SurveyCraft: A Simplified Web Application for Efficient Survey Creation

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Abstract: This paper presents a web-based survey creation application, named as SurveyCraft, proposed for applications across schools, colleges, researches and businesses. The app makes it easy to create and manage surveys. It has different question types, a user-friendly design, and a good support backend. The technologies used are React Redux for the front end and Django REST Framework (DRF) for the back end. This setup helps keep things simple, safe, and able to grow. In this work, Role-Based Access Control (RBAC) is further added to give different permissions to admins, creators, and the users, which makes it easier to manage who can do what. The application can also handle tasks like data management and notifications in the background using Celery and Redis, which helps it run smoothly, even when lots of people are using it. The proposed application works to keep data safe and easy to access, and offers real-time analytics and reporting in order to help users get useful insights. By making survey handling easier and data collection better, this tool is good for research, school projects, and market studies. The future plan includes adding advanced data visualization tools to it.

Keywords: Survey, Web Application, RBAC, Asynchronous Processing, React, Django.

1. Introduction

There's a need for better survey tools in schools, businesses, and research. Right now, many old survey systems just don't meet the mark- they are not flexible and lack the features people want. To fix this, a web-based survey application which is easy to use, secure, and works well, is developed and presented through this work.

The proposed app 'SurveyCraft' simplifies survey management. One can change the questions, use a simple interface, and get quick reports. It is built using React [3] on the front end and Django[2][9]in the back end, so that everything runs smoothly. RBAC has also been added. This gives different users like admins, creators, and responders different access levels, which keeps things secure. To keep the app running well with lots of users, Celery [16] and Redis[5] has been used. These tools help with tasks like processing data and sending notifications fast.

This paper describes how the SurveyCraft app has been built, what functionality it provides and how it works. It also stresses on how theapp can also be useful for school tests, market research, and other ways to gather data, focusing on ensuring that the app can grow and keep data safe, making it a great choice for surveys in different fields.

2. Background Study

In the existing digital landscape, where education, business and research take place on online platforms, the need for creating a comprehensive survey application is realized. The traditional survey methods, which involve paper surveys or questionnaires sent by email, are obsolete, as they are slow, less efficient, and more difficult to analyze [8]. On the other hand, digital survey tools bring real-time analytics, immediate access to responses, and more streamlined data management to the table, which makes them far more superior for organizations hoping to collect meaningful feedback quickly and accurately [10]. As organizations demand more efficient survey solutions, developers are building apps that serve both survey creators and respondents. These platforms should be user-friendly and allow for a diverse range of questions, from multiple choice to open-ended questions. Real-time analytics is essential because it enables both monitoring as responses are received and, if required, the modification of structures. Its function is to make it easier to find the trends quickly and respond to them in a timely and well-informed way [11].Security and privacy cannot be ignored when creating an online survey app. Because surveys collect a lot of personal data, their confidentiality must be safeguarded. HTTPS encryption, JSON Web Tokens (JWT)[6]or OAuth 2.0secure authentication protocols are necessary to name just a few, plus input data validation- all these take a part in making sure that the app is secure and trustworthy[12]. Finally, as the number of users and surveys grows, the system should be scalable. This will allow for higher demand without slowing down, thus guaranteeing a smooth experience to all of the users on it[13].

In order to fulfill its well-performing requirement, asynchronous sounding off is really important. For example, trying to synchronize the sending of notifications and operating on sets of real big data will grind a system to a halt. By using tools like Celery, one can move these tasks off into the background where they operate and keep main application responsive and efficient [14].Overall, creating a successful survey app needs more than just a way to collect data. It involves ensuring that the app is **easy to use, secure, scalable,** and able to handle background tasks efficiently. , Building an app that meets these needs becomes increasingly essential as businesses and educational institutions continue to rely on these tools for insights and decision-making[15].

