A Study of Catalogd: A Social Cataloging Application for Video Games

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***Abstract*—This paper presents the development of Catalogd, a social cataloging application designed to enhance the experience of video game enthusiasts through efficient management of game libraries and facilitation of community interaction. The primary research objective is to create a platform that allows users to catalog their gaming experiences, discover new titles, and engage with other gamers. The scope of the study encompasses three user types—guest, registered, and admin users—each with varying levels of access and interaction within the app. Functionally, Catalogd includes modules for authentication, navigation, game discovery, catalog management, and social networking. The methodology employed is the Rational Unified Process (RUP), which guides the structured development of the application, ensuring that project goals are met within the set timeframe. Catalogd aims to address the gap in dedicated video game cataloging services and to provide insights into user engagement and gaming trends.**

Keywords—social cataloging, video games, Catalogd.

I. Introduction

In the digital era, the concept of cataloging has evolved beyond the confines of libraries and personal collections into the realm of social interaction and community building. Social cataloging applications represent a significant innovation in this space, offering users a multifaceted platform that combines the traditional aspects of cataloging with the dynamic features of social networking. These applications allow individuals to meticulously organize and catalog their personal collections of various media, including books, films, music, and video games, while simultaneously connecting with others who share similar tastes and interests.

The rise of social cataloging apps has been driven by the desire for a more interactive and personalized experience in managing collections. Users are no longer satisfied with mere lists or static databases; they crave a living, breathing ecosystem where they can engage with content and fellow collectors in meaningful ways. This report aims to explore the various dimensions of social cataloging apps, from their user interface design and functionality to the algorithms that power recommendations and community engagement.

The paper will delve into the user experience, examining how these apps cater to both the novice enthusiast and the seasoned collector. Features will be discussed, highlighting how they simplify the cataloging process and enhance user satisfaction. Furthermore, the report will investigate how social cataloging apps leverage social networking principles to create communities of practice, enabling users to follow friends, share reviews, and participate in discussions.

The paper will also consider the broader cultural and economic implications of social cataloging apps. By analyzing user data and engagement metrics, the impact of these platforms on content discovery and consumption will be assessed. Additionally, the potential for these apps to influence market trends and the publishing industry, as well as their role in the preservation of cultural heritage and the promotion of literacy will be explored.

In summary, the paper will provide an in-depth analysis of social cataloging applications, offering insights into their design, functionality, and the vibrant community they support. Through a comprehensive review of current platforms and user behaviour, we will uncover the factors that contribute to the success of these apps and their profound influence on how we manage, share, and enjoy our personal collections in the 21st century.

II. Problem Statement

Video games are becoming more popular as a medium of entertainment in the digital world. There are few social cataloging apps dedicated to video games, and most lack features or support.

These problem statements describe the gaps that the Catalogd application aims to fill for video game enthusiasts.

A. Discovery of Video Games

With the vast number of video games available across various platforms and genres, it can be challenging for users to discover new games that align with their interests.

B. Managing Game Catalogs

Keeping track of games that one has played, wants to play, or put on hold can be a daunting task without a proper cataloging service application.

C. Review Searching

People often struggle finding reliable reviews of video games. Reviews are an important source of guidance for those who need decisions about what games to play or buy.

D. Sharing Experiences

There is a lack of a dedicated platform where video game enthusiasts can share their experiences, opinions, and reviews about the games they have played.

E. Community Engagement

There is a need for a platform that fosters a sense of community among video game enthusiasts, allowing them to engage in discussions, and share their game catalogs.

III. Objectives

A. Research Objectives

The research objectives of the Catalogd application are:

- To develop a social cataloging app for video games that enables users to create, share, and explore catalogs of games they have played or want to play, as well as rate and review them.
- To implement an app that helps users discover video games across various platforms and genres using recommended catalogs and specialized themed list.
- To design an app that encourages users to engage in discussions about their favorite video games, and form communities around specific games or genres.
- To build features that encourage users to find and write honest and constructive reviews of video game titles.
- To test social network features that allow users to connect their profiles and interact with each other through likes and comments or discussion.

