

# **Semantic E-Entertainment Portal**

## **Final report**

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## **I. Abstract**

This report presents the development of a Semantic E-Entertainment Portal, an innovative platform designed to redefine user engagement with entertainment content. By leveraging semantic web technologies, the portal offers an enriched, personalized, and intuitive experience. At the core of the system lies a custom ontology that encapsulates key concepts in entertainment, such as genres, creators, and user preferences, while enabling advanced reasoning and semantic queries.

The platform integrates diverse technologies and methodologies, including SPARQL for querying, RDF for semantic representation, and Apache Fuseki for triplestore management. Ontology design and mapping were performed using Protégé, ensuring compliance with semantic web standards such as URI, RDFS, OWL, and RDF/XML. Additionally, Python was utilized to process raw data and transform it into machine-readable formats like Turtle. The user-facing application employs Node.js for server-side functionality and HTML/CSS/JavaScript for an interactive and fluid interface.

Key features include mood-based recommendations, cross-media content discovery, and habit-driven personalization, enabled through the structured representation of data and semantic reasoning. The platform also supports intelligent search capabilities and dynamic exploration through intuitive navigation interfaces. This project demonstrates how semantic technologies can elevate user experiences in the entertainment domain by integrating knowledge representation, reasoning, and standards-compliant tools.

## **II. Introduction**

The Semantic E-Entertainment Portal aims to revolutionize content discovery by harnessing the power of semantic web technologies. Traditional entertainment platforms often lack the contextual understanding necessary to deliver personalized and interconnected experiences. Our project addresses this gap by designing an ontology-driven system that models entertainment concepts, such as movies, books, music, and games, and their relationships with user preferences, creators, and genres.

Central to the project is the development of an ontology using Protégé, which acts as the foundation for the semantic representation of content. The ontology includes classes, properties, and relationships that enable reasoning and advanced querying. By leveraging RDF and SPARQL, we enable structured exploration of entertainment content, allowing users to discover cross-media relationships, thematic suggestions, and personalized recommendations.

The portal integrates multiple data sources, including *IMDb*, *Spotify*, *Goodreads*, and *TwitchAPI*, to provide a rich dataset for reasoning and recommendations. This approach ensures interoperability and standardization, aligning with established semantic web practices. The system's ability to reason and infer new relationships from data enhances its intelligence, offering a next-generation experience for users.

### **III. Main Services**

#### **A. Original and Innovative Recommendations:**

- Recommendations by mood/emotion:** The user selects a state of mind (ex : relaxed, nostalgic, sad), and the platform offers content that matches this mood. The system retrieves relevant content using SPARQL queries over the triplestore.
- Recommendations by thematic:** Proposal of interactive journeys, the thematic concepts are included in the ontology and using SPARQL queries we can output the following informations like:  
"Journey through time": Films, books, games related to a specific era (80s, ancient Rome...).  
"Chilling evening": Horror films, immersive games and distressing playlists.  
"Friday evening": Suggestions for a movie night or multiplayer games.
- Cross-Media Exploration:** Discovering content related to other media types. For example: "Like a sci-fi movie, recommend similar books or video games." We store cross-media relationships in a triplestore.
- Niche Suggestions:** This includes discovering virtually unknown content on independent creators. Scrape data from indie platforms (ex: Bandcamp for music, Itch.io for games).

## **B.Immersive Personalization:**

- Habit-Based Suggestions:** The user can discover new content based on his own habit, like if he often listens to pop in the morning, we can recommend exploring new artists in this genre.
- Collaborative Recommendations:** Users can see lists of recommendations created by others with similar tastes.
- Weekly Leaderboards:** "Community trends" section where users see the most liked content of the week.

## **C. Clearer User Experience:**

- Intuitive Navigation:** Creation of an intuitive interface where each type of content has its own discovery section (ex: "Explore the films", "Dive into the music").
- Interactive Content Map:** Uses a visual map to navigate genres, creators, and trends.
- Dynamic Profile:** Users see their recommendations and history in a visually clear way.

