

# Knight Foundation School of Computing & Information Sciences

## Spring 2023 Capstone 2

### Sensor Data Visualization

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**Instructor/Faculty:** Seyedmasoud Sadjadi, PhD, Florida International University

#### PROBLEM

The challenge for researchers is to create visually appealing ways to present data that resonate with people, while also developing web-based solutions for clients that rely on both data and code. In the health domain, integrating Fitbit technology enables the collection of precise data on individuals' physical activity, sleep patterns, and caloric expenditure throughout the day. This project aims to provide researchers with a platform that offers user and administrative functionalities for effectively organizing, presenting, and analyzing data.

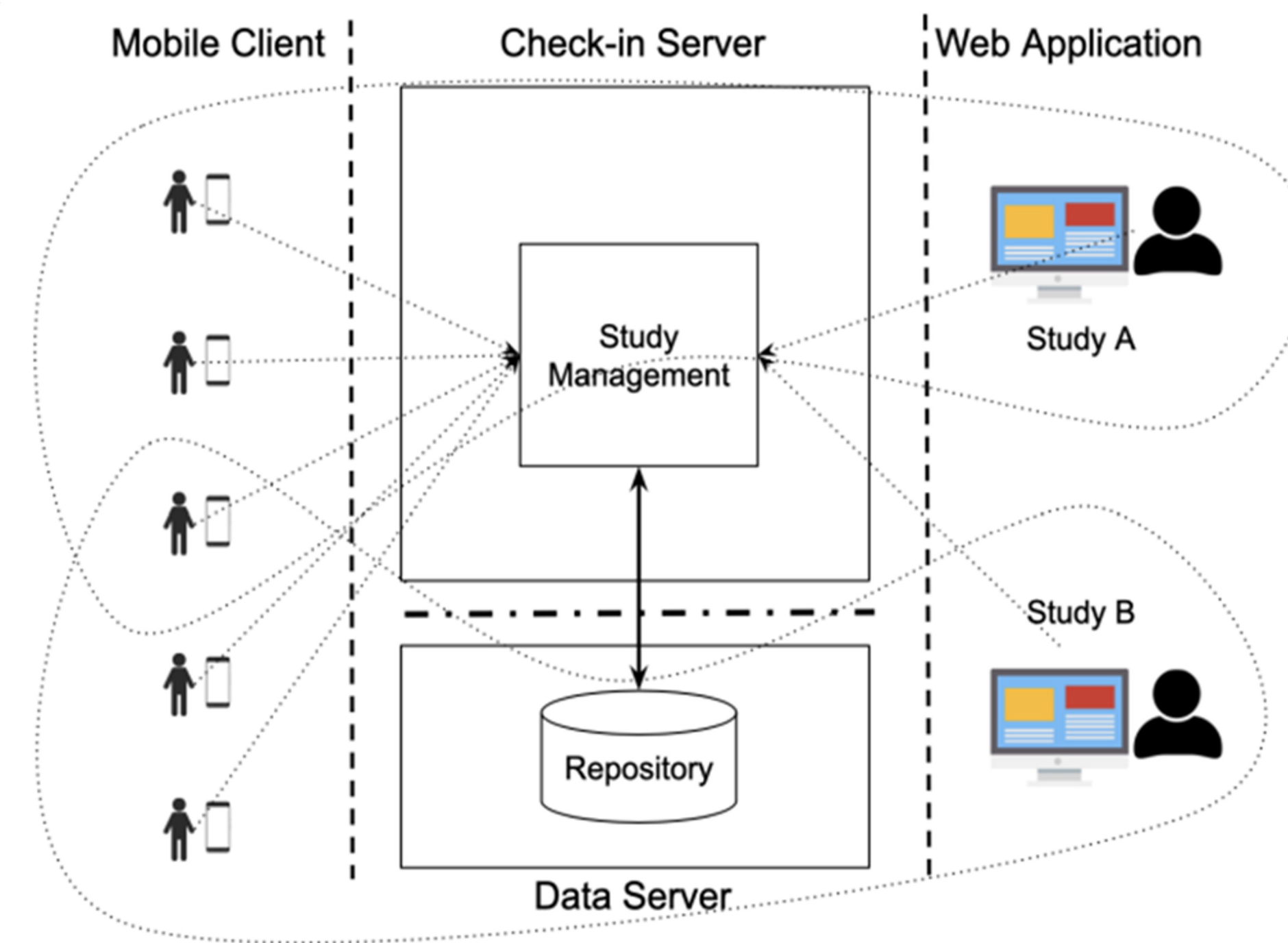
#### CURRENT SYSTEM

At present, the system adopts a dual approach for user interaction, comprising of a mobile application developed with Flutter and a web application constructed using Java Web Toolkit. For administrative purposes, a standalone web application has been developed utilizing Reacts, SASS, axios, and Spring Boot, with a MySQL backend server. This administrative system is capable of handling login requests, providing authentication, accessing the database to load studies and surveys, and displaying data in chart form. In addition, the Flutter application communicates with the server and efficiently stores user data in the database while also featuring graph-based visualizations for enhanced user-friendliness.