IV. Literature Review

A literature review is an in-depth synopsis of earlier studies on a particular subject. The general interpretation of the research being done is the main topic of this chapter. It examines studies on the viability of employing a social cataloging application for video games in place of the conventional paper-based approach. This chapter examines many existing systems that are similar to the system under development as an overview. This chapter also offers a thorough description of the research environment and lays the foundation for creating a successful video game social cataloging application using concepts from these evaluations.

A. Examples of Existing Social Cataloging Applications

1) Letterboxd

Letterboxd is a social cataloging application specifically designed for film enthusiasts. Launched in 2011, it has grown into a vibrant community where users can track, rate, review, and discuss movies. The platform offers a blend of features that cater to both personal cataloging needs and social networking desires, making it a popular choice among cinephiles.

2) GoodReads

Goodreads is a social cataloging application dedicated to books and readers. Launched in January 2007, it has become one of the world's largest sites for book recommendations and reviews, serving as a virtual bookshelf for millions of users. The platform allows readers to explore new books, keep track of what they've read, share their thoughts, and connect with other book lovers.

3) IGDB (The Internet Game Database)

IGDB (Internet Game Database) is a comprehensive social cataloging application and database for video games. It serves as a resource for gamers, developers, and industry professionals alike, providing detailed information about a vast array of video games across different platforms. IGDB aims to be the IMDb for video games, offering a centralized platform where users can find and contribute content about their favorite titles.

B. Summary of Literature Review

TABLE I. COMPARISON TABLE OF CATALOGD AND OTHER SOCIAL CATALOGING APPLICATIONS

Features	Catalogd	Letterboxd	GoodReads	IGDB
Focus on Video Games	✓	×	×	✓
Game Cataloging & Organization	✓	×	×	✓
Game Ratings & Reviews	✓	×	×	✓
Game Discovery & Recommendations	✓	×	×	✓
Strong Social Networking Features	✓	✓	✓	×
Good User Experience and Interface	✓	✓	✓	×
Mobile Accessibility	✓	✓	✓	×
Integration with External Services	✓	×	×	✓

Based on the literature review, there currently exists a variety of applications implemented that cater to social cataloging for different types of media, but not all encompass the specific features and focus that Catalogd aims to provide for video game enthusiasts. As can be observed, most of the systems reviewed, such as Letterboxd, Goodreads, and IGDB, have a focus towards managing collections and social interactions around their respective media types—films, books, and video games. These platforms enable users to track their media consumption, manage personal lists, and engage with a community through ratings and reviews. However, there are only certain systems that provide comprehensive features for discovery and

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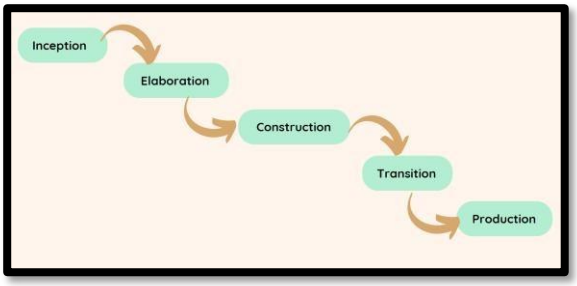
recommendations, such as Goodreads for books and Letterboxd for films.

V. METHODOLOGY

The methodology process for the web application Catalogd: A Social Cataloging App for Video Games is succinctly explained in this chapter. A methodology serves as a management guide to ensure that the project is carried out methodically, within the allocated timeframe, and with the desired results. The Rationale Unified Process (RUP) model is the approach employed in this study.



The Rational Unified Process (RUP) is a software development methodology that provides a structured approach to the development of software systems. It was originally developed by Rational Software, which was later acquired by IBM. RUP is an iterative and incremental framework, meaning that the software development process is divided into multiple mini-projects or iterations, with each one providing a portion of the functionality.

RUP breaks down the development process into repeated cycles (iterations), allowing for incremental development of the software. Each iteration results in an executable release with additional features, enabling teams to manage changes and risks by evaluating the project's progress at the end of each iteration. The methodology emphasizes the use of use cases to capture functional requirements. This helps ensure that the software is developed with the end user's needs in mind and facilitates communication between the development team and stakeholders. RUP stresses the importance of robust and flexible software architecture. Early iterations focus on establishing a solid architectural foundation, which guides the development in subsequent iterations. The process encourages teams to identify and address the most significant risks early in the project lifecycle. By doing so, the chances of project failure are reduced.

