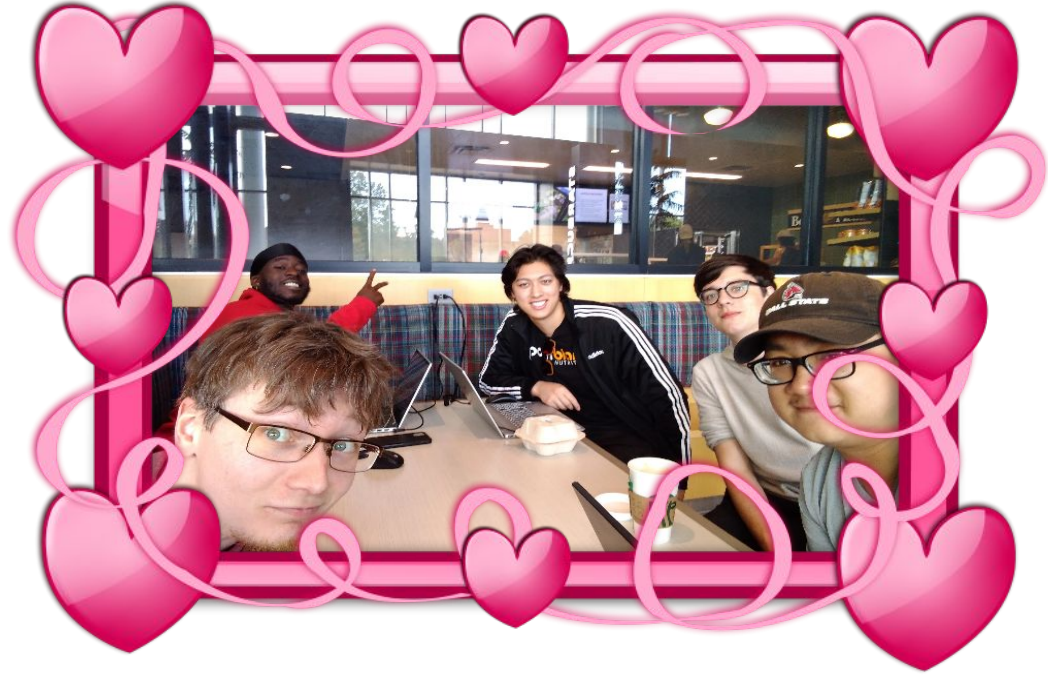# NEXT GEN EMOTION COMPUTING

Team Members

Ethan, Peter, Tommy, Ryan, Beethoven

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Our Client

- Peak Mind
- Dr. Alicia Mckoy
- Next Gen Emotion Computing
- VR Stress Reducing Technology

Business Requirement

- **BR1. Reduce stress in the workforce**

  - Primary Business goal
  - Address issues through core technologies (VR & biometrics technologies)
  - Measure & validate stress

- **BR2. Validate that stress reduction techniques are effective**

  - Peak Mind will be able to look for statistically significant decreases in stress biometrics by comparing biometrics before, during, and after stress reduction stimuli.

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Requirements

Functional Requirements

- **FR1**. (Corresponds to BR2) (Priority: HIGH) When a user is using the VR device, the video feed from the device's face camera will be recorded.
- **FR2.** (Corresponds to BR2) (Priority: HIGH) All recorded data will include timestamps so as to synchronize the individual feeds with each other for future playback.
- **FR3.** (Corresponds to BR1) (Priority: LOW) A user may log in with a six-digit code to view a visualization of their collected data.
- **FR4.** (Corresponds to BR2) (Priority: MEDIUM) Peak Mind analysts may access all collected data and associated visualizations.

Requirements cont.

Non-Functional Requirements

- **NR1**. (Corresponds to BR1, BR2) (Priority: HIGH) The software will connect to the HP Omnicept VR device.
- **NR2**. (Corresponds to BR1, BR2) (Priority: MEDIUM) The new software will extend the functionality of the existing software.
- **NR3**. (Corresponds to BR2) (Priority: LOW) Recorded data will be stored via an AWS instance.
- **NR4**. (Corresponds to BR1, BR2) (Priority: HIGH) Dr. Mckoy must have full access to and control over everything in the AWS account.
- **NR5**. (Corresponds to BR1. BR2) (Priority: LOW) All collection, storage, and access of user data must comply with applicable regulations.

Domain Model

Recorder
- connecting to and reading sensor data

VRDevice
- The VR headset, accessed via SDK.

Momentary Data
- A sensor reading at a single moment in time.

WebUI
- The frontend through which users and analysts may log in to access session data.

