



Class Attendance Forecasting System (CAFS)

Module 4 Assignment Submission

Scope and Objectives Report

by

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DISCLAIMER: This report is not affiliated in any way with ClassPass, nor does it intend to provide an accurate view of how ClassPass conducts its business activities. This is a learning exercise at the University of New Brunswick based on unfounded assumptions and “best guesses” made by the author. The author has no inside knowledge of how ClassPass’s software or business practices work. The objective is to simulate how requirements analysis might have been documented during the development of an information system similar to ClassPass’s.

Table of Contents

1.	Introduction	3
2.	Project Background	3
3.	CAFS Stakeholders	4
	ClassPass Organizational Chart	4
	System Owner	5
	Potential End Users	5
	Other ClassPass Stakeholders	5
4.	CAFS System Objectives	6
	Development Objectives	6
	Longer-Term Objectives	8
5.	Known Constraints that Limit the Software Design of CAFS	10
6.	CAFS Preliminary System Scope	11
	Informal Description of CAFS Functionality	11
	Business Events	13
	CAFS Context Diagram	15
	Functionality to be Excluded from CAFS	16
7.	Terminology and Acronyms	17
8.	Ideas Suggested by ChatGPT	18

1. Introduction

This document is the first requirements deliverable produced for the Class Attendance Forecasting System (CAFS) project. The purpose of this document is to capture the project team's consensus on:

- The factors that led to the development of CAFS.
- The primary stakeholders who will be impacted by CAFS development.
- The system objectives define the fundamental business-level improvements ClassPass wants to experience once CAFS is deployed.
- Any known constraints that may limit the design of CAFS.
- The preliminary system scope.
- Definitions for terms and acronyms relevant to the CAFS project.

2. Project Background

ClassPass is a subscription-based service that allows users to book fitness classes and wellness appointments across various studios and gyms based on their location and time preferences.

The need for implementing the Class Attendance Forecasting System (CAFS) arises from several challenges and opportunities identified through user feedback and strategic analysis. The challenges include:

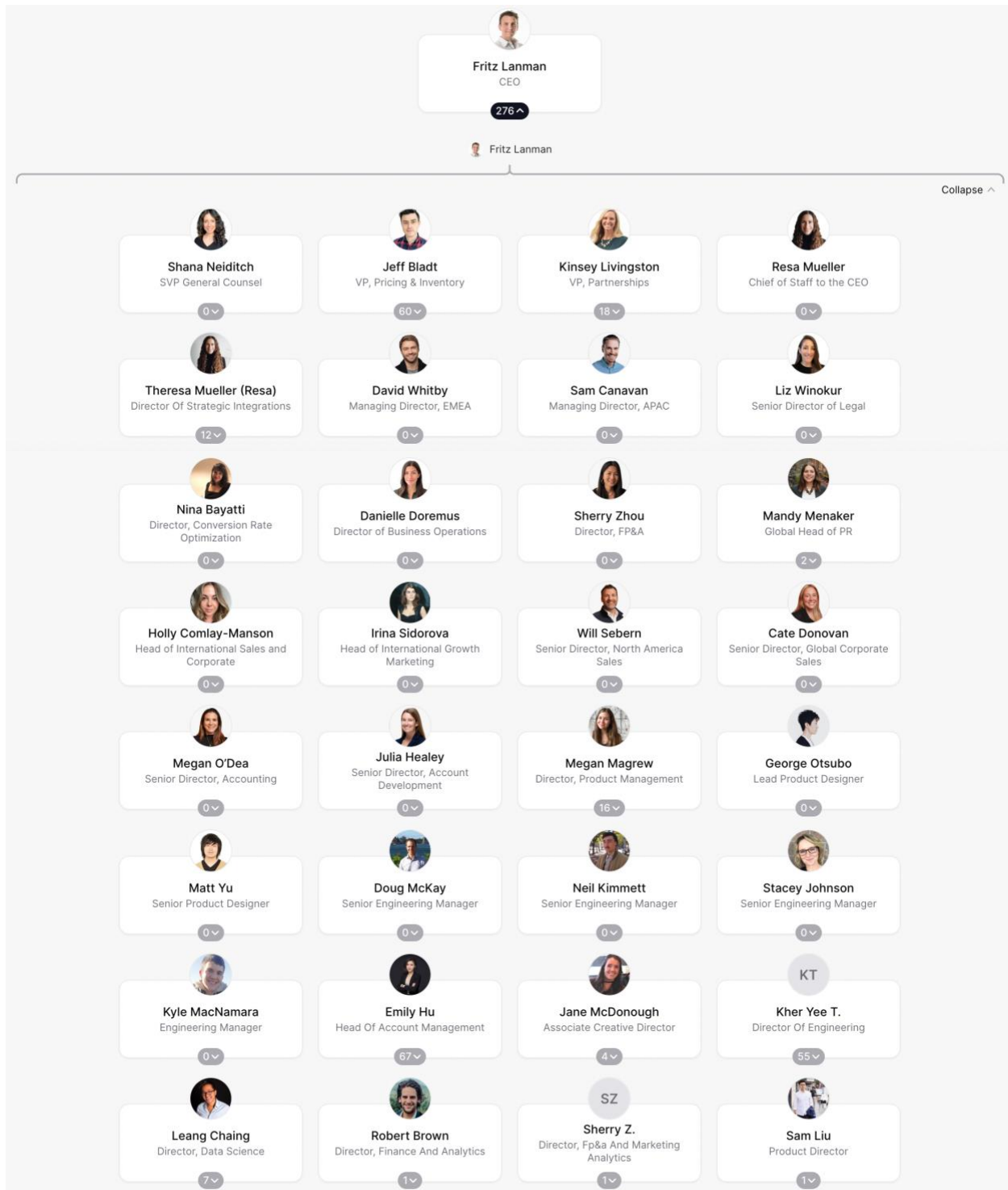
1. Users face difficulty booking classes due to unavailability or high demand during peak hours.
2. Businesses experience under-enrollment which often leads to decreased revenue.