## **D.Thematic and Fluid:**

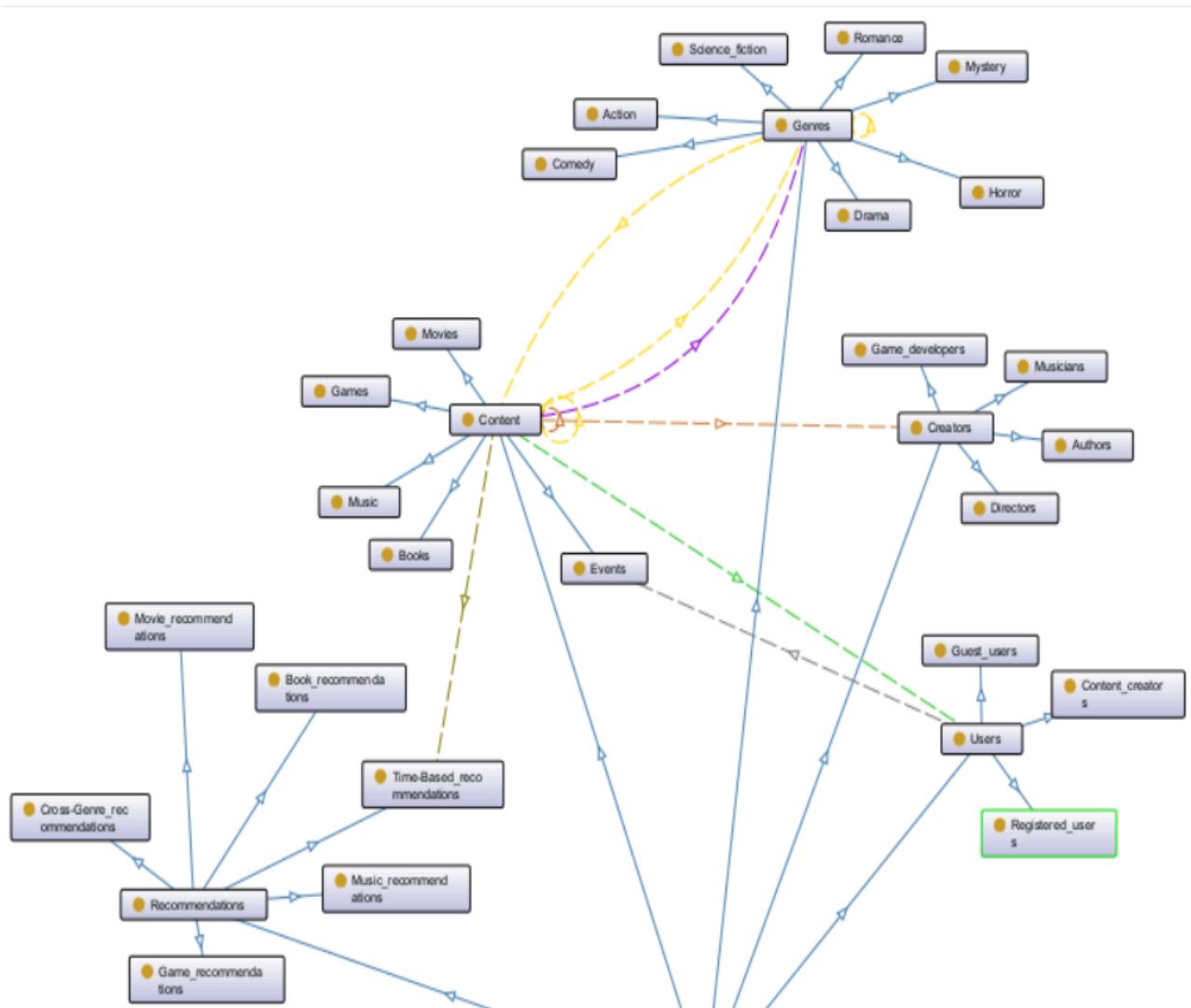
Using the SPARQL queries and the model relationships between our content in the ontology. We can get for example these actions:

- Searches by unique combinations:** "Films made by award-winning directors, released between 1990-2000".
- Interactive and Game-Like Aspects:** Badges and awards system, ex:  
"Cinephile" Badge: watch 10 movies from one director.  
"Genre Adventurer" Badge: uncover 5 diverse genres.  
"Challenges" section where the user can take on challenges, for example:  
Watch one movie per decade.
- Trends and Popular Content:** Added "Explore Current Trends" segment under rising themes on social networks (through APIs like Twitter Trends).

