Project Proposal: Comprehensive Used Book Sale Exchange Solution

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Declaration

We hereby declare that the project proposal submitted for evaluation of course module IT3162 leading to the award of a Bachelor of Science in Information Technology is entirely our own work, and the contents taken from the work of others have been cited and acknowledged within the text. This proposal has not been submitted for any degree at this University or any other institution.

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1 Introduction

1.1 Introduction

This project aims to explore the usage of blockchain based technology in developing a secure, decentralized, and transparent used book sale exchange solution. The market currently contains a number of used book sale exchange solutions, but they rely on individual databases of books, which are often not large enough to be useful to the end user, and are not updated frequently enough by the owners. The Ethereum blockchain provides a decentralized solution to this problem, where the books are stored in a decentralized manner, and the ownership of the books is tracked using smart contracts. This solution will also be integrated with an AI model that will allow the end user to discover books that they may be interested in.

1.2 Objectives

The primary object is to analyze the feasibility of using blockchain based technology for storage and management of databases, with a focus on used-books. The project will also explore the use of AI models for personalized book recommendations and efficient book searches.

1. Explore blockchain technology for storage of metadata and transaction data.
   (a) Explore blockchain platforms (e.g., Ethereum, Hyperledger) and their Existing implementations.
   (b) Explore possibilities of storing data on-chain and off-chain, and what data would suit which form of data storage
   (c) Create an open standard for storing book data on a blockchain, and a corresponding smart contract for tracking ownership of books.
2. Explore AI models for personalized book recommendations and efficient book searches.
   (a) Create an open-source model for book recommendations based on user preferences.
   (b) Create an open-source model for efficient book searches based on user preferences.
   (c) Train models to be effective and efficient in processing data in English, Tamil and Sinhala.
3. Create a model user-friendly platform for listing and discovering books for sale or exchange.
   (a) Implement a web application for users to list and discover books.
   (b) Demonstrate the capabilities of the recommendation and search algorithms
   (c) Demonstrate the feasibility of storing book data on blockchains, and it's benefits over traditional databases.
   (d) Create user profiles with transaction history.
   (e) Incorporate a messaging system for user interactions.
   (f) Explore the feasibility of extending the system to cover public library databases through APIs.

1.3 Benefits of this research

Currently, most recommendation/search algorithms are proprietary, and most small businesses rely on rudimentary techniques to display data. Customers in Sri Lanka find it difficult to navigate e-tailer stores, and find books that they are interested in. By creating an open-source model that can easily be integrated by any organzation into their storefront, it will allow clients to maximize their revenue and increase customer satisfaction.

Further, if decentralization and federation in the storage of book metadata and transaction data is deemed feasible, it will allow for a vast open-source repository of metadata, on which any organization can build

their own storefronts, and allow for easy exchange of data between storefronts, and for aggregation and second-hand market platforms (such as ours) to be built on top of it.

2 Background

2.1 Background

2.2 Review on Existing Systems

A comprehensive review on existing book exchange platforms, book-availability and metadata databases was performed. 20+ local e-tailers and 7 relevant international e-tailers were reviewed. A list of book sites can be found in the Appendix (see Section 8).

The study shows that while there are a plethora of existing book sales and exchange platforms, both affiliated with major book retailers/e-tailers and independent, the platforms themselves have a small selection of books, and are not updated frequently enough to be useful to the end user. The stores also use rudimentary 'newest first' or 'most popular' sorting algorithms, which are less effective in showing what the user is most likely to be interested in.

International e-tailers such as Amazon and AbeBooks have a much larger selection of books, both new and used, but do not provide competitive services to Sri Lankans due to high shipping costs, long delivery times, and import restrictions.

Here's an overview of some of the globally existing websites:

2.2.1 Amazon

Amazon is a popular online Web-App that offers both new and used books for sale through third-party sellers. Users can find a wide selection of used books in various conditions. It offers a vast collection of books and a user-friendly interface. This system has several subcategories that the books are classified by department, format, author, promotions, prizes, languages, etc. The user rating and book description part of amazon.com are one of the best features, as it allows users to make an informed decision before purchasing a book. However, the disadvantages of this website are, 1. E-commerce focus 2. Limited transparency 3.lack of personalization 4. High transaction cost

2.2.2 Goodreads

Goodreads primarily serves as a social platform for readers, also some users may offer books for trade or giveaway in discussion forums. This includes details about authors, publication information, and user-generated content. The site allows users to set and track reading goals for the year, which is a great feature for people who like to challenge themselves to read more. It allows users to create virtual bookshelves, rate books, and connect with other readers. However, disadvantages of this are, 1. Limited transaction capabilities 2. Incomplete listings 3. Complex selling process

2.2.3 AbeBooks

AbeBooks is a well-established online marketplace for books, including new, used, rare, and out-of-print versions of books. Many independent sellers and bookstores list their inventory on AbeBooks, which means you can find books that may not be available on mainstream platforms. This website's interface is user-friendly, and sellers on AbeBooks typically provide detailed descriptions of the book's condition, edition, etc., as well as international shipping options. This helps buyers make informed decisions. The website consists of rare or antique books, often including first editions and signed copies. Disadvantages of using this are, 1. Limited free listings 2. Commercial nature

2.2.4 Bookberry.lk

Bookberry is an online website that offers to sell used books online. Even though not overly famous across Sri Lanka gives the facility to bank deposit or cash on delivery option for buyers. Disadvantages are that it doesn't contain a large collection of books and user interfaces are not friendly.