#### REQUIREMENTS

- Install MySQL workbench to run the Koios Database
- Install IntelliJ and VSCode to run the backend and frontend respectively
- Install Tomcat Server
- Install Google Web Toolkit
- Install Flutter to run the mobile frontend code

#### SYSTEM DESIGN



#### OBJECT DESIGN

A

| #  | Question                             | Type      | Child Trigger           | Parentid | Show Graph             |
|----|--------------------------------------|-----------|-------------------------|----------|------------------------|
| 1  | Please enter your gender.            | selection |                         |          | <a href="#">Expand</a> |
| 2  | Please specify your gender.          | text      | Other (please specify)  | 1        | <a href="#">Expand</a> |
| 3  | How would you describe yourself.     | choice    |                         |          | <a href="#">Expand</a> |
| 4  | Please specify your previous answer. | text      | Other (please specify)  | 3        | <a href="#">Expand</a> |
| 5  | What is your age?                    | selection |                         |          | <a href="#">Expand</a> |
| 6  | Are you:                             | selection |                         |          | <a href="#">Expand</a> |
| 7  | What is your native language?        | text      |                         |          | <a href="#">Expand</a> |
| 8  | What is your profession?             | selection |                         |          | <a href="#">Expand</a> |
| 9  | Please specify your profession       | text      | Other (please specify)  | 8        | <a href="#">Expand</a> |
| 10 | What is your rank/role?              | selection | Law enforcement officer | 8        | <a href="#">Expand</a> |

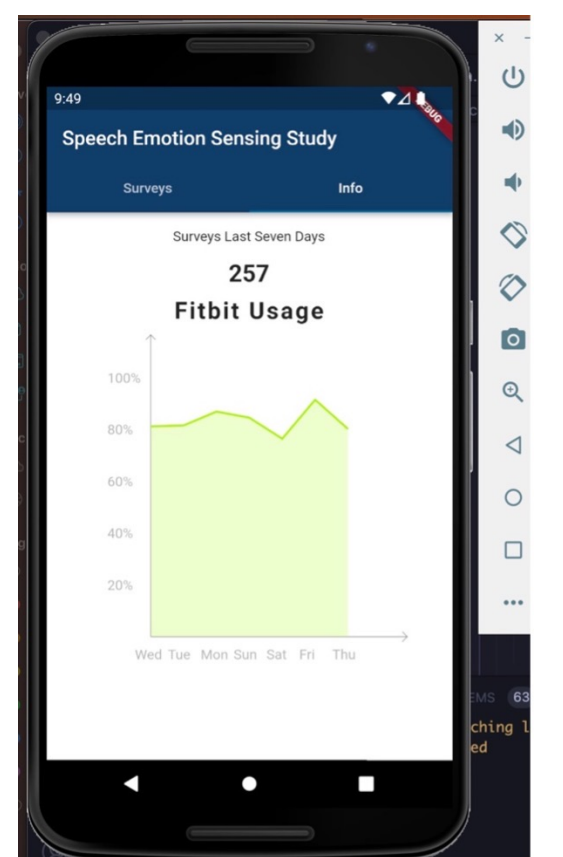
(A) Select Version Page

B

| Id | Name                                                | Questions                 |
|----|-----------------------------------------------------|---------------------------|
| 1  | Initial Data Collection One-Time                    | <a href="#">Questions</a> |
| 2  | Initial Data Collection Always                      | <a href="#">Questions</a> |
| 3  | Event Questionnaire                                 | <a href="#">Questions</a> |
| 4  | Audio Test                                          | <a href="#">Questions</a> |
| 5  | Periodic Mental Health Questionnaire Every Two Days | <a href="#">Questions</a> |
| 6  | Periodic Mental Health Questionnaire Always         | <a href="#">Questions</a> |