3. Working and Implementation

3.1 System Design

This empowers SurveyCraft with a modular and scalable system design to provide flexibility, security, and performance. The architecture comprises core components that take care of user requests, data processing, and backend services.

➢ **Frontend Design**

The frontend of the application is created in React, providing flexibility with reusable components, which keeps a clear and easy user interface (UI). This design allows survey creators and respondents to have a problem-free experience. To make this design responsive and work on all devices, tailwind CSS has been used. Tailwind [4] is used to make the design responsive, ensuring compatibility across various devices.

For state management, Redux is utilized to effectively handle the state through many different components. Friendly React minimizes and consolidates rendering while managing data flow_operation_type_ survey inputs and responses throughout the codebase. The UI is dynamic based on the user role (admin, creator, or respondent). Depending on the role, the user views different dashboards which should let them use all relevant features as per their permissions, including, but not limited to, creating surveys, submitting them, and analyzing the results.

➢ **Backend Design**

DRF [1]is used for easier creation of secure and efficient APIs (Application Programming Interfaces) that are used as the backend of the application. DRF simplifies building services to process surveys, questions, and answers. For the database, PostgreSQL [7]is used, given its scalability, reliability, and ability to handle complex queries. It contains all the vital elements like users, surveys, questions, answers, and analytics.

User authentication is handled with JWT, which provides a secure login. Role-Based Access Control ensures that each user can only access the features appropriate to their role whether that's as an admin, creator, or respondent. For handling tasks that run in the background, like sending notification and processing large datasets, Celeryhas been used with Redis as the message broker. This ensures that all these operations don't interrupt the main application flow.

➢ **Analytics Survey Module**

The analytics module gives admins and creators real-time insights of the survey results in visual graphs and charts, which help them gather valuable information regarding feedback

➢ **Security Measures**

All data transactions in this app are secured with HTTPS, ensuring that the user's sensitive information is kept private. Input validation and sanitization measures have also been implemented to defend against attacks such as SQL injection (SQLI) and cross-site scripting (XSS).

➢ **Asynchronous Processing**

Celery handles asynchronous tasks like sending email notifications or generating reports so that there is no issue related to slowing down of the main application. Further, Redis assists in managing how well the backend communicates with the task queues to keep things fresh.

➢ **Scalability and Performance**

The app is meant to be horizontally scalable to ensure that the system grows as demand increases, and still performs well. As the number of users and surveys scales, this will ensure that there's no performance degradation on the system. Docker[17] containers are used for the application, which makes scalability use easy and ensures that the app runs the same in all environments, offline servers, cloud.

3.2 System Architecture

SurveyCraft is architected as modular and layered with client-server model. This architecture allows the different components to talk to one another in a scalable, secure, and efficient manner. Figure 1 presents the architecture of the SurveyCraft application. The system consists of the following layers:

➢ **Client Layer (Frontend)**

For the frontend, React, Redux and Tailwind CSS (cascading stylesheets) have been used- React makes the app responsive, data flow is handled by Redux and, CSSis made simple with Tailwind CSS. Frontend is the part where admins, creators, and respondents use the application. It presents the survey data and results in an easy-to-read manner.

➢ **Application Layer (Backend/API)**

The backend is built with Django and Django REST Framework. It handles tasks like making surveys, managing users, and collecting responses. Redis helps keep the app fast by managing background tasks and storing data that gets used often.

➢ **Data Layer (Database)**

PostgreSQL is the database used for storing all important information, such as user profiles, survey details, responses, and stats. It's dependable and can manage a lot of data easily.

➢ **Security Layer**

This layer makes sure that the app is safe and secure. It uses JWT for user authentication, HTTPS for secure communication, and checks inputs for safety. It also makes sure users have the right access to various areas of the app.

➢ **Deployment Layer**

The app is packaged with Docker and Docker Compose. Cloud services like AWS or Azure are used to deploy and scale it. This layer keeps the app reliable and able to handle many users, even when there is a lot of traffic.