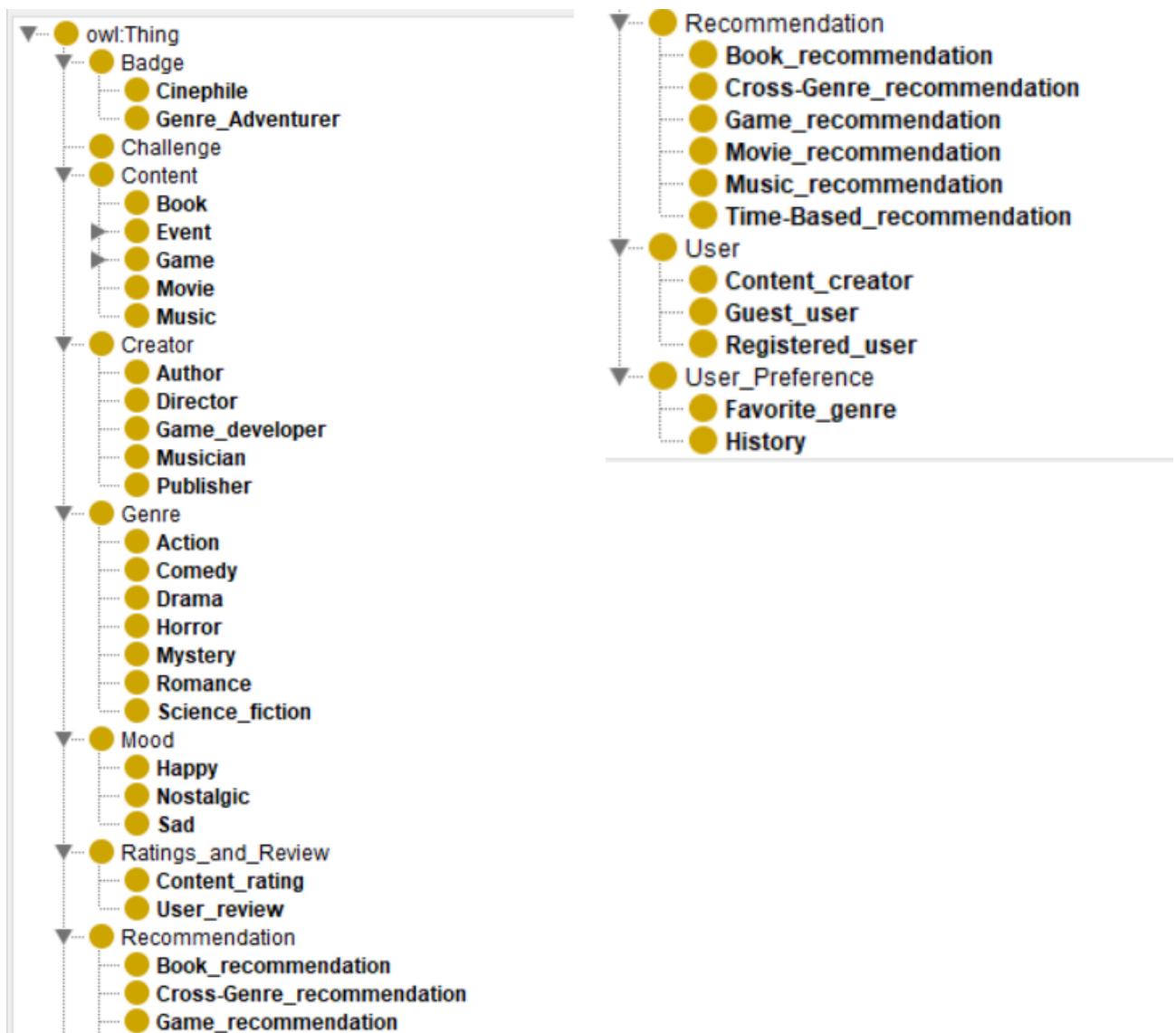
## **IV. The Ontology:**

The ontology includes classes such as:

- Content (e.g., Movies, Music, Books, Games)
- Users
- Creators
- Preferences



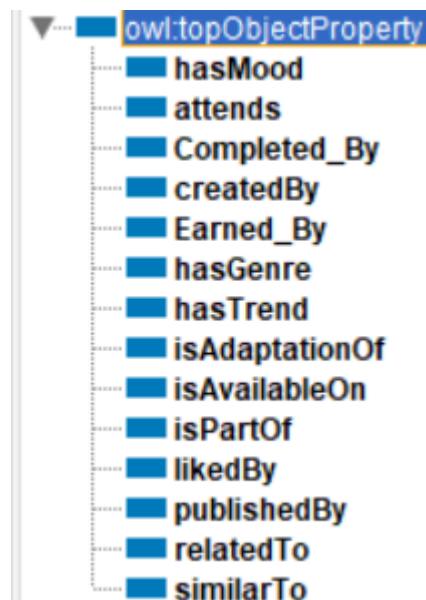
## A. Classes :



## **B. Object properties:**

Key relationships between classes:

- CreatedBy**: a piece of content (e.g., a movie, book, or game) and its creator (e.g., director, author, or developer).
- BelongsToGenre**: Associates content with specific genres, such as science fiction, romance, or adventure.
- PreferredBy**: Connects content to user preferences, indicating what content a user likes or engages with.
- RelatedTo**: Defines cross-media relationships, such as a book being related to a movie adaptation or a soundtrack being related to a game.
- HasEvent**: Links content to events, such as a movie being featured in a film festival or a book launch event.
- Recommends**: Establishes a recommendation relationship based on user habits or system-generated suggestions.- *CreatedBy*: Links content to its creator.