Database
- The storage method for collected session data, hosted on AWS and is accessed over the network.
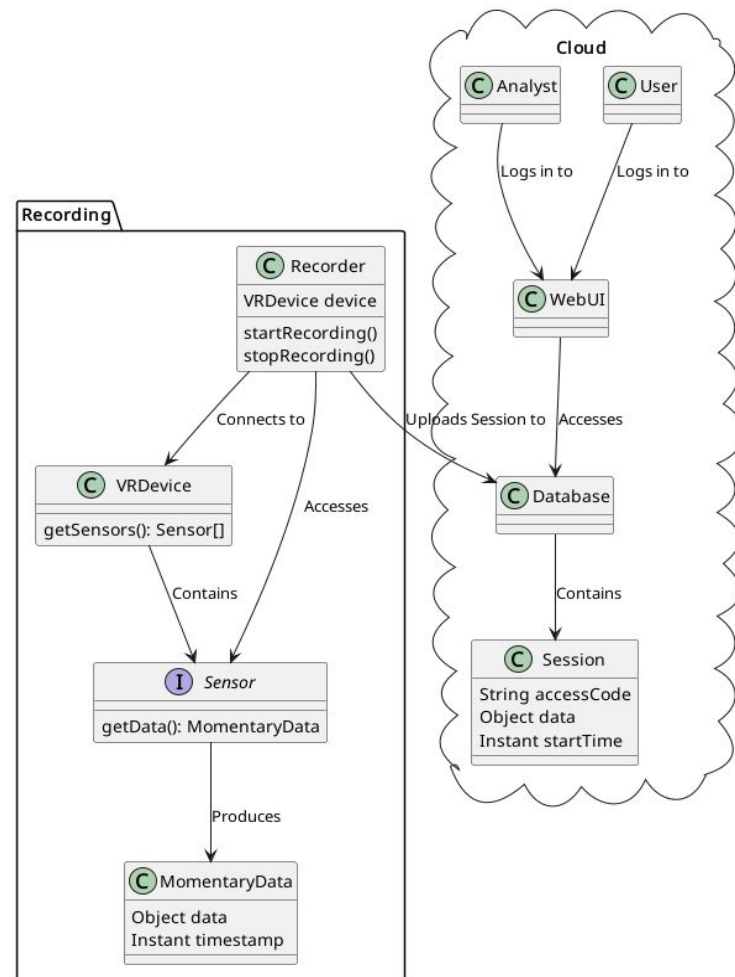
Session
- This class is associated with a six-digit access code

User
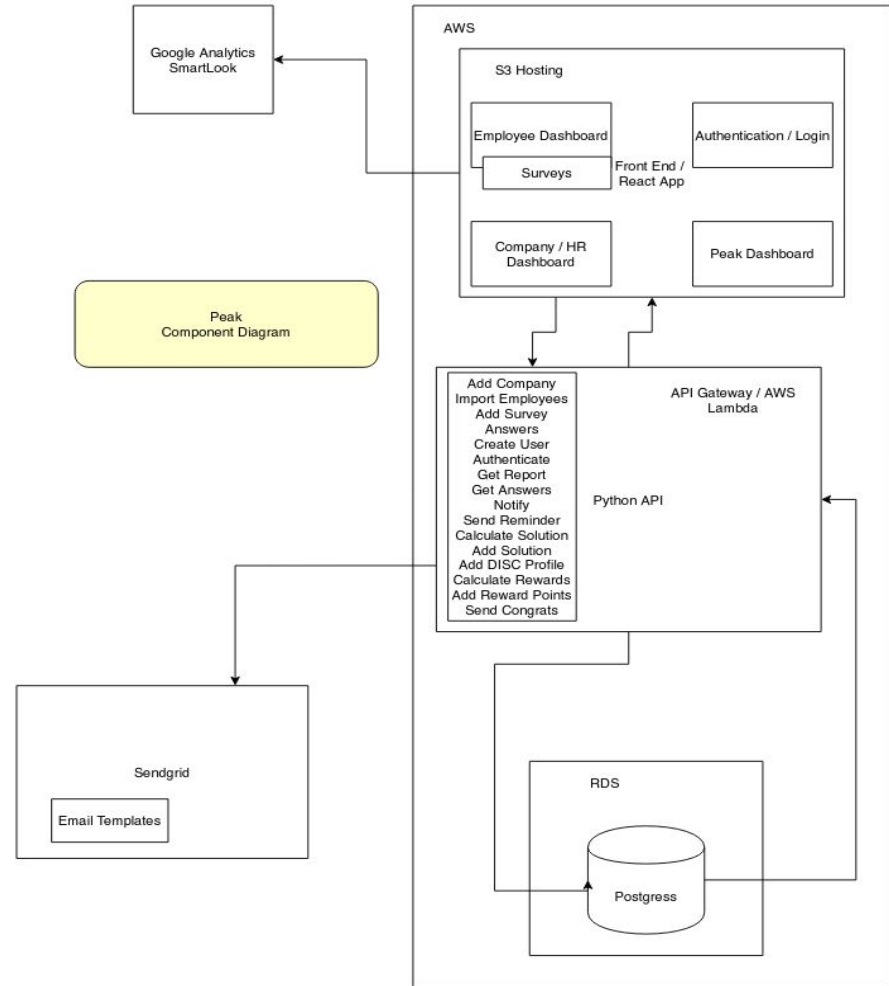- A person who may log in to the WebUI in order to access session visualizations.