(B) Survey Page

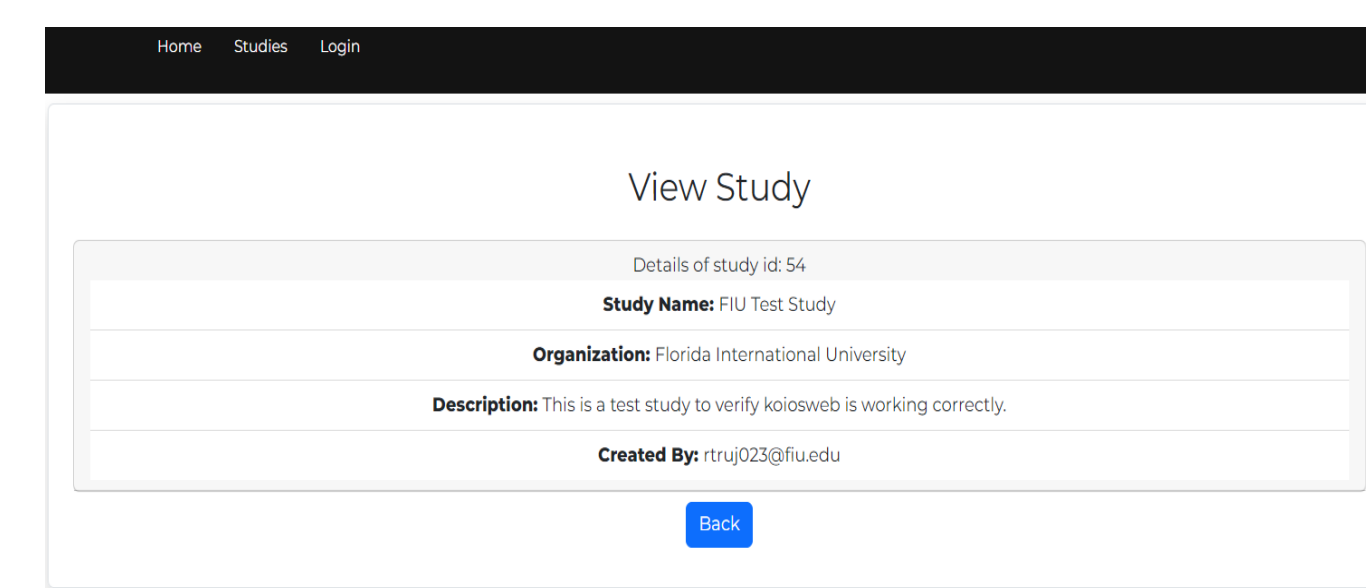
C



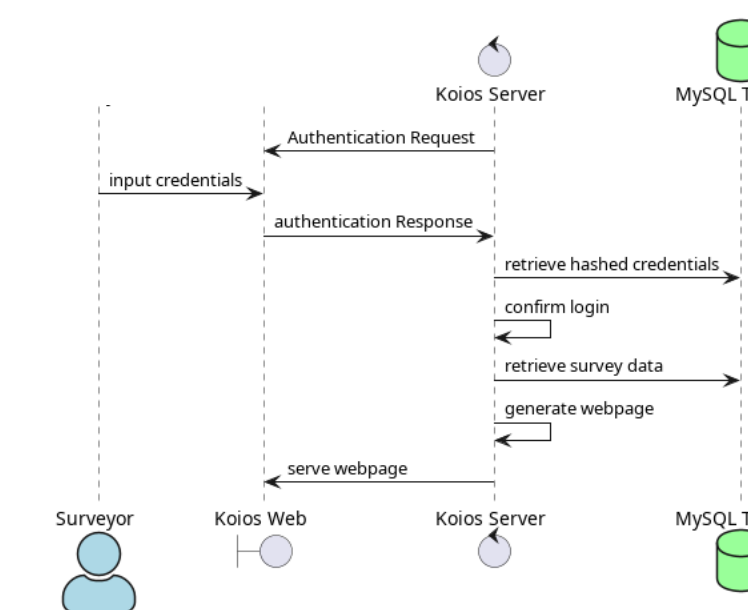
(C) Mobile Application

#### IMPLEMENTATION

- GitHub was used to create and store all the project documents and updates.
- React in VSCode was used to display the front end of the code.
- Spring was used to create .
- IntelliJ was used for the back end of the code.
- Postman was used to test
- MySQL was used to grab queries from the database.
- Flutter was used for mobile frontend code.



| Id | Name                         | Organization                     | Date             | Status | View Study                 | View Surveys                 |
|----|------------------------------|----------------------------------|------------------|--------|----------------------------|------------------------------|
| 1  | FIU Test Study               | Florida International University | 2023-03-26 16:24 | Open   | <a href="#">View Study</a> | <a href="#">View Surveys</a> |
| 2  | Test_1                       | FIU                              | 2023-03-29 09:07 | Open   | <a href="#">View Study</a> | <a href="#">View Surveys</a> |
| 3  | Test_2                       | FIU                              | 2023-03-29 14:24 | Open   | <a href="#">View Study</a> | <a href="#">View Surveys</a> |
| 4  | FIU Test Test Study          | Florida International University | 2023-07-25 14:03 | Open   | <a href="#">View Study</a> | <a href="#">View Surveys</a> |
| 5  | Test_3                       |                                  | 2023-07-24 02:27 | Open   | <a href="#">View Study</a> | <a href="#">View Surveys</a> |
| 6  | Test_4                       |                                  | 2023-07-24 23:05 | Open   | <a href="#">View Study</a> | <a href="#">View Surveys</a> |
| 7  | Speech Emotion Sensing Study | Florida International University | 2023-08-16 17:27 | Open   | <a href="#">View Study</a> | <a href="#">View Surveys</a> |
| 8  | Running Study                | FIU                              | 2023-08-16 10:27 | Closed | <a href="#">View Study</a> | <a href="#">View Surveys</a> |



#### SUMMARY

In summary, we covered in this research paper the challenges of bringing the survey's world into web development. We covered the different areas such as web development, deployment, and mobile development. Also, we were able to collect, perform, and save Studies and Surveys in a SQL Database and display it in frontend web and mobile development.

#### Verification

The verification process starts by having our Product Owner and Mentors assigned tasks which we had to completed each Sprint. The Mentors were very helpful due to they always guided us in how to perform our tasks the best way to improve the Sensor Data Visualization research project.

#### REFERENCES

<https://docs.flutter.dev>

#### ACKNOWLEDGEMENT

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