## **C. Data properties :**

Data properties define the attributes or characteristics of classes in the ontology. Key data properties include:

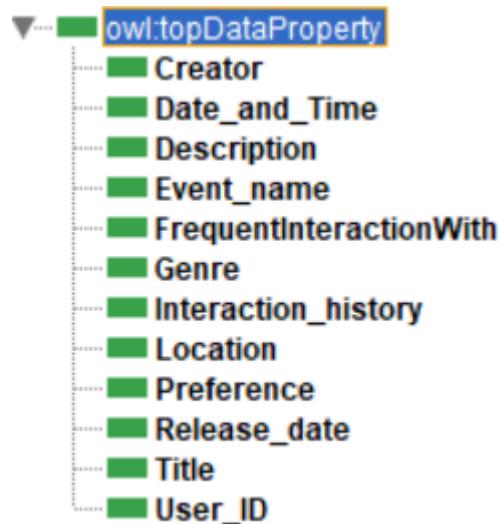
### **Content:**

- Title**: The name of the content (e.g., movie title, book name).
- ReleaseDate**: The date when the content was made available.
- Rating**: Numerical or categorical representation of user ratings or reviews.
- Synopsis**: A brief description or summary of the content.

### **Users:**

- Name**: The name of the user.
- Age**: The user's age, which may influence recommendations.
- Preferences**: Categories or genres the user prefers (e.g., action movies, jazz music).

These data properties provide detailed descriptive information to support semantic queries and enable personalized user experiences.



## **V. Implementation:**

### **A. Technologies Used**

Our project employs a range of technologies to ensure seamless functionality and user experience:

#### **Backend:**

- Node.js*: Used for developing a robust and scalable server-side application.
- SPARQL*: Query language employed for retrieving and manipulating data stored in Apache Fuseki.
- Python*: To do the process to import, clean, and transform datas to turtle.

#### **Frontend:**

- HTML/CSS/JS*: For creating a dynamic and responsive user interface, ensuring smooth navigation and content display.

#### **Ontology Modeling:**

- Protégé*: A popular tool for designing and managing the ontology structure.
- Apache Fuseki*: A database solution for storing, querying, and reasoning over RDF triplestore data.

#### **APIs:**

- IMDb, Spotify, Goodreads, TwitchAPI*: Data sources for movies, music, books, and video games, respectively.

#### **Additional Tools:**

- Postman*: For testing API endpoints.
- GitHub*: Version control and collaborative development.
- GitHub Codespace*: Containerization for consistent deployment across environments.

These technologies form the foundation of our semantic e-entertainment portal, ensuring a reliable and enriched user experience

## **B. System workflow**

In semantic web , a system workflow refers to the structured sequence of processes or steps through which semantic data is generated, processed, stored, queried, and utilized to achieve meaningful outcomes. It defines how various components, such as ontologies, reasoning engines, data sources, and user interactions, work together in a coordinated manner to enable the functionality of semantic web applications.

### **Key Components of a System Workflow in Web Semantics:**

#### **Data Acquisition:**

- Raw data is collected from external sources (e.g., IMDb, Spotify) and transformed into RDF format.

#### **Semantic Annotation:**

- Enriching raw data with semantic metadata using ontologies to make it machine-readable and interoperable.

#### **Ontology Integration:**

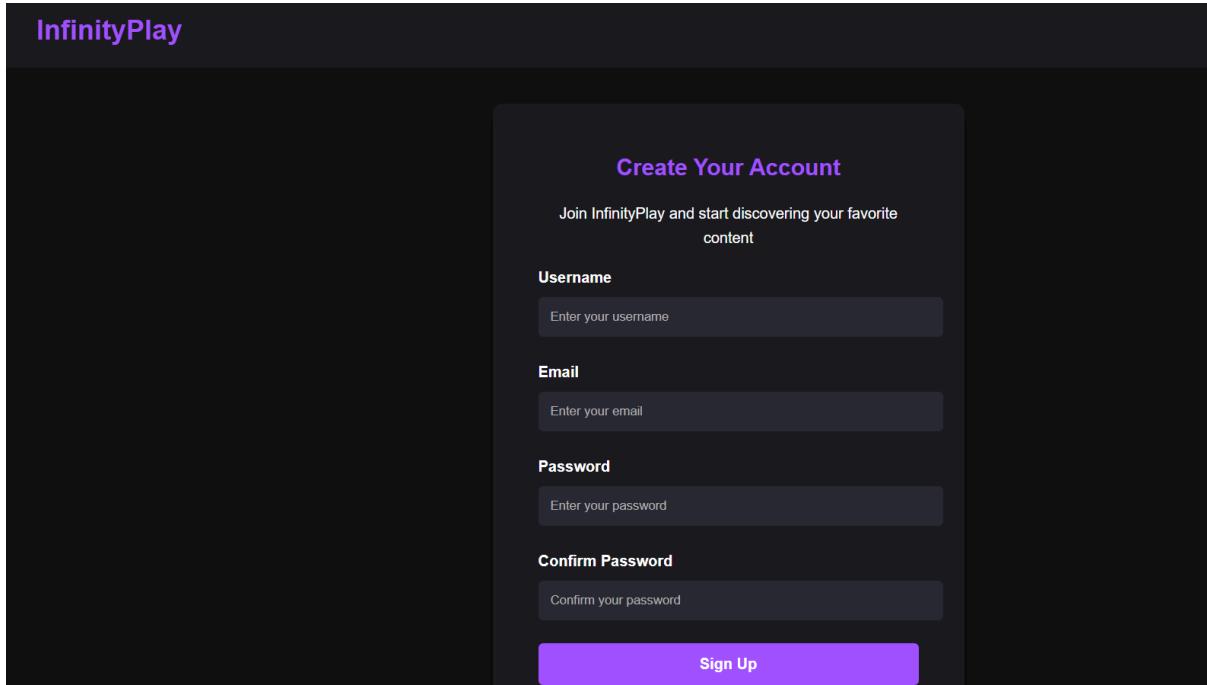
- Incorporating domain-specific or general-purpose ontologies to provide a shared vocabulary and structure for the data.
- Ensures data consistency and facilitates reasoning.

