

CS 411 Final Report

Project: RunTrack

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Changes from Original Proposal

Initially, our project proposed several advanced features, such as predictive performance analytics using machine learning and weather API integration. However, due to time constraints, we narrowed the scope to focus on building core functionalities. These include:

- Home page to display past running sessions and related stats.
- Run page to search for nearby events and create events.
- Cart page for purchasing running-related products.
- Profile page for user registration, login, and editing personal information.

Achievements and Failures

Our application successfully provides a platform for users to track their running stats, create running events, and manage their profiles. There are room for improvement, including:

- Advanced data visualization using charts/histograms.
- Integration of external datasets, such as the Berlin Marathon.

The app remains a useful tool for casual runners given its functionalities.

Data Schema Changes

Originally we planned to use external datasets like Berlin Marathon data to enhance the app's analytics. In final implementation, we focused solely on user-generated data, such as running stats and personal information, stored in a database. We simplified the schema to remove external data dependencies.

ER Diagram and Table Changes

We didn't change much about diagram and tables.

Functionalities Added/Removed

- **Added:**
 - Profile editing for users to manage their details.
- **Removed:**
 - Weather API integration.
 - Advanced data visualizations using machine learning techniques

Advanced Database Programs

- Transaction(s): We implement a transaction that groups the INSERT into Event and Host tables. If one step fails, the entire operation rolls back, keeping the database consistent
- Trigger(s): We implement a trigger that ensures once an event's Date is past, no more run sessions can be added for this event.
- Constraints: Besides primary and foreign key constraints, we also implement three extra constraints that make sure: 1. Make sure the price of product is positive. 2. The Quantity of purchase is positive. 3. The endTime must be after startTime in RunSessionData.
- Stored procedure(s): We implement a stored procedure that summarizes the total distance run by one user and each of the user's friends individually in the given time range. Then, it returns the top 3 people who ran the longest distance and the user, if the user is not one of the top 3. If the user is not one of the top 3, we return the list of products that top 3 users recently purchased.

Technical Challenges

Ziheng: I do not have much full-stack experience. I have some difficulties implementing the authentication for profile when handling secure login and user information update.

Boyu: Initially, I implemented the project using JPA. However, JPA was banned, so I decided to rewrite the code using Spring Data JDBC for better performance and simplicity. Additionally, I encountered Cross-Origin Resource Sharing (CORS) issues, which took a considerable amount of time to resolve.

Xiaohan: Not having too much experience on the backend side. After searching for related knowledge and collaborating with other team members to complete the Event page with two functions: creating Event with a certain date and location; viewing Events by giving a certain location.

Xiaoyang: I haven't developed webapps before. I have some difficulty integrating sql statements into the application.

Future Work

1. Integrate some advanced features like Weather API and user running data analysis.
2. Enhance user Interaction by adding some social features, such as following other users.
3. Mobile platform support.

Teamwork and Division of Labor

The division of labor was:

- **Xiaohan Mu:** Event Page: create events; view events

- **Boyu Liu:** Home page; frontend set up, backend set up for entity layer, service layer, controller layer and repository layer.
- **Ziheng Qi:** Register/Login, User Profile
- **Xiaoyang Chen:** Integrate transactions, triggers, constraints, and stored procedures

Teamwork was managed effectively and we went smoothly during our project. We enjoyed our teamwork very much.