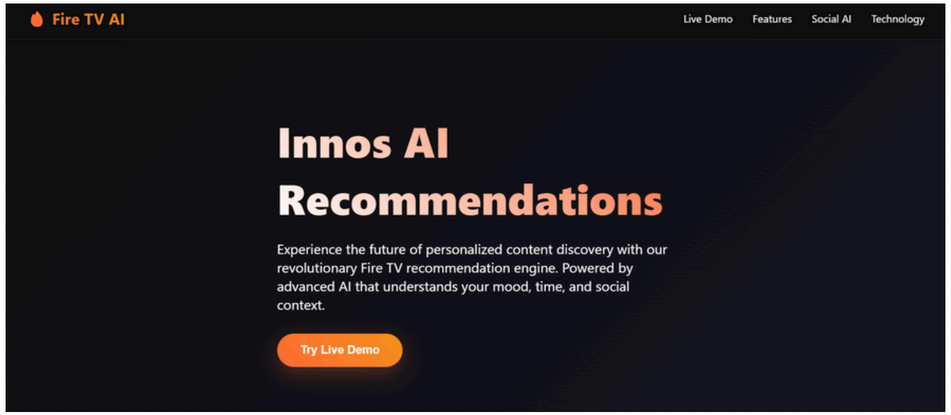
- Content ID
- Primary & Secondary Genre
- Platform
- Content Type
- Duration, Release Year
- Rating, Popularity Score
- Trending Status

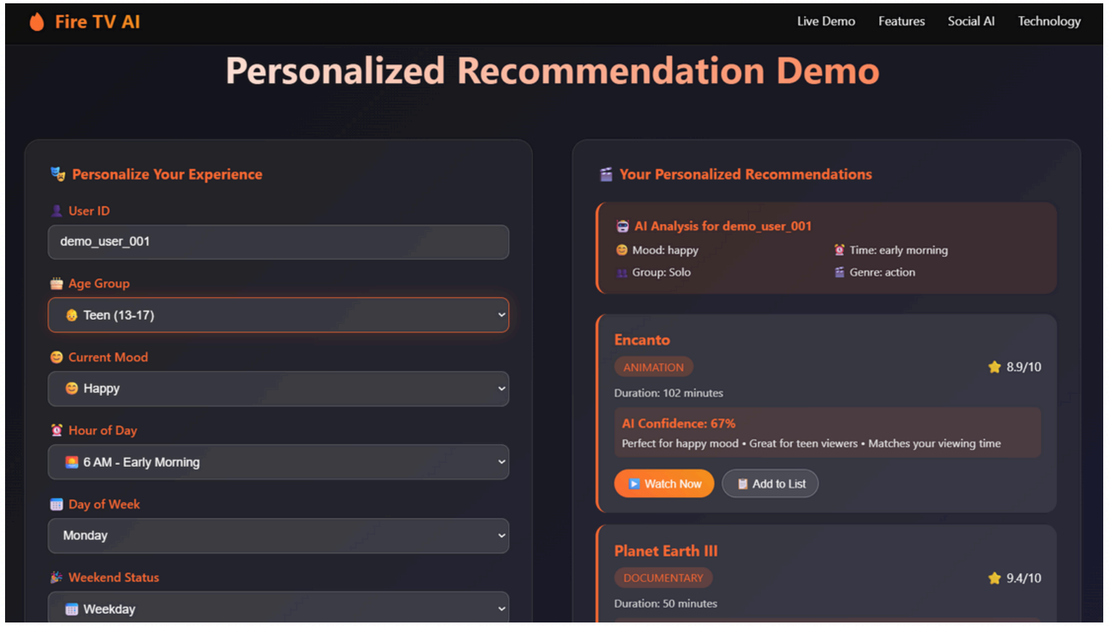
Processing:

- Content Embeddings
- Genre Embeddings
- Platform Embeddings
- Feature Normalization
- Dense Neural Networks
- L2 Normalization