#### **Query Processing:**

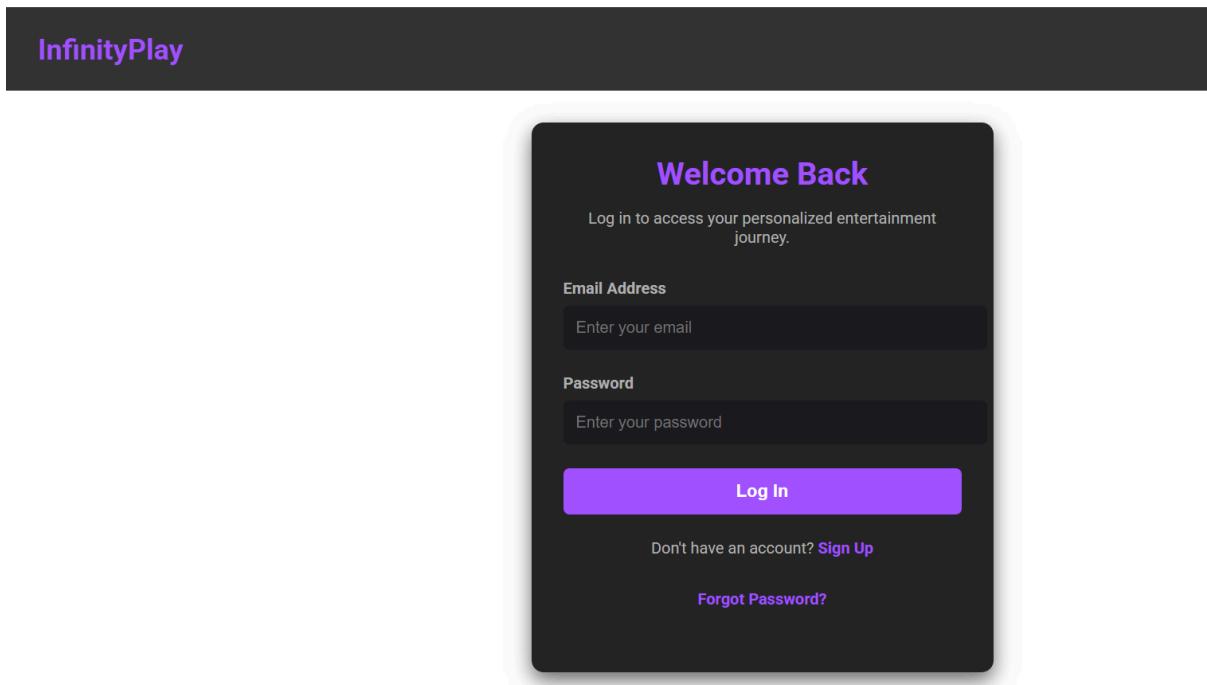
- Using query languages such as SPARQL to retrieve and manipulate semantic data stored in graph databases.