The Class Attendance Forecasting System (CAFS) development project is in response to these challenges.

3. CAFS Stakeholders

ClassPass Organizational Chart

Source: <https://theorg.com/org/classpass>



System Owner

- Fritz Lanman, the CEO of ClassPass, is an appropriate system owner for the Class Attendance Forecasting System (CAFS) at ClassPass. His experience and comprehensive understanding of the company's goals will be vital in guiding the development and implementation of CAFS to meet the needs of both ClassPass and its partners. His engagement in the project will primarily consist of occasional decision-making.

Potential End Users

- **Fitness Studio Managers and Owners:** Studio managers and owners are responsible for the daily operations of fitness studios, including scheduling classes and managing instructors. Their experience with studio operations and resource management provides valuable insights into the instructor-student-equipment ratio and space availability. **Danielle Doremus** is the Head of Business Operations.
- **ClassPass Members:** While ClassPass members are not direct end-users of CAFS, they will be benefited indirectly. **Emily Hu** is the Head of Account Management. The feedback collected from ClassPass members helps identify difficulties in booking popular classes and peak hour constraints. Information such as their preferred time and location for classes, booking history, membership details, and average number of attendees will help in accurate forecasting. Emily's involvement is crucial in the early phases of design and development.

Other ClassPass Stakeholders

- **Data Analysts and Scientists:** Data Analysts can help identify constraints or limitations that might affect the system, such as data availability, data quality, and technological constraints. Their expertise in determining the types of data required for the forecasting system, if any preprocessing is needed to ensure data is clean and usable, and defining specific algorithms or models that should be employed for forecasting will be useful. **Leang Chaing** is the Director of the Data Science department at ClassPass. Two Data Analysts/Scientists are needed to serve full-time on the CAFS project.
- **System Administrators*** and **Application Developers:** IT and system administrators' expertise will help identify the technical requirements of CAFS and integration challenges. **Doug McKay** is the Engineering Manager. Subject Matter Experts (SMEs) from this team will take part in determining CAFS requirements.
- **Financial Department*:** The finance team is responsible for budgeting, financial planning, and analysis. They assess the economic impact of new initiatives and ensure they contribute to the company's financial health. **Sherry Zhou**, the Director of FP&A, can provide valuable insights about the financial data needed for the system, including historical financial data and real-time financial metrics. Their familiarity and expertise with financial software and tools can strengthen our understanding of the integration of these tools to enhance the functionality of CAFS.