Sample Prototype Flow

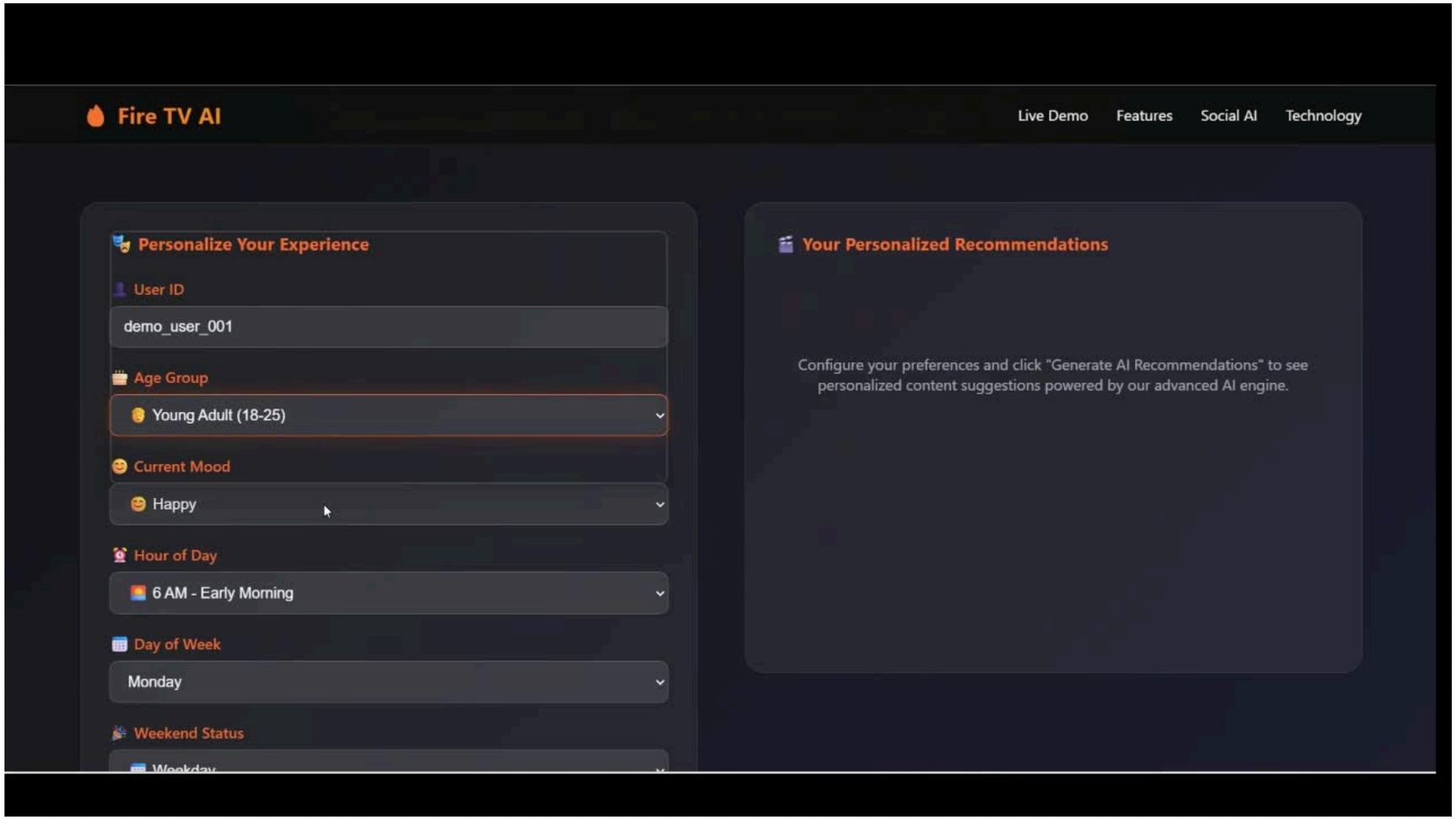






Sample Prototype

Demo video: https://youtu.be/GM9HXfpF_uE



Our Solution (Part-2)

Group-Based Recommendations:

- Users can form **virtual watch groups** directly within the Fire TV ecosystem, **inviting friends and family** to join a shared viewing session. Once a group is formed, users can **request content suggestions**. The system recommends movies or shows that **best match the combined preferences of all participants**, ensuring a **balanced and enjoyable experience for everyone**.