## C. User Interface:

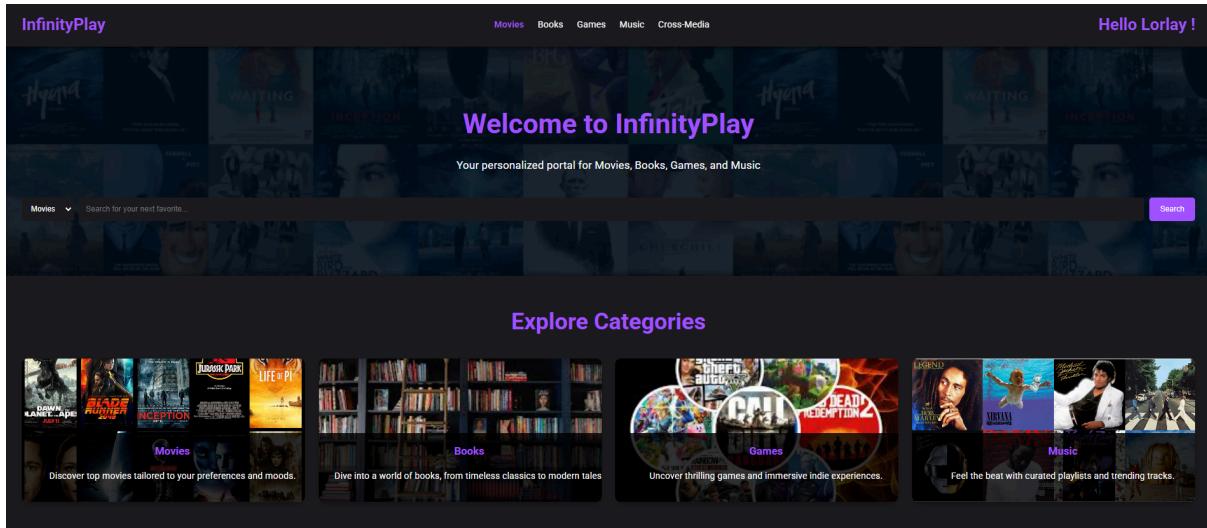
**Sign-Up Screen:** The sign-up screen provides a straightforward form with fields for username, email, password, and confirmation. Users can easily create an account with real-time input validation.



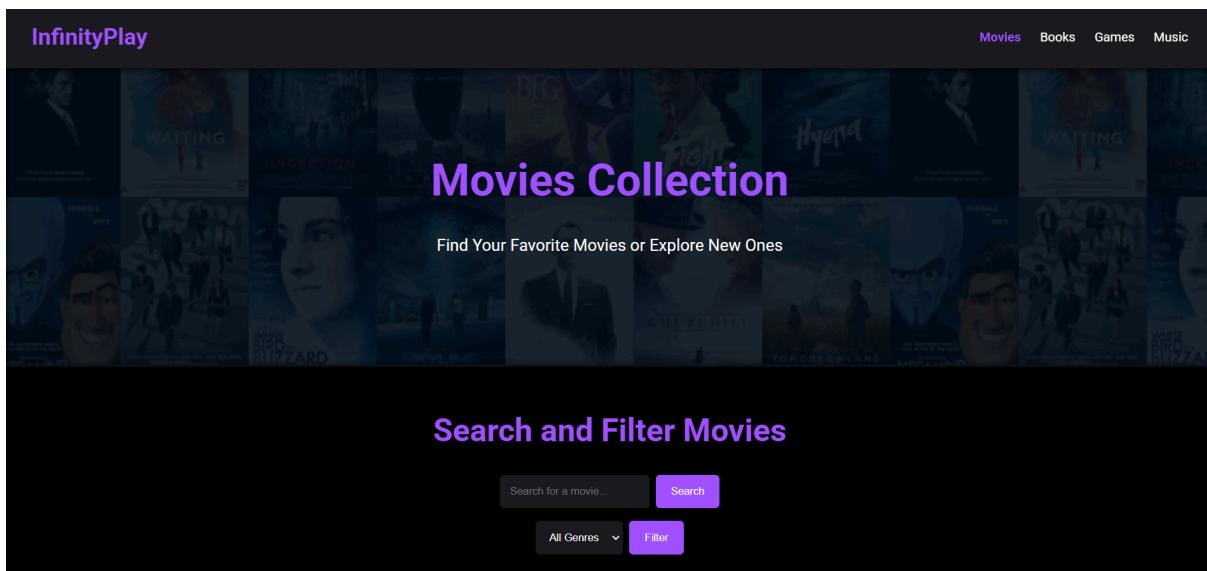
**Log-In Screen:** The log-in screen features a simple and clean form with fields for email and password. A prominent "Log In" button is displayed for easy access, along with options to reset the password or create a new account if the user doesn't have one.