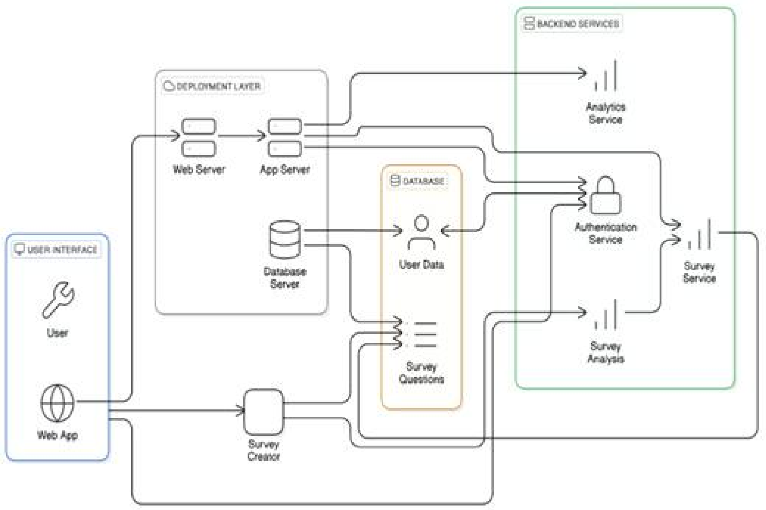

Fig. 1: Architecture of SurveyCraft application

1.1 Application Interface

In the given figures 2-6, SurveyCraftapp interface is shown.