Interactive Social Layer:

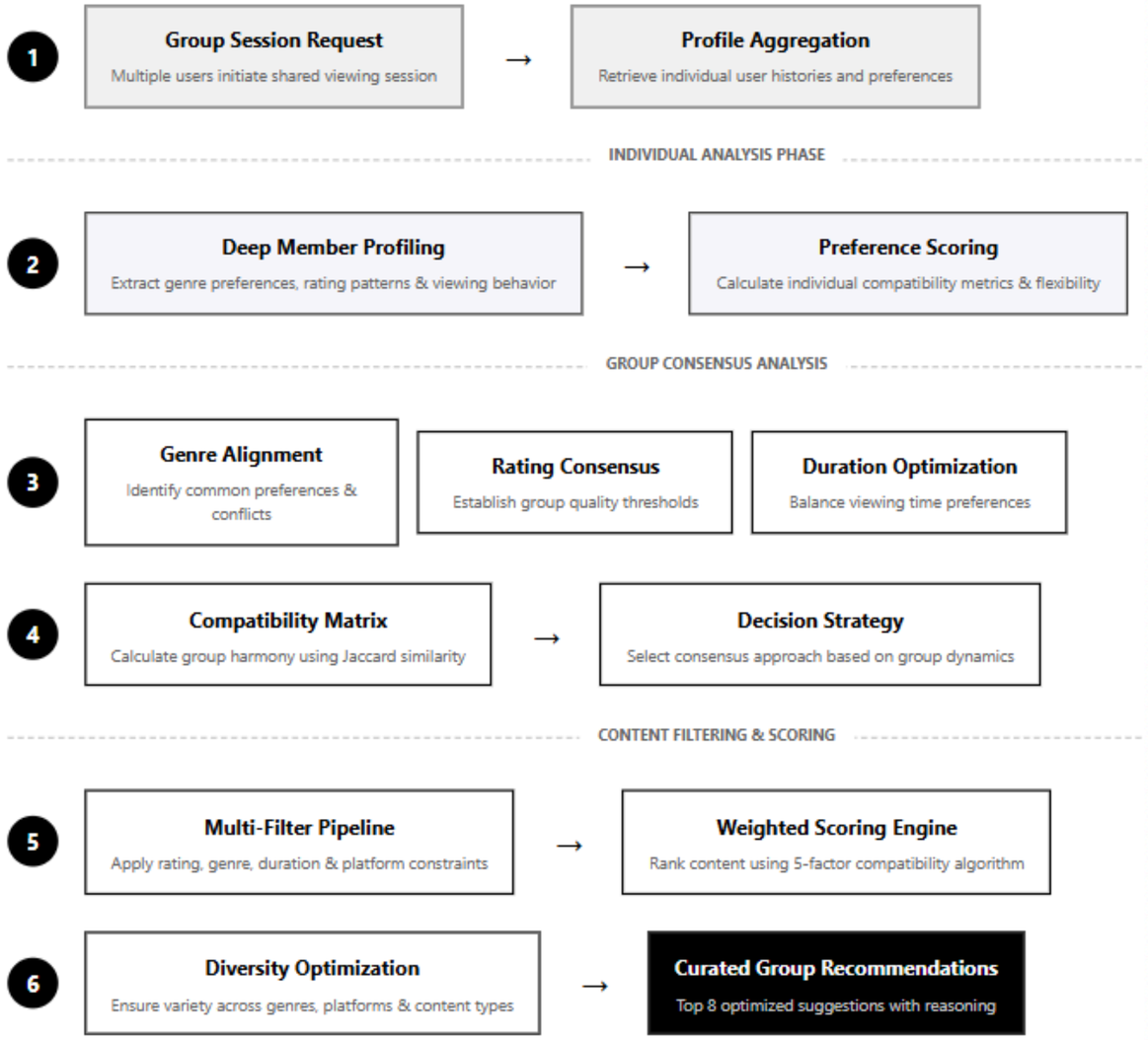
- During playback, users can engage using **emojis, live text chat, and voice interactions via Alexa**—bringing back **real-time conversations and emotional reactions**. To make group watching more fun, **features like streaks, watch challenges, and shared milestones** can be introduced, encouraging consistency and friendly competition.