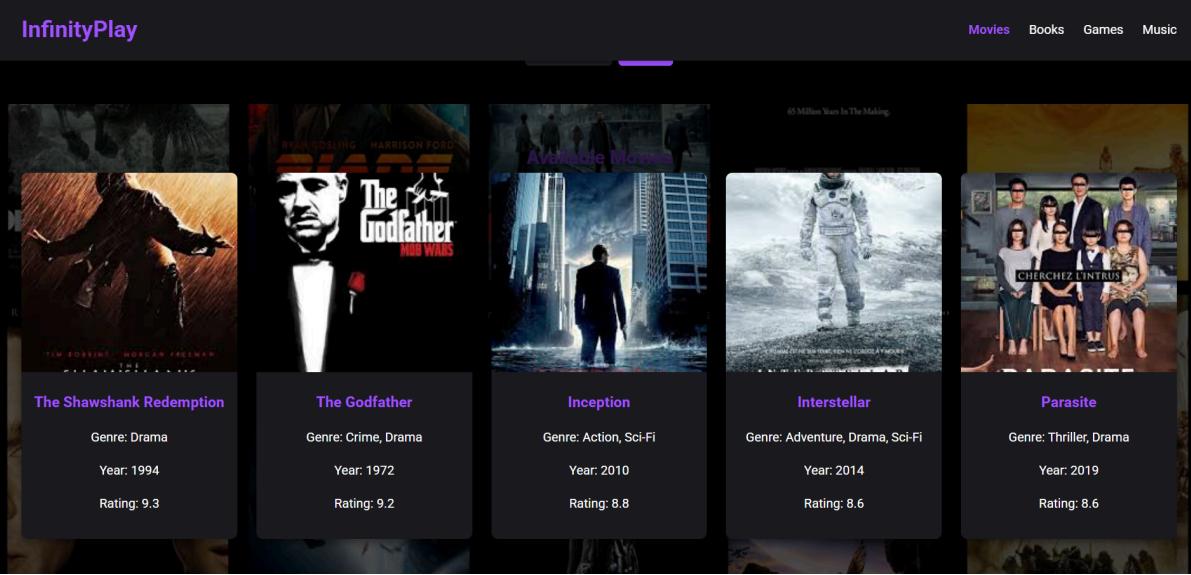
**Home Page:** The home page greets users with a large banner, a central search bar, and categories for Movies, Books, Games, and Music. It offers a clean layout for quick navigation. Also, we have an explore categories section. This section highlights four categories with visually engaging cards, each featuring a brief description and a we can click on each for detailed exploration.



**Movies Page:** Users can search for movies by title or filter by genres, release year, and ratings. Movie cards display titles, genres, release dates, and ratings for quick selection.



Here's how the movies are displayed once they've been searched, we can see the important info about those, the genre, the year and the rating. We can click on each movie to know information about.



**Details page:** This page offers a clear, user-oriented interface for exploring a content, with intuitive options for interacting with it (adding to personal lists, rating, etc.) and comprehensive content information.

InfinityPlay

Movies Books Games Music

## The Shawshank Redemption

A timeless story of hope and resilience.

[Details](#)

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**Details**

Director: Frank Darabont  
Cast: Tim Robbins, Morgan Freeman, Bob Gunton  
Genre: Drama  
Year: 1994  
Rating: 9.3

Available on: Netflix, Amazon Prime

[Add to Favorites](#)  
[Add to Watched List](#)  
[Rate Movie](#)

★★★★★

**Synopsis**

The Shawshank Redemption tells the story of Andy Dufresne, a banker who is sentenced to life in Shawshank State Penitentiary for the murders of his wife and her lover, despite his claims of innocence. Over the following two decades, he befriends a fellow prisoner, Ellis 'Red' Redding, and becomes instrumental in a money-laundering operation led by the prison warden.

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**Games Page:** The games section allows users to discover popular games, filter by platform or release date, and view detailed game information.

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## Games Collection

Discover Your Next Gaming Adventure

Recommended Xbox Games

Xbox game

Halo Infinite  
Genre: First-Person Shooter

Forza Horizon 5  
Genre: Racing

Gears 5  
Genre: Third-Person Shooter

Minecraft  
Genre: Sandbox/Adventure

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## Search and Filter Games

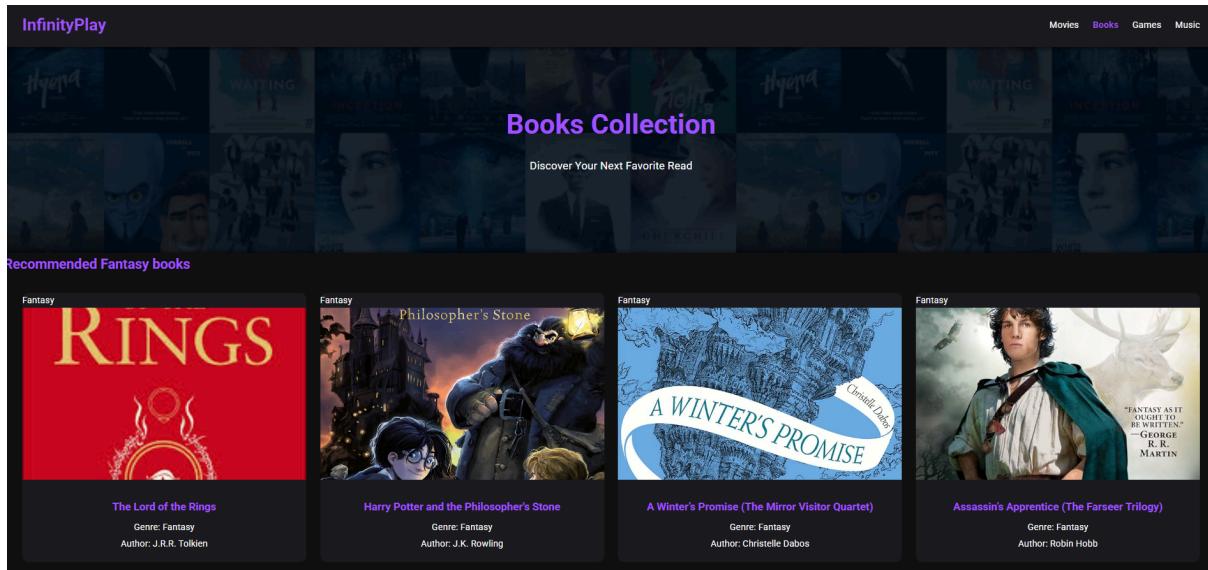
Search for a game...