2.2.5 UsedBooks.lk

UsedBooks.lk is an online marketplace for books where you can find used and rare books used by independent traders around Sri Lanka for sale. Website contains detailed descriptions on the book's condition and photos uploaded by the seller. They also have various categories of books but the drawback is that since the books aren't categorized correctly the buyer finds trouble in sorting through the catelog looking for the book he wants. Registration process is fairly easy which creates oppotunities for fake sellers. Another notable disadvantage is that even though books have been used the prices are overly high which may discourage lot of buyers.

2.2.6 bookswap.lk

BookSwap.lk is free online platform for exchange used books or sell books free online. You can buy second hand books, text books or used books by institutions. Even though they have put up an extensive collection of books the website is still completed as they haven't specified a payment method. Platform encourages to meet the buyer personally rather than online transactions which might not be appealing for some customers.

3 Materials and Methods

4 Expected Results

Book Database

The book database will be built leveraging blockchain technologies, with the aim of creating an open and decentralized repository of book metadata. This repository will be used to power the search and recommendation systems. Transaction and availability data will also be stored on the blockchain or on layered solutions depending on the use case.

Techniques to automate data ingest, including scraping data from web APIs and websites, will be explored in order to maximize the size and relevance of the database, especially with regards to Sinhala and Tamil language resources.

Open Recommendation System

The Recommendation System will utilize AI/ML models to provide personalized book recommendations to users based on their preferences. The system will generate user profiles based on browsing history, purchase history, and other relevant data. The system will easily integrate with existing storefronts.

Open Book Search

The book search will utilize the recommendation system, to provide relevant and accurate results to the user. This system will also be built in a way as to ensure compatibility with existing and new systems.

Book Marketplace and Discovery Platform

A marketplace and discovery platform will be built to showcase the features and functionality of the recommendatio, search systems, and the book database. This platform will contain all the necessary features and functionality necessary for a modern book marketplace, including user profiles, messaging, and a book listing system.

Authentication and Authorization

- Users can log in and sign up using a username, password, and email or via OAUTH.
- Bookshops can register by providing the following information:
  - Shop name
  - Contact information (Address, Phone Number, Email Address)
  - Owner/manager information (Name, Contact Number, Email Address)
  - Hours of operation
  - Shop description
  - Shop policies (Terms and Conditions, Return Policy)
  - Inventory quantity
  - Social media links
  - Website URL

4.0.1 Book Listing

- Users and bookshops can list books manually or by using barcode.

4.0.2 Book Details

- Users can click on the book picture to view all the details relevant to the book.

4.0.3 User Profiles

- User profiles show user-purchased books (only visible to the profile owner) and the user's basic details.
- Bookshop profiles show all the details of the shop that buyers should know.

4.0.4 Notifications

- If a user adds a book to their favorite list, it notifies the book owner or bookshop.
- If the book is not available to the user, the system will notify the user if the book is listed within one week.

5 Technology Stack

5.1 Front-end

The front-end will be built using ReactJS, a JavaScript library for building user interfaces. Building on ReactJS gives us the option to use the same codebase to build a web application and a mobile application if necessary.

5.2 Backend

The backend for the storefront will be built using NextJS, a ReactJS framework for building server-side rendered applications. The backend for the blockchain will be built using Solidity, a smart contract programming language for the Ethereum blockchain. The backend for the recommendation and search systems will be built using Python, with the use of the TensorFlow and PyTorch libraries for machine learning.

5.3 Database

Tentatively, we are exploring the use of Ethereum based private blockchains for storing data, in combination with a MongoDB database for a hybrid on-chain/off-chain solution.

5.4 External APIs

External APIs will be used in the Marketplace and Discovery Platform for the following purposes:

- Google Maps API for location services
- Google Books API for book metadata
- Google Translate API for translation services

5.5 Hosting and Deployment

We are planning on using free hosting solutions for the initial deployment, such as Vercel.