Analyst
- access any session without the need for its access code, and may also access the session's raw data in addition to visualizations.

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# **Architecture**

Existing Requirement

Architecture cont.

VR Data Visualization System

- **AWS API:** Biometric sample data will be retrieved from Peak Mind's AWS database.
- **Unity data vis app:** The data visualization app will obtain sample biometric data and convert it into VR modules.
- **Web app dashboard iFrame:** The visualizations will be sent to the web app dashboard and displayed via iFrame.
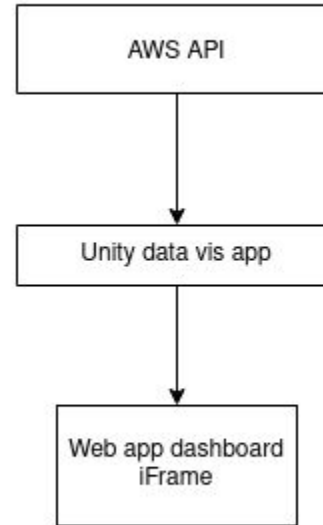
Prototype

TechStack

Web App

- **React** (Link to https://reactjs.org)
  - Peak Mind utilizes React for the portion of their web app that we will be working with.
- **JavaScript** (Link to https://www.javascript.com)
  - JavaScript was previously utilized by the last group of students who worked on the Web App because React is a JavaScript framework.
- **AWS** (Link to https://aws.amazon.com)
  - Peak Mind's database operates as a cloud native system in AWS.
- **Docker** (Link to https://www.docker.com)
  - Docker will ensure that our code can run on any system. Our team is using a variety of machines with varying operating systems. A docker container will allow us to move the application into the AWS production environment.

Use Cases 1

UC1. (Corresponds to BR1, BR2) Reduce employee stress by administering stress reducing stimuli

- We aim to reduce employee stress via the administration of stress reducing stimuli. This stimuli is most effective in VR format, thus employees of high stress demographics will utilize VR headsets to receive their stress reduction stimuli. The intended result is that employees will experience reduced stress during and after exposure to VR stress reduction stimuli.
    - High Stress Employees
    - Program Flow:
        - Users access web app to request help with stress
        - Backend evaluates user data to select appropriate response
        - Response is provided via web app/VR device

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Use Cases 2

UC2. (Corresponds to BR2) Access visualized employees stress biometric data for analysis

- Data analysts will want to be able to access both real time and recorded visualizations of employee stress biometric data. A live graph will be present, along with a recording of said graph as it evolves. A final chart will demonstrate how the graph changed over the duration of treatment/exposure.
    - Data Analysts
    - Program Flow:
        - Participant data is collected via VR headset and stored in AWS backend
        - Analysts request data via web app
        - Data is retrieved from AWS backend, visualized, and displayed

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Use Cases 3

UC3. (Corresponds to BR1, BR2) Identify most common workplace stressors
- The cumulative data collected and utilized by data analysts will allow the owner to determine the most common workplace stressors in each workplace that is analyzed. Recorded historic biometric data will play a key role in this identification process. Pattern analysis will certainly be necessary to accurately convey biometric data into real world, explainable stressors.
    - Data Analysts
    - Program Flow:
        - Biometric data is collected from users via VR headset and stored in AWS backend
        - Analysts evaluate data to identify common stressors

First Iteration Features

- **FR1.** (Corresponds to BR2) (Priority: HIGH) When a user is using the VR device, the video feed from the device's face camera will be recorded.

- **FR2.** (Corresponds to BR2) (Priority: HIGH) All recorded data will include timestamps so as to synchronize the individual feeds with each other for future playback.

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Mentor Feedback

- Need a client CC for AWS account.
- Collectively select IDEs.
- Must request more information on setting up camera.
- We are good to go 👍
    - Wyatt Lawrence

Client Feedback

- Add a third actor, data scientists, who look at percentages and what they mean in terms of emotion response.
- Modify UC1 Program Flow to start with users put on the VR headset.
- For UC2, think about how we can visualize the data differently between data scientists and users.
- For UC3, keep in mind that there are only 8 customized avatars corresponding to emotion.
- UC3 as currently stated may not be possible. Potentially create more avatars or work on more of the frontend.
- Change FR3 to incorporate a username and password because we are still in beta testing, not commercialization.

Interesting Slide

When you know you're not winning that $500