Admin Controls:

- A **remote-control-like feature** enables designated **group admins to control playback—pause, play, skip**—for synchronized and smooth group sessions.

Our Solution (Part-2)

Group Recommendation System Flow



- The architecture is designed to enable seamless and intelligent **social viewing on Fire TV**. It begins with group session formation, where users create virtual watch parties and invite others. Individual **user preferences are aggregated through viewing history, genre affinity, and rating patterns, followed by deep profiling to compute compatibility scores**. A **group consensus engine** then aligns genres, optimizes viewing durations, and resolves conflicts using similarity metrics and fairness-based strategies. The **multi-filter pipeline applies constraints** like platform availability and duration, **while a weighted scoring engine ranks content using a 5-factor compatibility model**. Finally, curated recommendations are presented with reasoning for transparency. Real-time engagement is powered by **WebSocket-based chat, Alexa voice support, and synchronized admin controls** for playback. To boost user retention, streaks, challenges, and gamified elements are integrated, making the shared viewing experience both smart and socially rewarding.

Sample Prototype Results

Personalized Recommendation:

```
Fire TV Personalized Recommendation Engine Demo
======================================================================
Fire TV Recommendation System by team Innos
✅ Initialized with 1000 content items

=================== USER 1 DEMO ===================
👤 User: alice_123
😊 Mood: relaxed
⏰ Time: 20:00 on Weekend
📺 Watch History: 2 items
👥 Group Watch: No

 Getting recommendations for user: alice_123

🎯 Based on your relaxed mood and evening weekend timing, we've selected 5 personalized recommendations.
📋 Top Recommendations:
   1. Title_640 (romance) - Peacock
      ⭐ Rating: 9.3 | Score: 0.93
   2. Title_26 (documentary) - Paramount+
      ⭐ Rating: 9.1 | Score: 0.91
   3. Title_466 (romance) - HBO Max
      ⭐ Rating: 7.8 | Score: 0.78
   4. Title_348 (drama) - Peacock
      ⭐ Rating: 8.5 | Score: 0.76
   5. Title_955 (fantasy) - Paramount+
      ⭐ Rating: 7.3 | Score: 0.73

=================== USER 2 DEMO ===================
👤 User: bob_456
😊 Mood: excited
⏰ Time: 21:00 on Weekend
📺 Watch History: 2 items
👥 Group Watch: Yes

 Getting recommendations for user: bob_456

🎯 Based on your excited mood and evening weekend timing and your group watching session, we've selected
📋 Top Recommendations:
   1. Title_882 (action) - Disney+
      ⭐ Rating: 8.4 | Score: 5.92
   2. Title_863 (thriller) - Apple TV+
      ⭐ Rating: 6.4 | Score: 5.72
   3. Title_319 (action) - Disney+
      ⭐ Rating: 7.2 | Score: 4.92
   4. Title_264 (action) - Apple TV+
      ⭐ Rating: 8.9 | Score: 0.89
   5. Title_335 (thriller) - Prime Video
      ⭐ Rating: 8.8 | Score: 0.88
```