A. Inception Phase

During the inception phase for Catalogd, the project's scope and vision would be established. This would involve identifying the core features of the Catalogd application, such as game cataloging, social networking, discovery and recommendations, and user-generated content like reviews and ratings. Stakeholders would outline the business case, which could include addressing the need for a dedicated social platform for gamers. Key risks, such as competition from existing platforms and user adoption challenges, would be identified. Deliverables at this stage might include a vision document, initial use-case models for gamer interactions, and a preliminary project plan with estimated costs and timelines.

The Catalogd team decides that the application must support a large database of video games and provide a seamless user experience on both desktop and mobile platforms. They identify a risk that the targeted gamer demographic might prefer existing platforms, so they plan to conduct market research to refine their value proposition.

B. Elaboration Phase

In the elaboration phase, the Catalogd project would focus on further developing the project's architecture. This would involve choosing the technology stack, establishing the database schema for game information, and designing the system's architecture to support scalability and integration with services like the RAWG API. The team would also work on mitigating identified risks, such as ensuring the platform can handle high traffic volumes. Detailed project plans would be updated, and more precise resource allocations would be made. Key deliverables would include an architectural baseline, revised risk assessments, and a more detailed project plan.

The development team selects a microservices architecture to ensure that the Catalogd application can scale efficiently. They also prioritize the development of a robust user authentication system to address security concerns.

C. Construction Phase

The construction phase would see the Catalogd application being built, tested, and refined over multiple iterations. Each iteration would result in a working increment of the software, with new features being added and tested. The development team would code the user interfaces, backend services, and integrate third-party APIs. Testing would be conducted to ensure functionality, performance, and security. The main deliverables would be the incrementally improved versions of the Catalogd application and accompanying documentation.

The first iteration might focus on core features like user registration, game cataloging, and basic social networking capabilities. Subsequent iterations would add advanced features like game recommendations and event management.

D. Transition Phase

During the transition phase, the Catalogd application would be prepared for release to the user base. Activities would include conducting beta testing with a select group of users, training the support team, and finalizing the deployment infrastructure. Feedback from beta testing would be used to fix any remaining issues. The phase concludes with the launch of the Catalogd application to the public. Deliverables include the final release of the application and user training materials.

The Catalogd team releases a beta version to a community of gamers and collects feedback on usability and features. They use this feedback to make final adjustments before the official launch.

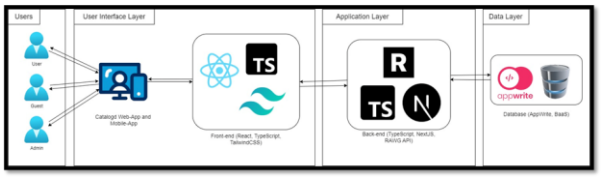
E. Production Phase

After the transition phase, the Catalogd application enters the production phase. This phase focuses on maintaining and supporting the application in a production environment. The team would monitor the application's performance, address any issues, and provide ongoing support to users. They would also collect user feedback for future enhancements. The production phase is ongoing as long as the application is in use, with the potential for further development cycles to introduce new features or improvements based on user demand.

The Catalogd team sets up a support desk to handle user inquiries and technical issues. They also implement analytics to monitor user engagement and gather data that will inform the development of new features, such as a virtual reality interface for exploring game worlds.

VI. System Architecture

The system architecture of Catalogd is designed to facilitate user interaction with the platform while ensuring efficient data management and application functionality. The architecture can be broadly divided into three layers: the User Interface Layer, the Application Layer, and the Data Layer. Each layer utilizes specific elements of the technology stack to fulfil its role within the system.



A. Development with Next.js and React

Next.js provides built-in support for server-side rendering (SSR) and static-site generation (SSG), which can improve the performance and search engine optimization (SEO) of the application. By pre-rendering pages on the server, Catalogd can deliver faster initial load times and better search engine visibility. Next.js provides a flexible way to integrate with external APIs, such as the RAWG API used in Catalogd. API requests can be made on the server side or client side, depending on the use case. Next.js and React support various styling solutions, including CSS modules, styled components, and Tailwind CSS. This flexibility allows developers to choose the best approach for their needs.