(* Suggested by ChatGPT 3.5)

4. CAFS System Objectives

The system objectives define the benefits ClassPass wants to experience when CAFS is installed. System objectives serve as a high-level guide when designing a solution.

The following objectives consist of both development objectives and longer-term objectives. The intention behind CAFS is to improve business operations and customer satisfaction.

Development objectives help to (a) guide the definition of requirements (which should be consistent with these objectives), and (b) determine when CAFS development is complete. Longer-term objectives can only be measured after a certain time after CAFS development is complete. Each longer-term objective should be supported by at least one development objective. Longer-term objectives represent anticipated eventual business benefits of CAFS development.

Development Objectives

OBJECTIVE-001

Requirement: Predict class attendance to suggest optimal class schedules.

Who benefits and how: Fitness studio owners and managers will have better schedules. There will be more attendees per class and resources will be used optimally. This will lead to increased revenue and efficiency.

How / when to measure: Measure class attendance rates and resource utilization before and six months after implementation to confirm improved scheduling effectiveness. The system will be considered successful if the number of attendees per class is increased by at least 20% and/or the number of empty seats is decreased by at least 20%.

Origin: Danielle Doremus, the Head of Business Operations, was present at the system objectives workshop held on May 20, 2024.

OBJECTIVE-002

Requirement: Allocate instructors, facilities, and equipment based on predicted attendance.

Who benefits and how: Instructors will have optimized schedules, ensuring better class sizes and utilization of their time. Studios will manage resources (equipment and instructors) more efficiently, reducing costs.

How / when to measure: Measure the utilization rate of instructors and facilities before and six months after implementation to confirm improved resource allocation. The system will be considered successful if the utilization rate of resources is increased by at least 10%.

Origin: Danielle Doremus, the Head of Business Operations, was present at the system objectives workshop held on May 20, 2024.

OBJECTIVE-003

Requirement: Provide more booking options for members to increase class availability during peak hours.

Who benefits and how: ClassPass members will have more options for booking classes during peak times, enhancing their experience and satisfaction.

How / when to measure: Are there more booking options available after implementation to confirm increased availability?

Origin: Emily Hu, the Head of Account Management, was present at the system objectives workshop held on May 20, 2024.

OBJECTIVE-004

Requirement: Provide detailed reports and visual analytics on attendance trends and forecasts.

Who benefits and how: Fitness studio owners and managers will have actionable insights to optimize operations. Data analysts will benefit from robust tools for data analysis.

How / when to measure: Measure the usage and impact of reporting tools through user feedback and operational metrics within three to six months of implementation.

Origin: Leang Chaing, the Head of Data Science, was present at the system objectives workshop held on May 20, 2024.

OBJECTIVE-005

Requirement: Generate detailed insights on equipment needs and staff requirements based on attendance forecasts*.

(* Suggested by ChatGPT 3.5)

Who benefits and how: Fitness studio managers will manage equipment and staffing more efficiently. This will ensure resources are available when needed and avoid overstaffing or underutilization.

How / when to measure: Measure resource allocation efficiency before and after implementation to confirm better management of equipment and staffing. The system will be considered successful if the efficiency is increased by at least 10%.

Origin: Danielle Doremus, the Head of Business Operations, was present at the system objectives workshop held on May 20, 2024.

OBJECTIVE-006

Requirement: Ensure data security and privacy by implementing robust measures to protect user data.

Who benefits and how: ClassPass members will trust the platform more due to enhanced data security. ClassPass will comply with legal requirements and reduce the risk of data breaches. This will also benefit Studio owners.

How / when to measure: Measure the implementation and effectiveness of data security protocols after the development is complete by assessing compliance and monitoring for security incidents. The system will be considered successful if there is less than 5% growth in the number of security issues.

Origin: Doug McKay, the Engineering Manager, SMEs from his team, and Liz Winokur, the Director of Legal, were present at the system objectives workshop held on May 20, 2024.

Longer-Term Objectives

OBJECTIVE-007

Requirement: Maximize partner studios' revenue by ensuring classes are fully booked during peak times.

Who benefits and how: Partner studios will see increased revenue from optimized class schedules. ClassPass benefits from stronger partnerships and higher member retention.

How / when to measure: Measure class attendance and revenue before and six months after implementation to confirm improved booking rates and revenue. The system will be considered successful if at least 20% growth in revenue and booking rates exist.