Group Recommendation:

```
Fire TV Recommendation System by team Innos
✅ Initialized with 3000 content items
🔥 FIRE TV GROUP WATCH RECOMMENDATION DEMO
================================================

 Getting recommendations for user: group_session_001
🎯 Generating group recommendations for 3 members
📊 Analyzing preferences for group members: ['alice_123', 'bob_456', 'carol_789']
✅ Group analysis complete - Compatibility Score: 0.77
🎬 Generating group recommendations with compatibility score: 0.77
✅ Generated 8 group recommendations

👥 Group Members: alice_123, bob_456, carol_789
🎯 Context: {'mood': 'relaxed', 'time_context': 'Evening Weekend', 'is_group_session': True}
💡 Explanation: Based on your relaxed mood and evening weekend timing and your group of 3 members' combined prefere

🏆 TOP GROUP RECOMMENDATIONS:
------------------------------------------------------------
1. Title_1307
   Genre: sci-fi | Platform: Apple TV+
   Rating: 9.1 | Duration: 90 min
   Why: Great for your group!

2. Title_1653
   Genre: drama | Platform: YouTube
   Rating: 9.0 | Duration: 90 min
   Why: Great for your group!

3. Title_2329
   Genre: thriller | Platform: Apple TV+
   Rating: 9.2 | Duration: 90 min
   Why: Great for your group!

4. Title_462
   Genre: drama | Platform: Netflix
   Rating: 8.0 | Duration: 90 min
   Why: Great for your group!

5. Title_1073
   Genre: drama | Platform: Paramount+
   Rating: 7.2 | Duration: 90 min
   Why: Great for your group!
```

Comprehensive:

```
👤 User: power_user_001
Context: Evening Weekend
Mood: excited
Group Session: Yes

📋 Top 5 Recommendations:
   1. Title_907 (comedy) - Paramount+
      ⭐ Rating: 8.1 | Score: 7.55
   2. Title_184 (comedy) - HBO Max
      ⭐ Rating: 6.6 | Score: 5.99
   3. Title_293 (action) - Disney+
      ⭐ Rating: 6.6 | Score: 5.77
   4. Title_566 (fantasy) - Prime Video
      ⭐ Rating: 8.2 | Score: 0.82
   5. Title_417 (thriller) - Peacock
      ⭐ Rating: 7.4 | Score: 0.74

 ADVANCED FEATURES DEMO
--------------------------------------------------

 🎵 Mood-Based Content Playlist:

 Getting recommendations for user: power_user_001

 Getting recommendations for user: power_user_001

 Getting recommendations for user: power_user_001

 Getting recommendations for user: power_user_001

 Getting recommendations for user: power_user_001
   1. Title_907 (Mood: excited)
   2. Title_907 (Mood: happy)
   3. Title_907 (Mood: excited)
   4. Title_907 (Mood: happy)
   5. Title_907 (Mood: excited)

 User Behavior Analysis:
   • Total Content Watched: 30
   • Average Completion Rate: 0.95
   • Binge Watching Tendency: 0.00

 SOCIAL FEATURES SHOWCASE
--------------------------------------------------
✅ Group Session Created: session_0_135406
   • Members: 4 users
   • Preferred Genres: ['action', 'comedy', 'thrill
   • Voting Started for 3 options
```

Google Colab: https://colab.research.google.com/drive/1L0XcQniNj8OcVBKkqRf__aMu1QXAEGuZ

Impact Metrics

Customer Engagement	• Time-to-Content(TTC) : Browsing time before content selection. 18 minutes → Less than 2 minutes • Sessions that end without content selection.	1. 18 minutes → Less than 2 minutes of browsing time 2. 20% → Less than 10% of session termination rate
Social Impact	• Group Viewing Frequency: Number of social/group viewing sessions per user/week. • Group Satisfaction Score: Post-session rating of collective viewing experience	1. 60% increase in group viewing frequency 2. Maintain a rating of 4.5/5.
Business Growth	• New user acquisition • User retention • Percentage of users upgrading to premium for enhanced features	1. 30% increase in users. 2. 40% increase in user retention 3. 25% increase in premium users
Competitor Benchmarking	• Recommendation relevance vs Native recommendations • Churn Rate • Average Time Saved per Session	1. 30% increase in accuracy of content suggestion. 2. 20% reduction in churn rate

Scalability

- **Compatible** with Fire TV, Android TV, Smart TVs, mobile apps and web — **a unified engine that adapts across all ecosystems.**
- **Scalable to support millions of users**, using cloud-based retraining loops and **incremental learning from user feedback.**
- **Group aware recommendations and Real-time interactions** (chat, reactions, votes) are streamed via WebSockets with elastic scaling.