React enables fast client-side navigation, allowing users to move between different parts of the application without full page reloads. This creates a smoother and more responsive user experience. React promotes a component-based architecture, which encourages reusability and modularity. Components can be developed, tested, and maintained independently, making the codebase more manageable. React provides hooks like useState and useContext for managing local and global state within the application. This simplifies the process of handling dynamic data and user interactions.

B. Fetching Game Data through REST API (RAWG)

The RAWG API is a REST API. REST (Representational State Transfer) is an architectural style for designing networked applications. It relies on a stateless, client-server, cacheable communications protocol -- the HTTP protocol is commonly used.

The RAWG API follows REST principles, providing endpoints for various resources such as games, genres, and screenshots. These endpoints support standard HTTP methods like GET, POST, PUT, and DELETE, allowing clients to perform CRUD (Create, Read, Update, Delete) operations on the resources.

The API uses query parameters to filter, sort, and paginate the results, making it flexible and powerful for various use cases.

Catalogd uses the RAWG API to fetch data about games, including details, lists, screenshots, genres, and search results. The data is fetched using a set of utility functions defined in the rawg directory. These functions handle API requests, caching, and rate limiting to ensure efficient and reliable data retrieval.

C. Appwrite Database Integration (BaaS)

Appwrite is an open-source Backend-as-a-Service (BaaS) platform designed to simplify backend development for web, mobile, and serverless applications. It provides developers with a set of easy-to-use REST APIs to manage various backend functionalities such as databases, authentication, file storage, and cloud functions. By offering these services out-of-the-box, Appwrite helps developers to focus more on building the frontend and business logic of their applications, rather than worrying about backend infrastructure.

Appwrite works by providing a centralized server that a developer can interact with via its RESTful APIs. A developer can set up an Appwrite server in their development environment or on a cloud server, configure the necessary services, and then integrate these services into their applications through API calls.

Appwrite uses a structured approach to data storage that revolves around collections and documents, similar to a NoSQL database paradigm. Collections are analogous to tables in a relational database. Each collection is a container for documents that share a common structure or purpose. Documents are individual records within a collection, similar to rows in a table.

D. Utilizing DataStax Vector Database for AI Game Recommendation

The process begins by using Python scripts for fetching game data from the RAWG API, processing it, storing it in an SQLite database, and finally exporting it to an Excel file. The process is divided into three main Pythonscripts: main.py, main_model.py, and DataFrame.py.

The excel file containing the game data is cleaned into a CSV format file and then uploaded to the DataStax vector collection database. The DataStax vector database integrates Mistral AI API to provide AI-powered recommendations. It calculates vector embeddings which are an array of numbers that best describe the meaning or information of a row of data inside of a collection.

The SearchTerm function handles user input for finding games with similar vectors (game information) so that new recommendations can be provided to the user. Typing the term "Games where you play as Mario" in the search bar will process the term into a vector which then yield video game recommendations that share similar vector values as the search term.

E. Production Code Deployment on Vercel

Deploying the Catalogd application on Vercel from a GitHub repository is a straightforward process. Here are the steps done to get Catalogd application deployed. Go to Vercel website and sign up for an account. Developers may sign up using their GitHub, GitLab, or Bitbucket account. After logging in, click on the "Add New..." button on the Vercel dashboard. Choose the platform where the Catalogd repository is hosted (GitHub, GitLab, Bitbucket) and authorize Vercel to access the repository if prompted. Select the repository to deploy from the list of available repositories.

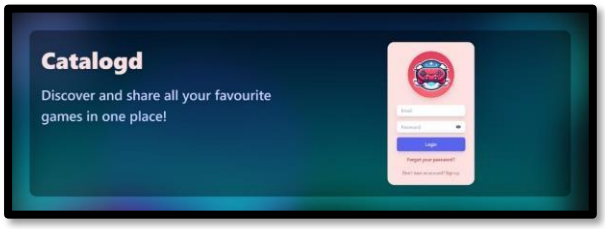
Once the Catalogd repository is selected, Vercel will provide a series of configuration options. Vercel automatically detects the framework the project is using. The Catalogd application requires environment variables, hence it is important to add them. Click on "Environment Variables" and input the necessary key-value pairs in the project code's ".env" file. Click the "Deploy" button to start the deployment process. Vercel will now build and deploy the Catalogd application.