Which development objective(s) support the achievement of this objective: Predicting class attendance to optimize class schedules and improve resource use (**OBJECTIVE-001**) and offering more booking options to increase availability during peak hours (**OBJECTIVE-003**) help achieve this goal.

Origin: Sherry Zhou, the Director of FP&A, was present at the system objectives workshop held on May 20, 2024.

OBJECTIVE-008

Requirement: Support the expansion of the network of partner studios by aligning the forecasting system with ClassPass's strategic goals.

Who benefits and how: ClassPass will benefit from a robust and scalable system supporting growth and expansion. Partner studios will see enhanced support and optimized operations.

How / when to measure: Measure the system's impact on the expansion and performance of the partner network within six to twelve months by tracking growth

metrics and partner feedback. The system will be considered successful if there is at least 10% growth in the number of new studios.

Which development objective(s) support the achievement of this objective: Providing detailed reports and visual analytics on attendance trends and forecasts (**OBJECTIVE-004**) and generating insights on equipment needs and staff requirements based on attendance forecasts (**OBJECTIVE-005**) help achieve this goal.

Origin: Sherry Zhou, the Director of FP&A, was present at the system objectives workshop held on May 20, 2024.

5. Known Constraints that Limit the Software Design of CAFS

Constraints are factors that limit how the CAFS software can be designed.

CONSTRAINT-001

Requirement: The Class Attendance Forecasting System (CAFS) must comply with global data privacy regulations (GDPR).

Rationale: Compliance with data privacy regulations is crucial to protect user data and avoid legal repercussions. This includes limiting design choices to those that ensure data security and privacy.

How / when to measure: Conduct regular audits and reviews against GDPR requirements during and after development. Compliance should be confirmed during the development phase and monitored continuously after deployment.

Origin: This constraint originated from Liz Winokur, the Director of Legal, who was present at the system objectives workshop held on May 20, 2024.

CONSTRAINT-002

Requirement: The Class Attendance Forecasting System (CAFS) must be designed to integrate seamlessly with the existing ClassPass platform and infrastructure, without incorporating new third-party services in the initial release.

Rationale: Limiting the initial integration scope ensures that the system can be developed and deployed more efficiently within the current resource constraints and timeline. Future integrations will be addressed in later updates.

How / when to measure: Verify integration compatibility with all current third-party services and APIs during development and testing.

Origin: This constraint originated from Doug McKay, the Engineering Manager, and the SMEs from his team, who were present at the system objectives workshop held on May 20, 2024.

6. CAFS Preliminary System Scope

System scope defines what functionality is to be included in CAFS.

Developing such a definition of system scope is important to:

- direct and limit the software development effort, and
- resolve any potential future disputes over what the software should include.

This section defines the Class Attendance Forecasting System (CAFS) in the following ways:

- An informal description of the current vision for CAFS functionality.
- A list of business events and associated use cases, which help to clarify scope by identifying data flowing in and out of the boundary of the system scope.
- A context diagram that provides a visual representation of data flowing in and out of the boundary of the system scope.
- A list of capabilities that are to be excluded from CAFS, which can help lessen potential ambiguity in how system scope might be interpreted.

Informal Description of CAFS Functionality

The Class Attendance Forecasting System (CAFS) enhances the operational efficiency and resource management of fitness studios partnered with ClassPass. It leverages advanced data science and machine learning techniques to support key business functions and processing functionalities. CAFS aims to optimize class schedules, allocate resources effectively, and provide actionable insights through reporting and analytics.

The vision for CAFS is to focus on these core functionalities in the initial release, ensuring that the system effectively supports the primary operational needs of fitness studios. Future enhancements and additional features can be considered in subsequent releases based on user feedback and evolving business requirements.

Business Functions Supported:

1. Optimizing class schedules: Suggest optimal class times based on predicted attendance to maximize attendance and resource utilization.
2. Efficient resource allocation: Allocate instructors, facilities, and equipment based on attendance forecasts to ensure optimal use of resources.

Processing Functionality:

1. Attendance Prediction: Use historical data and real-time updates to forecast class attendance, identifying peak and off-peak times with advanced machine learning models.