All Platforms

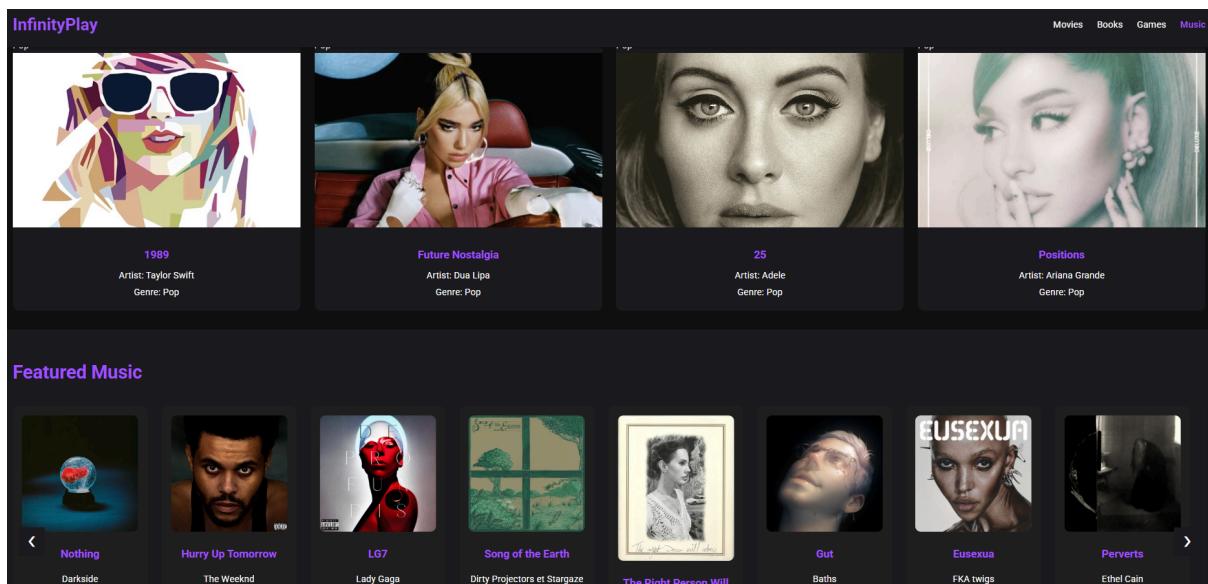
Available Games

<p><b>Marvel's Spider-Man 2</b> Platform: PlayStation Release Date: October 20, 2023</p>	<p><b>DRAGON BALL: Sparking Zero</b> Platform: PlayStation, Xbox, PC Release Date: December 5, 2024</p>	<p><b>HALO INFINITE</b> Platform: Xbox Release Date: December 8, 2021</p>	<p><b>GRAND THEFT AUTO V</b> Platform: PlayStation, Xbox, PC Release Date: September 17, 2013</p>	<p><b>FORZA HORIZON 5</b> Platform: PlayStation, Xbox, PC Release Date: November 9, 2021</p>	<p><b>Gears 5</b> Platform: Xbox Release Date: September 10, 2019</p>	<p><b>GOD OF WAR</b> Platform: PlayStation, PC Release Date: April 20, 2018</p>	<p><b>MINECRAFT</b> Platform: Xbox, PC Release Date: November 18, 2011</p>
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**Book Page:** The book section allows users to discover popular book, filter by genre and view detailed information about the author.



**Music Page:** The Music section allows users to discover popular music and give us recommendations.



## **VI. Conclusion:**

The Semantic E-Entertainment Portal demonstrates the transformative potential of semantic web technologies in delivering personalized and intuitive user experiences. By integrating diverse content sources and structuring data through a robust ontology, the platform empowers users to discover, explore, and engage with entertainment content in innovative ways. Thorough testing validated the system's performance and usability, ensuring its readiness for deployment. With a roadmap of enhancements, including AI-driven insights, gamification, and mobile app integration, the portal is poised to become a comprehensive solution for personalized entertainment. This project sets a benchmark for future applications of semantic technologies in user-centric domains.