Once the deployment is complete, Vercel will provide a URL where Catalogd application is live. People can access the Catalogd application using this URL.

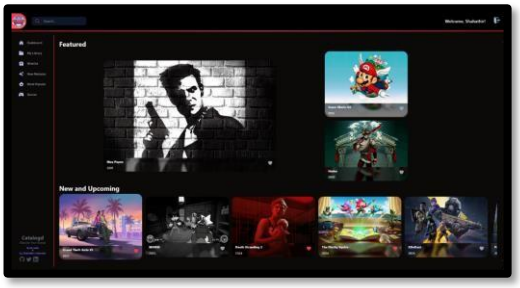
VII. Results And Discussion

The results and discussion section of the research paper will address the various Catalogd's graphical user interfaces and its system features.

A. System Features and GUI

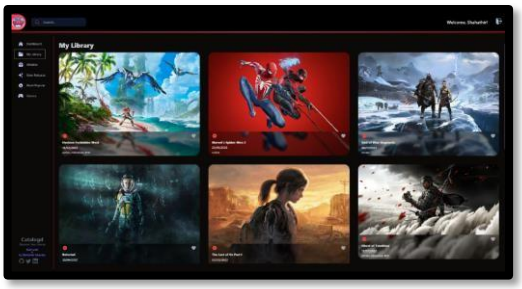


The Login GUI is the entry point for existing users to access their Catalogd account. It provides fields for users to enter their email and password. Users enter their registered email address.

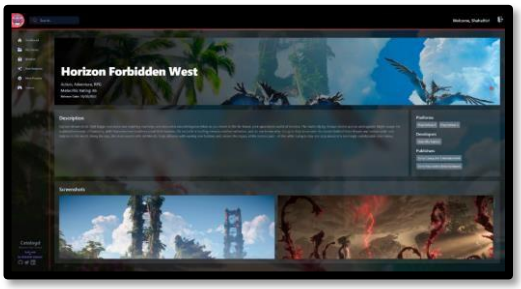


The Home Dashboard GUI is the main landing page for logged-in users. It provides an overview of featured and upcoming games.

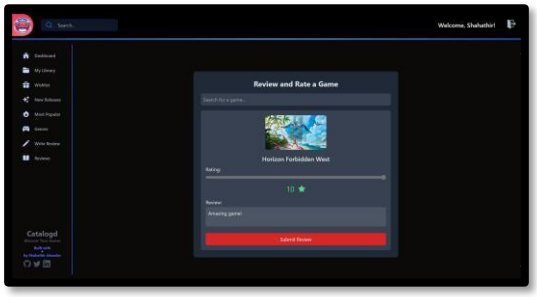
The Genres Page GUI displays a list of game genres, allowing users to explore games by genre.



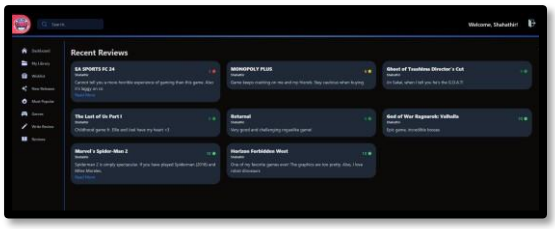
The My Library Page GUI allows users to view and manage their personal game library.



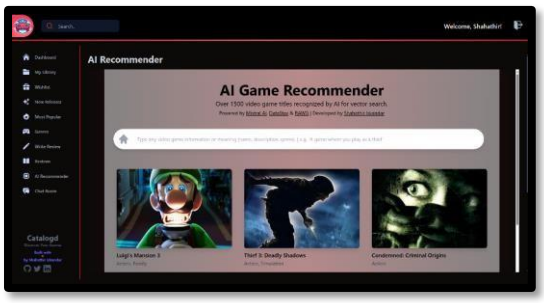
The Game Title Information Page GUI provides detailed information about a specific game.