2. **Schedule Optimization:** Suggest optimal class schedules, such as increasing classes during peak hours and reducing them during off-peak times.
3. **Resource Management:** Provide insights on equipment needs and staffing recommendations based on attendance forecasts.
4. **Reporting and Analytics:** Generate reports and visual analytics on attendance trends and forecasts to help studio managers make informed decisions.

Business Events

A **business event** is an action that initiates some part of the work ClassPass performs while supporting Studio Owners or Managers, and ClassPass members. The response to each event is called a **business use case**, representing a discrete functional **partition** of the work. Later, this partitioning will enable us to focus on one business use case at a time when determining more detailed requirements. The **inputs and outputs** clarify the **scope** of the work (in other words, what's in versus what's out).

Event Name (include initiating actor) • Supports Objective(s)	Input and Output	Use Case Summary
EVENT-001 Predict Class Attendance Initiating actor: Studio Owners or Managers • OBJECTIVE-001	Historical attendance data (in) Real-time booking data (in) User activity logs (in) Predicted attendance figures for upcoming classes (out)	Help optimize class schedules, ensure better resource utilization and increased attendance rates.
EVENT-002 Optimize Class Schedules Initiating actor: Studio Owners or Managers • OBJECTIVE-003	Predicted attendance figures (in) Recommended class schedules for peak and off-peak times (out)	Increase class availability during peak hours and reduce it during off-peak times.
EVENT-003 Allocate Resources Initiating actor: Studio Owners or Managers • OBJECTIVE-002 • OBJECTIVE-005	Predicted attendance figures (in) Current resource availability (in) Resource allocation plan (instructors, facilities, equipment) for upcoming classes (out)	Create a resource allocation plan using predicted attendance to optimize utilization and reduce costs.
EVENT-004 Generate Reports and Analytics Initiating actor: Data Analysts. • OBJECTIVE-004	Attendance data (in) Scheduling data (in) Resource utilization data (in) Reports and visual analytics on attendance trends, forecasts, and resource utilization (out)	Generate detailed reports and visual analytics on various metrics.
EVENT-005 Ensure Data Security and Privacy	User data (in) Booking history (in) Demographic information (in)	Implement robust data security measures to protect user data and

Initiating actor: ClassPass Legal Department. • OBJECTIVE-006	Compliance reports (out) Secure data storage (out)	ensure compliance with GDPR.
EVENT-006 Maximize Partner Studios' Revenue Initiating actor: ClassPass Financial Team and Studio Owners or Managers. • OBJECTIVE-007	Attendance predictions (in) Class schedules (in) Resource allocation plans (in) Revenue reports (out) Optimized class schedules (out)	Maximize revenue for partner studios.
EVENT-007 Align System with Strategic Goals Initiating actor: ClassPass Executive Leadership • OBJECTIVE-008	Strategic objectives (in) Market analysis data (in) User feedback (in) System alignment reports (out) Strategic growth plans (out)	Provide insights and recommendations that align with the company's long-term objectives, facilitating ClassPass's growth.

NOTE: The list of illustrative business events shown on the preceding pages is in a proper format but is not complete. This “strawman” list would need to be verified and expanded based on discussions with ClassPass subject matter experts.