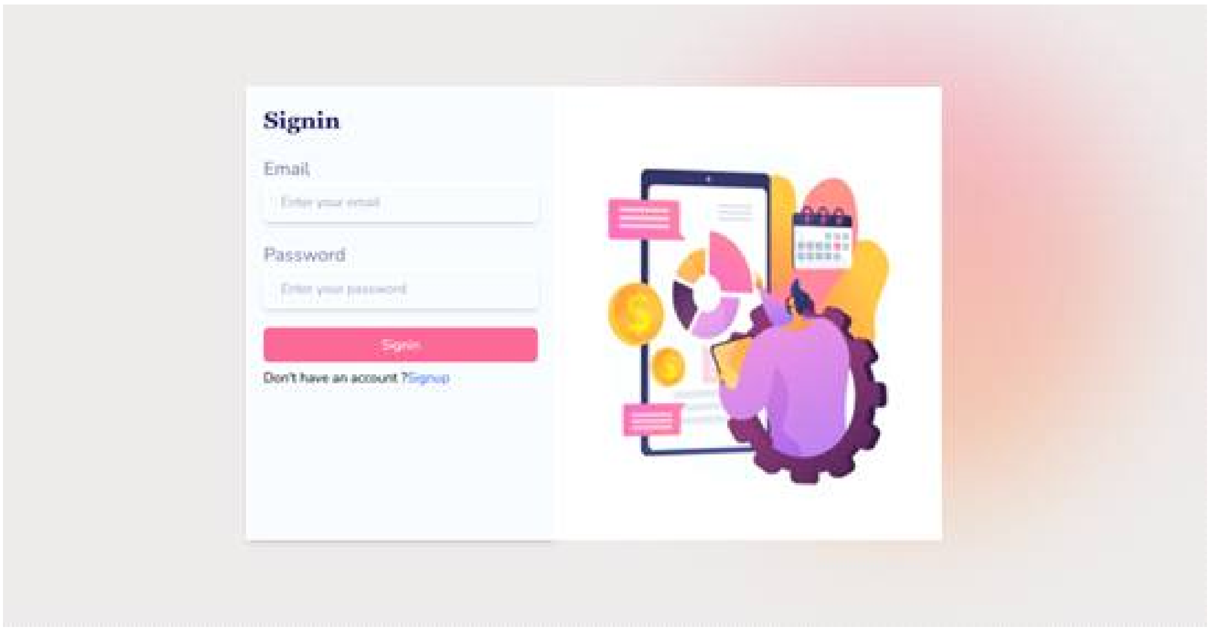

Fig.2: Sign-in Page

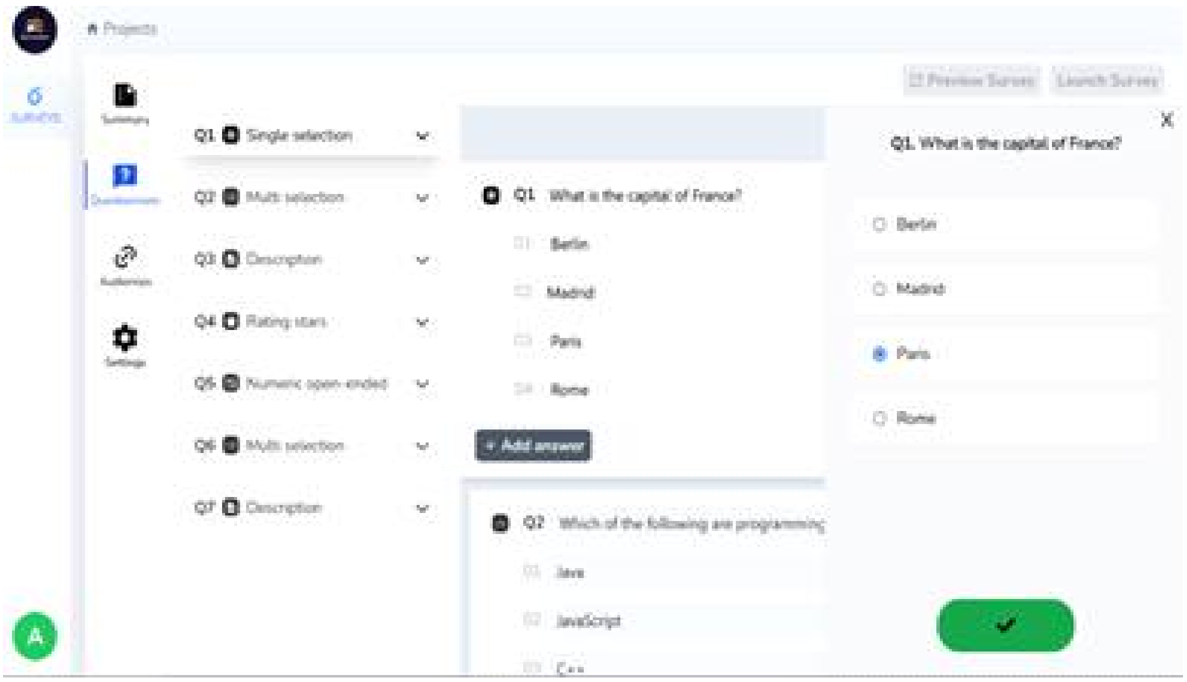

Fig.3: Dashboard Page

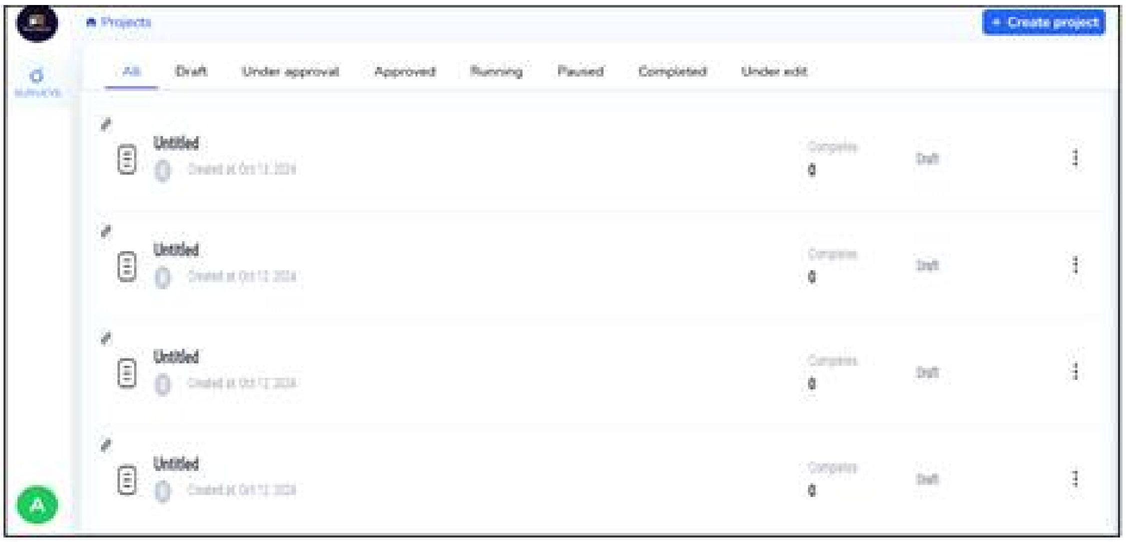

Fig.4: Survey Creation Page

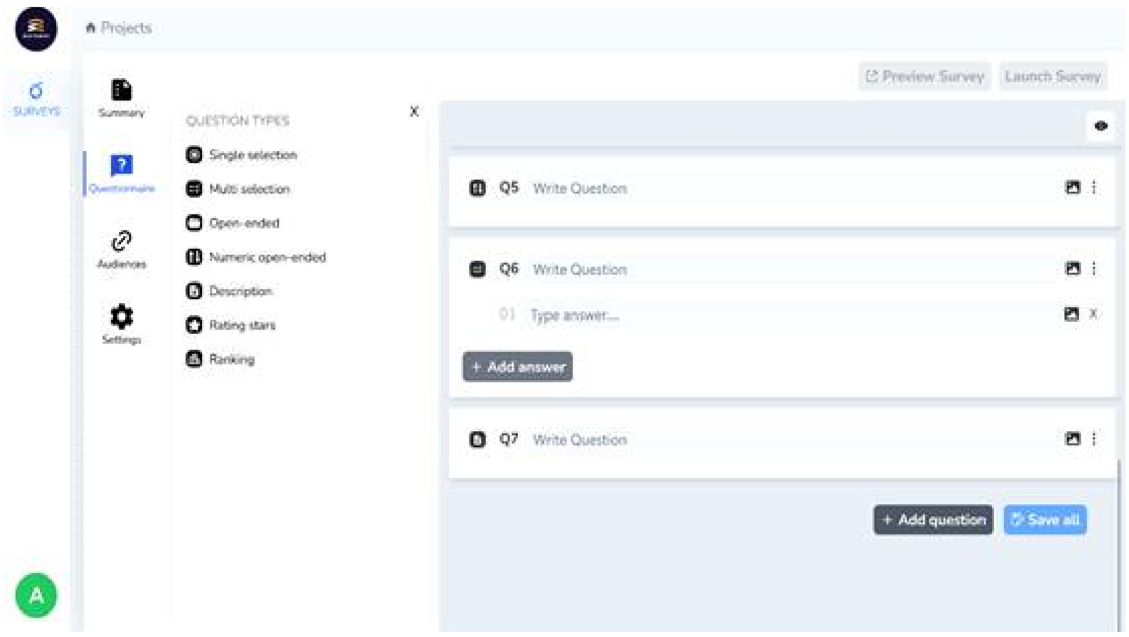

Fig.5: Add and Save

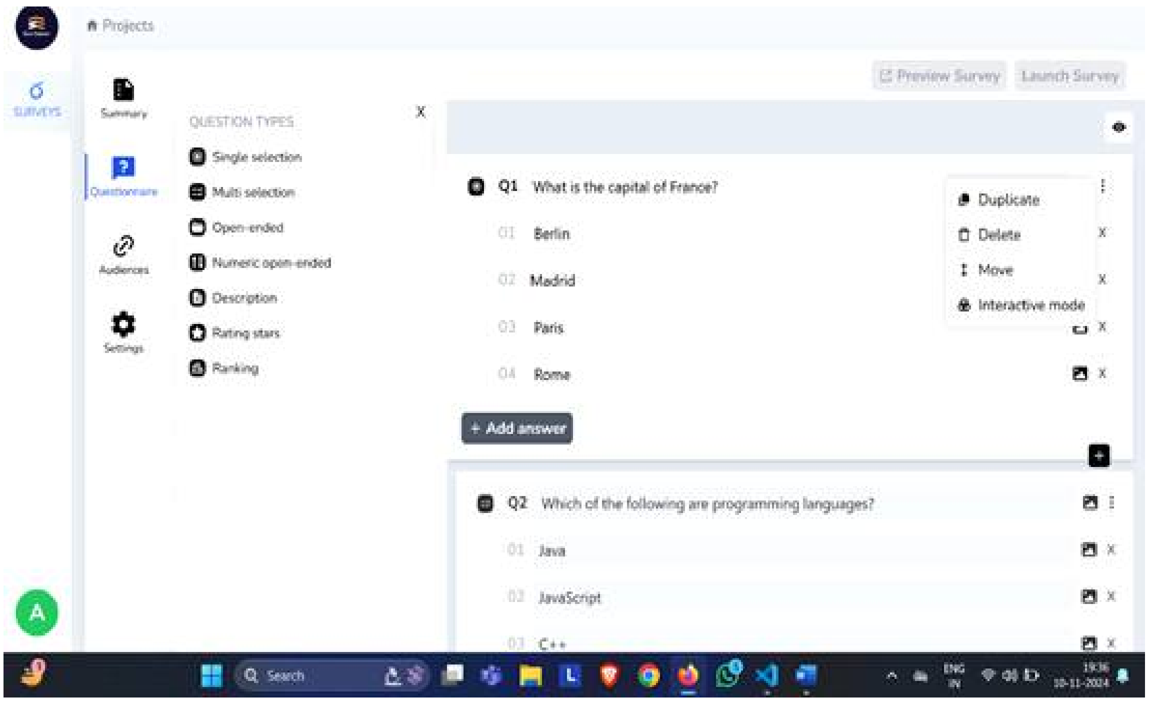

Fig.6: Delete and more option

4. Findings

The development of the SurveyCraftapp with its set of features has resulted in a platform that efficiently handles survey creation, distribution, and response processing. Key findings include:

➢ High Response Rate Expectation: Based on the design, the platform is expected to handle surveys with a strong response rate, as the interface is intuitive and user-friendly.

➢ Diverse Question Types: The platform supports different types of questions, including single choice, multiple choicequestions (MCQs), and open-ended questions, allowing for comprehensive data collection.

➢ Real-Time Analytics: The survey feedback and results will no longer require waiting weeks for analysis as the system can process and visualize responses in one pipeline, providing feedback in under 10 mili-seconds.

➢ Error Handling: The platform incorporates error-checking mechanisms to address issues such as incomplete responses or network errors, minimizing disruptions in the survey participation process.

➢ Availability: The architecture is designed to keep surveys open at all times, and underwent availability testing over a period of time.

6. Conclusion and Future Scope

This paper discusses a proposed web-based survey creation applicationSurveyCrafta versatile and easy-to-use form builder to create one's own survey. It can handle multiple types of questions, including Likertscale with emojis, multiple choice, and open-ended questions, such that it's easy to create surveys and quiz that cover all bases. The app offers a clean interface, which enables creators to design and edit surveys with utmost ease. The platform focuses on ease of use, reliability, and flexibility to ensure smooth scaling.As this work discusses the initial release of the app with the general public, regular testing and updates will further help improve the performance of the application software.

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