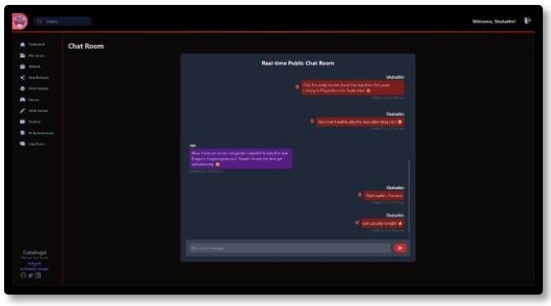
The Write Review GUI allows users to write and submit reviews for games.



The Read Reviews GUI displays reviews written by users for a specific game.



The AI Game Recommender GUI displays the video game recommender web application that leverages AI through vector embeddings to suggest games.



The Chat Room GUI allows users to send and receive messages in real-time. It is a public chat room, meaning that all messages are visible to all users. The chat room is designed to be responsive and user-friendly, with a focus on real-time communication.

VIII. Conclusion And Recommendation

A. *Conclusion*

The Catalogd project was initiated to address specific gaps in the realm of video game cataloging. The primary problems identified were the difficulty in discovering new games, sharing gaming experiences, managing personal game catalogs, engaging with the gaming community, and finding reliable game reviews. The objectives were to develop a social cataloging application that allows users to create, share, and explore game catalogs, rate and review games, and engage in discussions within a community of gamers.

Catalogd successfully addressed these problems by implementing a range of features, including user authentication, game discovery through recommended catalogs and themed lists, game catalog management, social networking capabilities, and a review system. The Rational Unified Process (RUP) methodology was employed to guide the structured development of the application, ensuring that project goals were met within the set timeframe.

The outcomes of the project indicate that Catalogd effectively meets its objectives. Users can now discover new games, share their gaming experiences, manage their game collections efficiently, and engage with a community of like-minded gamers. The review system implemented also allows users to find and contribute reliable reviews, enhancing the overall user experience.

B. *Recommendation*

While the Catalogd application has achieved its primary objectives, there are several areas for future enhancement and research:

1) Mobile App Development

Expanding the mobile version of the app to include all features available on the web platform, ensuring a consistent user experience across devices.

2) Performance Optimization

Continuously optimizing the performance and scalability of the app to handle a growing user base and increased data load.

3) User-Generated Content

Introducing more features for user-generated content, such as video reviews, gameplay highlights, and custom lists, to enrich the user experience.

4) Localized Content

Adding support for multiple languages and regional game catalogs to cater to a global audience.

5) Enhanced Community Features

Developing more advanced community engagement tools such as forums, and gaming events to foster deeper interactions among users.

6) Data Analytics

Utilizing user engagement data to continuously improve the platform and provide insights into gaming trends and user preferences.

7) Monetization Strategies

Exploring monetization strategies such as premium memberships, ad placements, or partnerships.

Future research could also focus on evaluating the long-term impact of Catalogd on user engagement and its influence on gaming trends. Continuous feedback from users will be crucial in guiding these improvements and ensuring that Catalogd remains a valuable resource for the gaming community. By addressing these areas, Catalogd can continue to evolve and adapt to the needs of its users, maintaining its relevance and enhancing its utility as a comprehensive social cataloging tool for video games.

ACKNOWLEDGMENT

I would like to express my sincere gratitude to my supervisor, Ms. Zanariah binti Abu Bakar, for her invaluable guidance, support, and encouragement throughout the duration of this project. Her expertise and unwavering commitment have been instrumental in shaping the development of this thesis. I am deeply appreciative of her insightful feedback, which has significantly contributed to the refinement and improvement of the project.

I would also like to extend my heartfelt thanks to my parents for their unwavering support and encouragement throughout this journey. Their constant encouragement and belief in my abilities have been a source of strength and motivation. Additionally, I am grateful to my friends for their support and guidance, as well as for sharing their expertise and insights, which have proved invaluable in navigating the challenges of this project.

Finally, I am indebted to my seniors, whose assistance and guidance in the documentation process have been invaluable. Her expertise and willingness to lend a helping hand have been greatly appreciated.

Thank you to everyone who has contributed to the success of this project. Your support and encouragement have been invaluable, and I am truly grateful for the opportunity to embark on this journey of learning and growth.

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