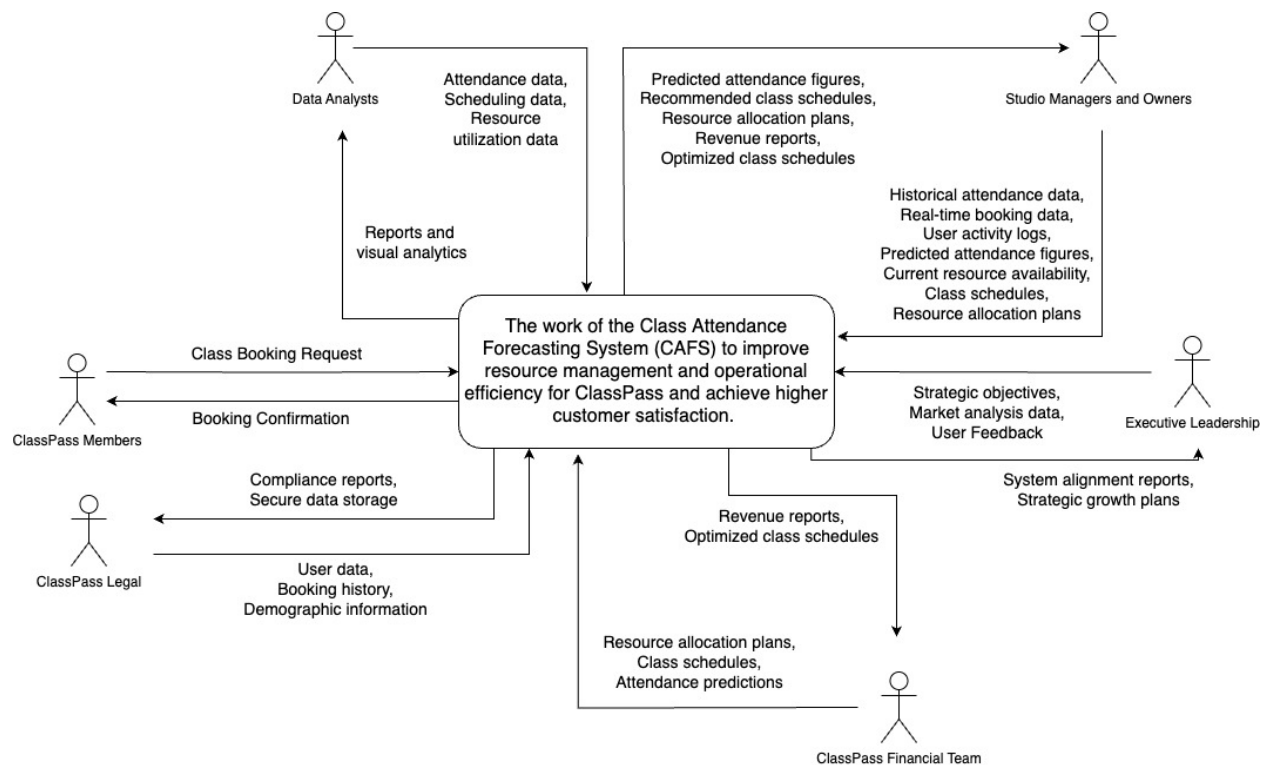
This list is missing events related to other in-scope ClassPass business functions, such as:

- Managing the relationship between ClassPass and Fitness Studios.
- Managing the relationship between ClassPass instructors and clients.
- Interactions of Account Manager with clients for data collection.
- Integration with third-party systems or APIs.
- Class booking management (this functionality already exists).

CAFS Context Diagram

The following context diagram provides a visual summary of the “inputs and outputs” identified for the business events on the preceding pages. These inputs and outputs clarify the scope of the functionality to be included in CAFS.

NOTE: Just as the list of business events is not complete, the context diagram below is in a proper format (and thus demonstrates how to create a context diagram) but is incomplete.



Functionality to be Excluded from CAFS

The following are examples of business functions that are not within the scope of CAFS:

- Fitness Studios' administrative services, including management of payroll, employee benefits, human resources (hiring, etc.), physical resources (office space, office equipment, etc.)
- Marketing and advertising for new classes or newly added fitness studios.
- Membership management and Customer Relationship Management.
- In-depth Financial Analytics.
- Detailed Instructor Performance Evaluation.
- The initial version of the Class Attendance Forecasting System (CAFS) will not be designed to handle future scalability needs.

7. Terminology and Acronyms

NOTE: The information in this section will be updated throughout the project as new terminology arises.

CAFS - Class Attendance Forecasting System.

Predictive Analytics - Techniques used to analyze historical and real-time data to forecast future outcomes, such as class attendance.

Optimization - The process of making something as effective or functional as possible.

Resource Allocation - The process of distributing available resources in the most efficient manner.

Machine Learning (ML) - A type of artificial intelligence that enables systems to learn from data and improve over time without being explicitly programmed.

Compliance - Adherence to laws, regulations, guidelines, and specifications relevant to the business.

Scalability - The capability of a system to handle increased loads without affecting performance.

Integration - The process of linking together different computing systems and software applications physically or functionally.

Data Privacy - The practice of handling data in accordance with legal requirements to protect personal information.

GDPR - General Data Protection Regulation.

API - Application Programming Interface.

SME - Subject Matter Expert.

