

Knight Foundation School of Computing and Information Science

Fall 2024 Senior Design Project

StudyQuest

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PROBLEM

The lack of a unified social networking platform that integrates gamified elements (such as XP bars and achievements) alongside core features like messaging, friend requests, and posts limits engagement and user retention. Many platforms fail to provide seamless integration of these features with modern authentication and backend services

CURRENT SYSTEM

Current solutions include:
1.Social Networking Apps: Focus on traditional features such as messaging and posts but lack gamified experiences.
2.Gamified Platforms: Provide user engagement but rarely include robust social networking features.
3.Development Challenges: Existing solutions are either complex to develop or lack Firebase integration, making features like authentication and real-time database functionality harder to implement.

REQUIREMENTS

- Functional Requirements:**
- User registration and login
 - Profile management with unique usernames.
 - Friends management: friend requests, accept/reject requests.
 - Post creation, editing, and viewing.
 - Gamified features: XP bars, achievements, and levels.
 - Commenting system integrated with posts.
- Non-functional Requirements:**
- Responsive design and visually engaging interface.
 - Scalable backend using Firebase.
 - Secure authentication and real-time updates.

SYSTEM DESIGN

The system design is structured into:
1.Frontend: Built using Next.js for dynamic routing and client-side interactivity.
2.Backend: Firebase for real-time database, authentication, and storage.
3.UI Design:
1.Centralized navigation for features like "Home," "Posts," "Friends," and "Search."
2.Gamified visual elements such as XP bars and achievement badges.
4.Database:
1.Firebase Firestore stores user profiles, posts, comments, and friend relationships.

OBJECT DESIGN

Key components include:
1.Authentication: Handles user login, registration, and Google Sign-In.
2.Friends Feature: Manages friend requests, friend lists, and statuses (online/offline).
3.Post Manager: Allows users to create posts with auto-filled author information, preview posts, and navigate to detailed views.
4.Comment System: Dynamically links comments to posts.
5.Gamified Elements: Tracks XP progress and achievements based on user activity.

IMPLEMENTATION

The app was implemented as follows:
1.Frontend: Designed with React components and styled using reusable CSS from collaborators. Integrated with Next.js for page routing and rendering.
2.Backend: Firebase Firestore for database operations (e.g., storing posts, comments, and friendships).Firebase Authentication for secure login (email/password and Google).
3.Features: Dynamic routing (e.g., /posts/[id] for post details). Notification for friend requests and comments.

VERIFICATION

Conducted testing for:
- Functional features (login, friend requests, posts, comments).
- Data consistency between the client and Firebase.
Verified UI responsiveness on different devices.
Reviewed scalability by simulating multiple simultaneous user interactions

SUMMARY

This project delivers a modern social networking platform that integrates gamified elements to enhance user engagement. By leveraging Firebase's robust backend services and Next.js's dynamic frontend capabilities, we achieved a responsive and feature-rich application suitable for scalable deployment.

REFERENCES

- References**
- 1.Firebase Documentation: firebase.google.com/docs
 - 2.Next.js Documentation: nextjs.org/docs
 - 3.CSS Design Patterns: Leveraged from collaborator contributions.

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