5.6 Security

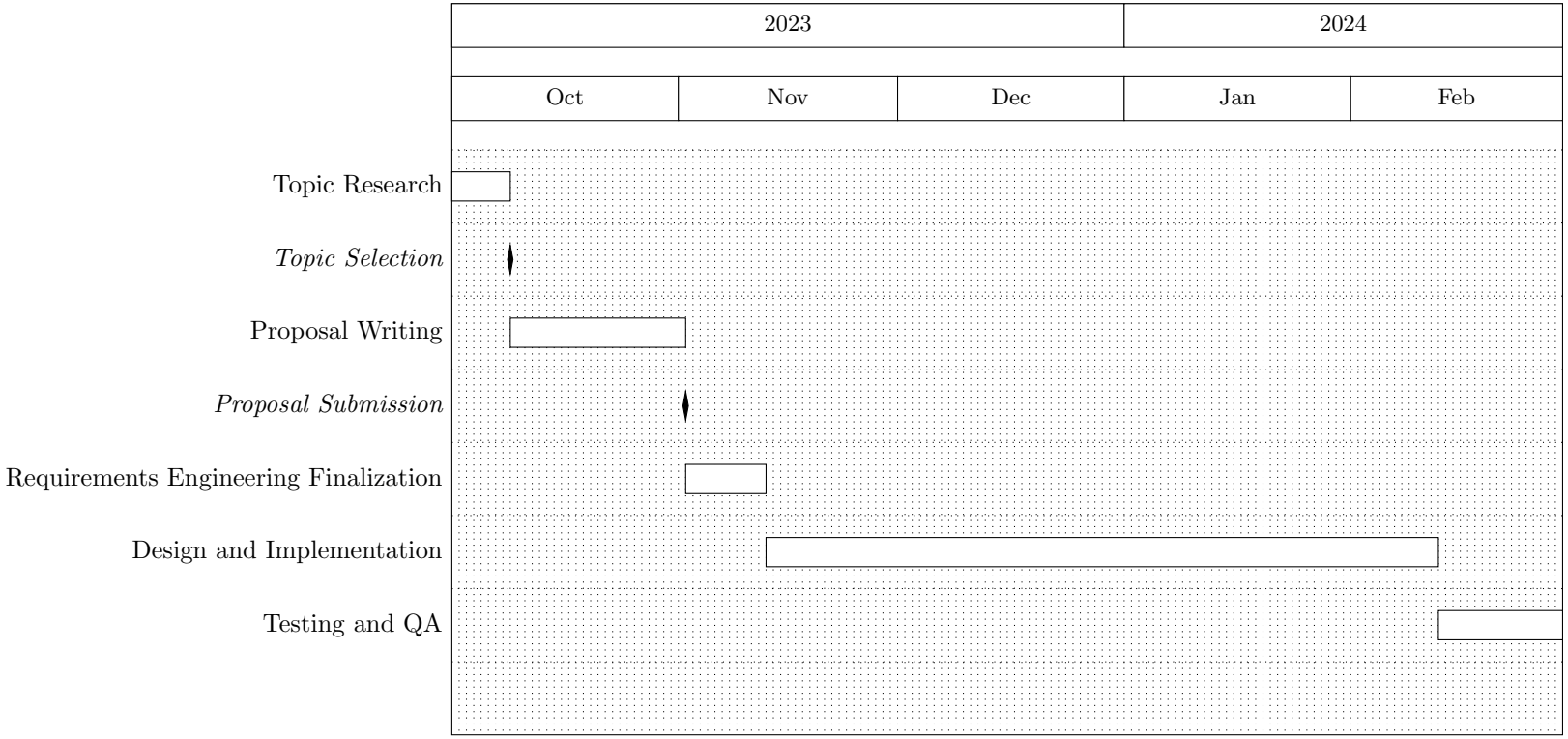
5.6.1 Data Encryption

- Encrypt and store users' and sellers' sensitive data.

5.6.2 Authentication

- Use two-factor authentication for logging in.

6 Timeline of the Research


2023
2024
Oct
Nov
Dec
Jan
Feb
Topic Research
Topic Selection
Proposal Writing
Proposal Submission
Requirements Engineering Finalization
Design and Implementation
Testing and QA

-01-01

7 References

8 Appendix

Appendix I:

List of Book Sites

Here is a list of book sites, including local e-tailers and relevant international e-tailers:

1. Sarasavi (sarasavi.lk)
2. Vijitha Yapa Bookshop (vijithayapa.com)
3. MD Gunasena (mdgunasena.com)
4. Makeen Books (makeenbooks.com)
5. Granthaya (granthaya.com)
6. Lanka Buy Books (lankabuybooks.com)
7. Vidusara Bookshop (vidusarabookshop.lk)
8. Samayawardhana Book Shop (samayawardhanabookshop.com)
9. Wijesuriya Bookshop (wijesuriyabookshop.lk)
10. Island Books (islandbooks.lk)
11. Daraz.lk (daraz.lk)
12. eThaksalawa (ethaksalawa.lk)
13. Lanka Book Publishers Association (slbpa.lk)
14. Amazon (amazon.com)
15. AbeBooks (abebooks.com)
16. eBay (ebay.com)
17. Book Depository (bookdepository.com)
18. Rakuten Kobo (kobo.com)
19. Project Gutenberg (gutenberg.org)
20. Goodreads (goodreads.com)