8. Ideas Suggested by ChatGPT

The following queries were submitted to ChatGPT 3.5 on 27th May 2024, producing the results shown below. These results were used as a completeness check for the requirements presented in the preceding sections of this document.

The query submitted to ChatGPT:

Please provide a list of potential end users for the Class Attendance Forecasting System (CAFS) leveraging data science to improve resource management and operational efficiency for ClassPass.

The result returned by ChatGPT:

Certainly! Here's a list of potential end users for the Class Attendance Forecasting System (CAFS) developed to improve resource management and operational efficiency for ClassPass:

1. **Fitness Studios and Gyms:** Owners, managers, and staff responsible for scheduling classes, managing instructors, and optimizing resource allocation.
2. **Instructors:** Fitness instructors who teach classes, who can use attendance forecasts to tailor their teaching approach and prepare adequately for class sizes.
3. **Members:** ClassPass users who want to plan their schedules better by knowing the expected attendance for classes they intend to book.
4. **ClassPass Administrators:** Personnel responsible for overseeing the overall functioning of the ClassPass platform, including optimizing class availability and allocation across different locations and times.
5. **Data Analysts and Scientists:** Professionals tasked with analyzing attendance data and refining forecasting algorithms to continuously improve accuracy.
6. **Customer Support:** Representatives who may need to address customer inquiries or issues related to class availability and attendance.
7. **Marketing Teams:** Utilize attendance forecasts to strategize promotional campaigns and offers to increase class bookings during off-peak times or in underutilized locations.
8. **Business Development Managers:** Identify trends and opportunities for partnerships with new fitness studios or gyms based on attendance forecasts and resource utilization.
9. **Finance Department:** Use attendance forecasts to better allocate budget resources for marketing, instructor payments, and facility maintenance based on expected demand.
10. **Mobile App Developers:** Ensure that attendance forecasts are integrated seamlessly into the ClassPass user interface for easy access and understanding.

These end users represent various stakeholders within ClassPass who can benefit from the insights and optimizations provided by the Class Attendance Forecasting System.

The query submitted to ChatGPT:

Please suggest 10 objectives for the ClassPass Class Attendance Forecasting System. This system is to be developed to improve resource management and operational efficiency for ClassPass. This system will help fitness studios manage resources more effectively by suggesting optimal class schedules, increasing class availability during peak hours, and reducing it during off-peak times.

The result returned by ChatGPT:

Here are 10 objectives for the ClassPass Class Attendance Forecasting System:

1. **Optimize Class Scheduling:** Develop forecasts to help fitness studios schedule classes at times when attendance is expected to be highest, thereby maximizing class participation and studio utilization.
2. **Improve Resource Allocation:** Ensure optimal allocation of resources such as instructors, space, and equipment by predicting class attendance accurately, reducing overstaffing or understaffing situations.
3. **Enhance User Experience:** Provide ClassPass members with insights into class availability and expected attendance, enabling them to make informed decisions about which classes to book.
4. **Reduce Operational Costs:** Minimize wasted resources by decreasing the number of under-attended classes, leading to cost savings on instructor fees and facility usage.
5. **Balance Class Availability:** Adjust the number of available classes during peak and off-peak times based on attendance predictions to ensure a balanced schedule that meets member demand.
6. **Increase Member Retention:** Improve member satisfaction by ensuring popular classes are available at convenient times, thereby increasing overall member retention rates.
7. **Support Marketing Initiatives:** Provide data-driven insights for marketing teams to create targeted promotions aimed at filling classes during off-peak times or boosting attendance for specific classes.
8. **Facilitate Capacity Planning:** Assist studios in planning for future growth by forecasting long-term attendance trends and identifying peak times and seasonal variations in class demand.
9. **Enhance Instructor Scheduling:** Optimize instructor schedules based on expected class sizes, ensuring that the right number of instructors are available for classes with higher attendance.
10. **Improve Data-Driven Decision Making:** Empower studio managers and ClassPass administrators with actionable insights derived from data analysis, leading to more informed and strategic decision-making processes.

These objectives aim to leverage the capabilities of the Class Attendance Forecasting System to enhance the operational efficiency, resource management, and overall user satisfaction for both ClassPass and its partner fitness studios.

Note: Text in this section marked with yellow highlighting has been used to enhance ideas presented elsewhere in this document.