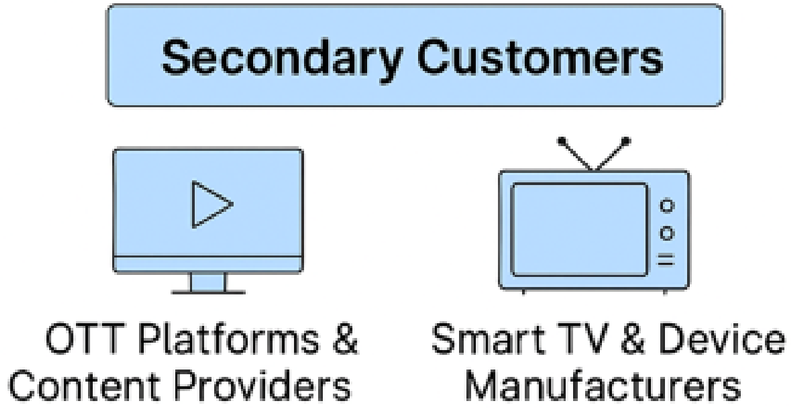
Business Relevance

- **Increased Fire TV Users and Subscriptions**: As new customers join, the chances of them taking a subscription plan will increase given the perks of our intelligent recommendation system, cross-platform content discovery, and social viewing features that transform Fire TV from a simple streaming device into an indispensable entertainment hub
- **Competitive Advantage & Market Position:** Solving the cross-platform social viewing crisis, Amazon can capture the next wave of entertainment evolution and remain competitive in the market safeguarding it’s revenue stream.

Targeted Audience

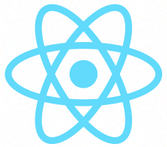
- **Primary Customers:**
  - Our primary customers are digitally savvy individuals with the disposable income to maintain multiple entertainment subscriptions who view quality entertainment discovery as essential infrastructure for their digital lifestyle.
  - Frustrated with the limitations of current recommendation tools, they are actively seeking smarter, more personalized solutions—and are willing to pay for better alternatives.

- **Secondary Customers:**
  - OTT Platforms & Content Providers looking to improve user engagement and watch time.
  - Smart TV & Device Manufacturers interested in embedding more AI-driven, context-aware



FrameWorks/Technologies

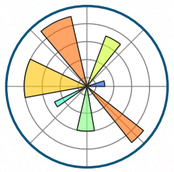
- **Web Development Framework:**


React

Django

- **AI/ML Tech Stack:**



- **Database Management:**


AWS RDS

Postgresql

AWS
DynamoDB

- **Deployment:**

Future Scope

Mood Detection Using Voice	• Real-time emotional tone analysis via Alexa, Echo devices, Fire TV remotes, or the Alexa mobile app for personalized voice-based mood detection.	• Enhances personalized recommendations by aligning content with the user's emotional state.
Real-Time Event-Based Content Curation	• Correlates calendar events, weather patterns, breaking news, and user habits for contextual content delivery.	• Enables hyper-contextual recommendations, e.g., "comfort shows" during rainy days or post-breakup.
Personalized Content via Amazon Ecosystem	• Uses Amazon purchases, Pay activity, and Alexa routines to personalize content recommendations.	• Recommends fitness, cooking, or relaxing content based on recent purchases and payments.
Social Clip Sharing & Story Integration	• Allows users to create and share 30–60 second content clips as stories at any time.	• Lets users share favorite scenes as stories, adding a social layer to content.

Thank You!

Google colab: https://colab.research.google.com/drive/1L0XcQniNj8OcVBKkqRf__aMu1QXAEGuZ

Demo video: https://youtu.be/GM9HXfpF_uE