Lab 1 - QuestNest Description

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Table of Contents

Listing Of Figures

Listing of Tables

No table of figures entries found.

1 Introduction

1.1 Societal Problem

Chores usually fall on one parent or caregiver, often leading to parent-child conflict when children resist taking on tasks or when there is no shared agreement on how chores should be distributed (Lam, 2016). Braun Research found that out of 1,001 U.S. adults, only 28% assigned chores to their children (Society for the Psychology of Women, 2017). Research by Rende (2015) displays an increase of school engagement, positive mental health in adulthood, and family cohesion when children are assigned chores.

1.2 Problem Characteristics

Parents struggle to assign and follow up on chores effectively, especially in busy families. Traditional chore charts often fail to provide the necessary structure or engagement to promote consistency and accountability. Families need a positive and structured system to balance responsibilities and build better habits in an engaging way.

1.3 Solution Statement

QuestNest is a gamified mobile application that makes chore tracking engaging and fun through a reward management system. The goal is to transform routine household chores into a rewarding quest, teaching responsibility and healthy habits through positive reinforcement.

2 Product Description

QuestNest is a cross-platform mobile application designed to help families manage chores through a fun and structured reward system. By turning daily responsibilities into interactive quests, the application motivates children to complete tasks while giving caregivers tools to assign, monitor, and customize chores with ease. Children earn experience points (XP) for completing tasks, level up through consistent participation, and unlock real-world rewards like extra screen time or special privileges. QuestNest includes features such as caregiver-managed verification, tiered incentives, reminders, and a shared family calendar to encourage consistency, accountability, and communication. The application promotes lifelong habits of responsibility while reducing household stress and improving family collaboration.

2.1 Key Product Features and Capabilities

2.1.1 Gamified Chore Tracking and Experience Points System

QuestNest transforms daily chores into interactive quests using a gamified system that rewards children with experience points (XP) upon task completion.

2.1.2 Tiered Leveling System

The application utilizes a tiered leveling system that tracks progress as XP is accumulated. As children level up, they unlock higher-value rewards that were previously inaccessible. This structure reinforces long-term engagement by linking progression with goal setting.

2.1.3 Collaborative Family Rewards

The Collaborative Family Rewards feature enables caregivers to define rewards that require collective completion of tasks by the entire family. This collaboration fosters mutual accountability and helps strengthen familial bonds.

2.1.4 Customization

Caregivers have full control over the rewards system, including the ability to define which rewards are available and assign XP costs to each. All reward redemptions will require caregiver approval before being granted.

2.1.5 Validation and Verification

The application includes a verification measure managed by caregivers. When children complete a task, they must submit proof, such as photos or videos. Caregivers can then review submissions and validate accordingly before awarding XP.

2.1.6 Shared Family Calendar and Notifications

An integrated family calendar is included within the application to ensure the family stays organized and responsible. The calendar allows for the scheduling of chores, events, and important dates. Assigned tasks will be visible and tied directly to reminders and notifications.

2.2 Major Components (Hardware/Software)

QuestNest will be developed as a cross-platform mobile application using Python 3.13.5. The application will adopt the Model-View-Controller (MVC) architectural pattern to ensure an organized codebase and assert strict responsibilities to each technology/class. The MVC model and functional components are shown in Figure 1.

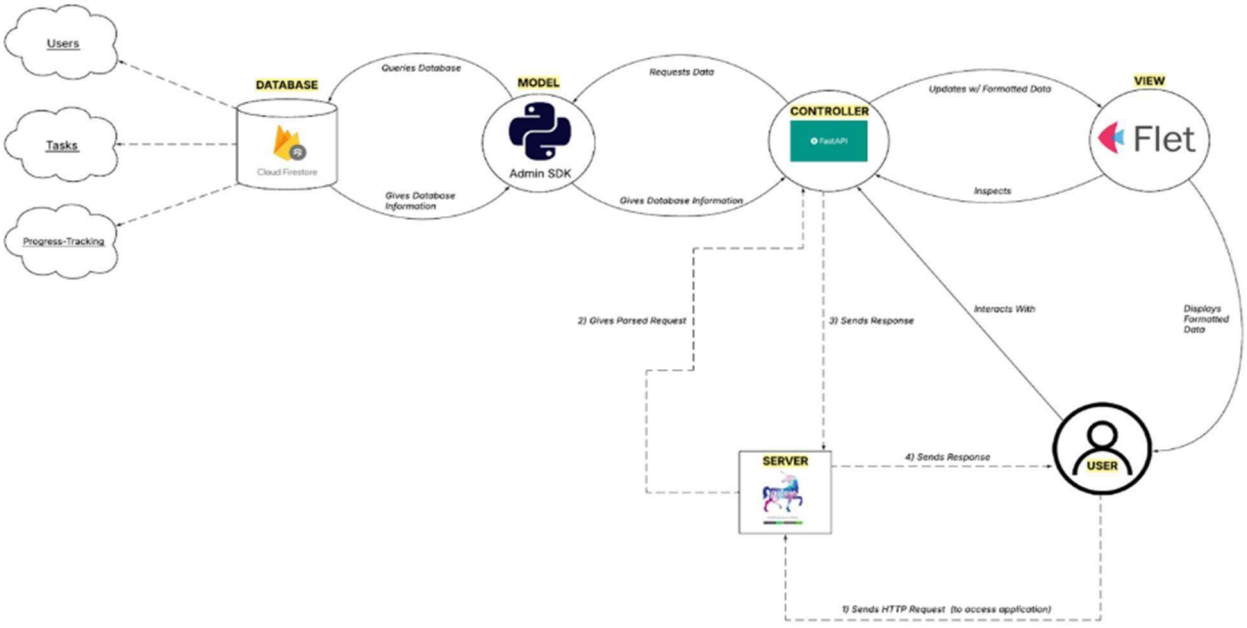

Figure 1: Functional Component Diagram

2.2.1 Model

The Model layer is responsible for handling the application's business logic and database interactions. QuestNest will use Google Firestore, a cloud-based NoSQL database, capable of multi-platform hosting and quick real-time updates. The model will use the Python Admin SDK to query and interact with the Firestore database directly.

2.2.2 View

The View will manage the visual presentation of the application. It formats and displays data from the database. The application will utilize Flet, a Python framework built on Flutter. Flet supports multi-platform development and enables the creation of an appealing UI for users of all ages.

2.2.3 Controller

The Controller serves as the central coordinator of the application. The model and view will not have any interaction with one another and are handled solely by the controller. It serves as a

middleman for communication between the two, and the device is to be interacted with by the user. It will "ask" the model for information pertaining to the database, then allow the view to receive that data in a defined fashion.

The controller will also need to carry the load of work to be done for the back end, but this cannot be done easily with Python alone. FastAPI is a framework that will connect all the components. It will follow the protocols and procedures of RESTful API, allowing the establishment of endpoints for user's navigation needs, and interacting with the web server while also providing quick performance.

2.2.4 Web Server

Uvicorn will serve as the web server, which will receive the user's request, parse through its data, give that data to FastAPI, then receive the response and deliver it to the user for access. It is a tightly integrated dependency of FastAPI and works seamlessly with flet.

3. Identification of Case Study

QuestNest is designed to make chores fun and engaging while promoting consistency and accountability. Users include all family members, such as parents and caregivers, who are seeking to establish better habits for kids, as well as children looking for an engaging way to make mandatory chores more rewarding. QuestNest will support families who struggle with distributing chores effectively while motivating children to complete responsibilities.

In the future, QuestNest may be adapted for use in educational environments and therapeutic settings where positive behaviors and habit building are beneficial.

4 Glossary

5 References