

PDE2101 Engineering Software Development

# ★ iFitXplore Studio ★

PROJECT REPORT PROPOSAL

GROUP 1



# Meet The Team

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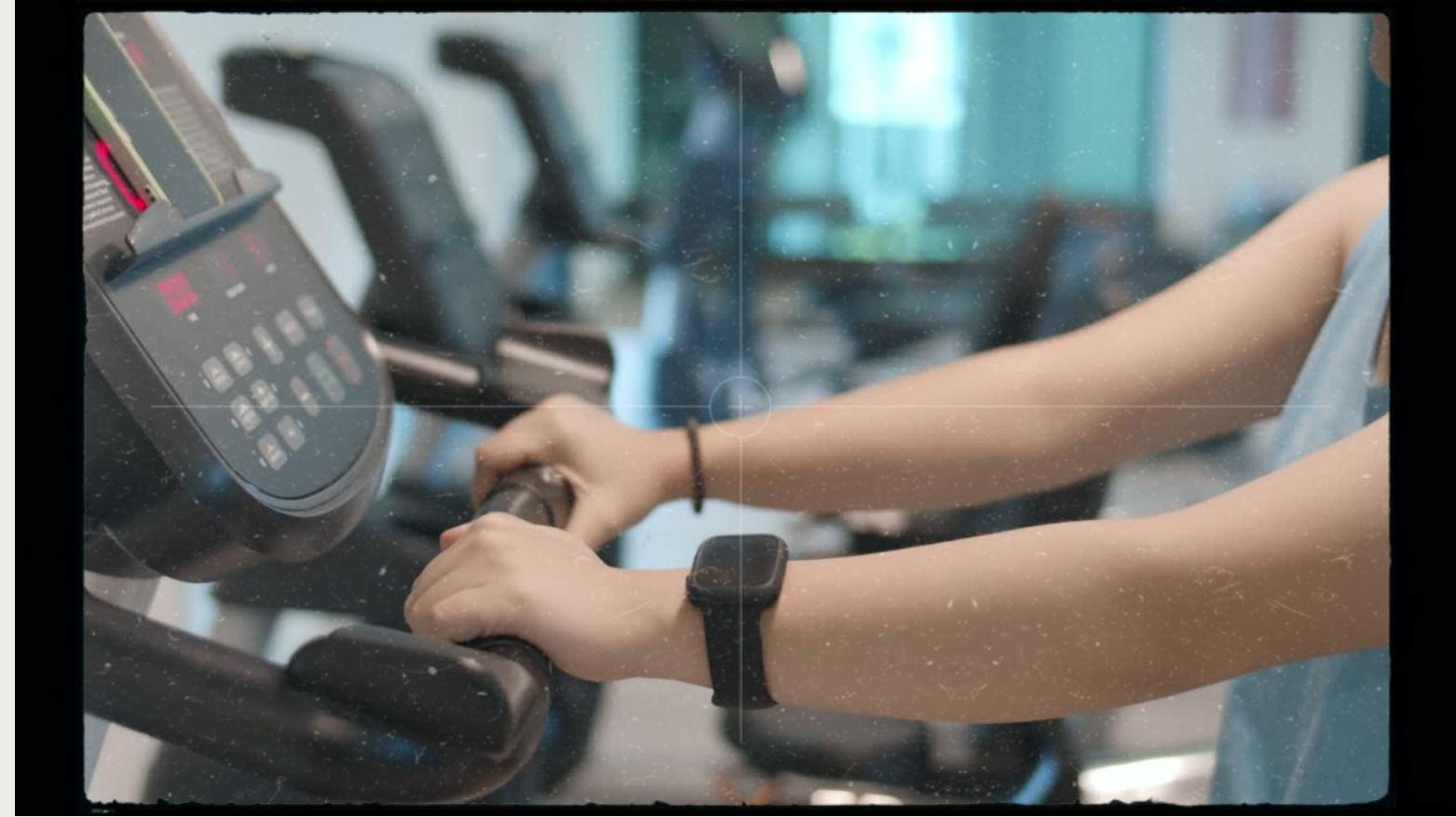
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# Abstract



IFitXplore Studio is a system that integrates IoT, hardware and software to assist gymgoers in making their workout routines more effective and help them reach their fitness goals.



# Introduction

The Internet of Things technology (IoT) extends the internet by connecting physical sensors that take inputs from its environment.

We aim to demonstrate how "iFitXplore Studio" can bring a paradigm shift to the fitness world, offering an environment that empowers individuals to achieve their fitness goals efficiently and effectively.

# Problem Definition

Many people face challenges in their fitness journey not knowing how to use equipment properly, struggling to track their progress, etc. These problems can negatively affect their health & motivation.

Our iFitXplore studio project will integrate IoT devices with already existing equipment which can track usage and parameters like speed or count.

Their data will be collected by a wearable device, linking them to the machine they're currently using. Our system supports gym users with a real-time view of equipment availability, track of their daily workouts, and personalized workout plans, among many other features.

# Description

The system's purpose is to empower users by giving them insights into their growth, among many other features that saves their time & makes them feel connected & efficient in achieving their goals.

## Aims & Objectives

The implementation of this system aims to increase user convenience by showing the current status of equipment and having tutorials on how to use each equipment at their fingertips.

# Benefits of the Project

Our "iFit Xplore Studio" project offers a comprehensive and user-centred solution that not only improves the overall gym experience, making it more efficient, enjoyable, and safer, but also has the potential to boost gym membership retention, enhance customer satisfaction, and optimize gym operations.

# Functional Requirements

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- When the watch is tapped on the RFID module- the machine and user will be linked
- Tap at the beginning and end of each workout
- The watch should show the next workout from the plan the user is following
- availability page will show the occupied machines as 'red' and free machines as 'green'
- The system will encompass real time workout tracking for each exercise
- basic health data will be displayed on the watch
- Users must log into app to use features
- user interaction through a chatroom

# Non-Functional Requirements

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- reliability- the system must be reliable with minimal disruptions
- performance- must operate efficiently, providing real-time data

- scalability- must handle large data base
- security- user encryption

- hardware placement must interfere with regular user usage
- usability- easy interface to use

- wearable device must be compact and efficient

# Resources

## Hardware

- Arduino UNO development board
- Wi-Fi module
- RFID module
- Variety of sensors
- Health-indicating sensors will be added to the wearable device
- Screen to display current health stats and the next workout on the device
- Breadboard & wires
- Batteries

## Software

- Arduino IDE
- Flutter SDK and its language, Dart
- TinkerCAD
- Google Cloud's services
- MS Word
- MS Project, Canva and Creately next workout on the device

# Research Methodology

**A combination of  
exploratory & applied  
research**

**Some descriptive &  
quantitative research**

# Development Methodology

## **Agile Methodology**

It was considered most suitable since this task involves many small components.

# Ethical Issues

To address ethical concerns,  
we will establish clear features

## Privacy data management

- privacy policy
- authorization
- email requests
- password protection
- registration



## Trust-based features

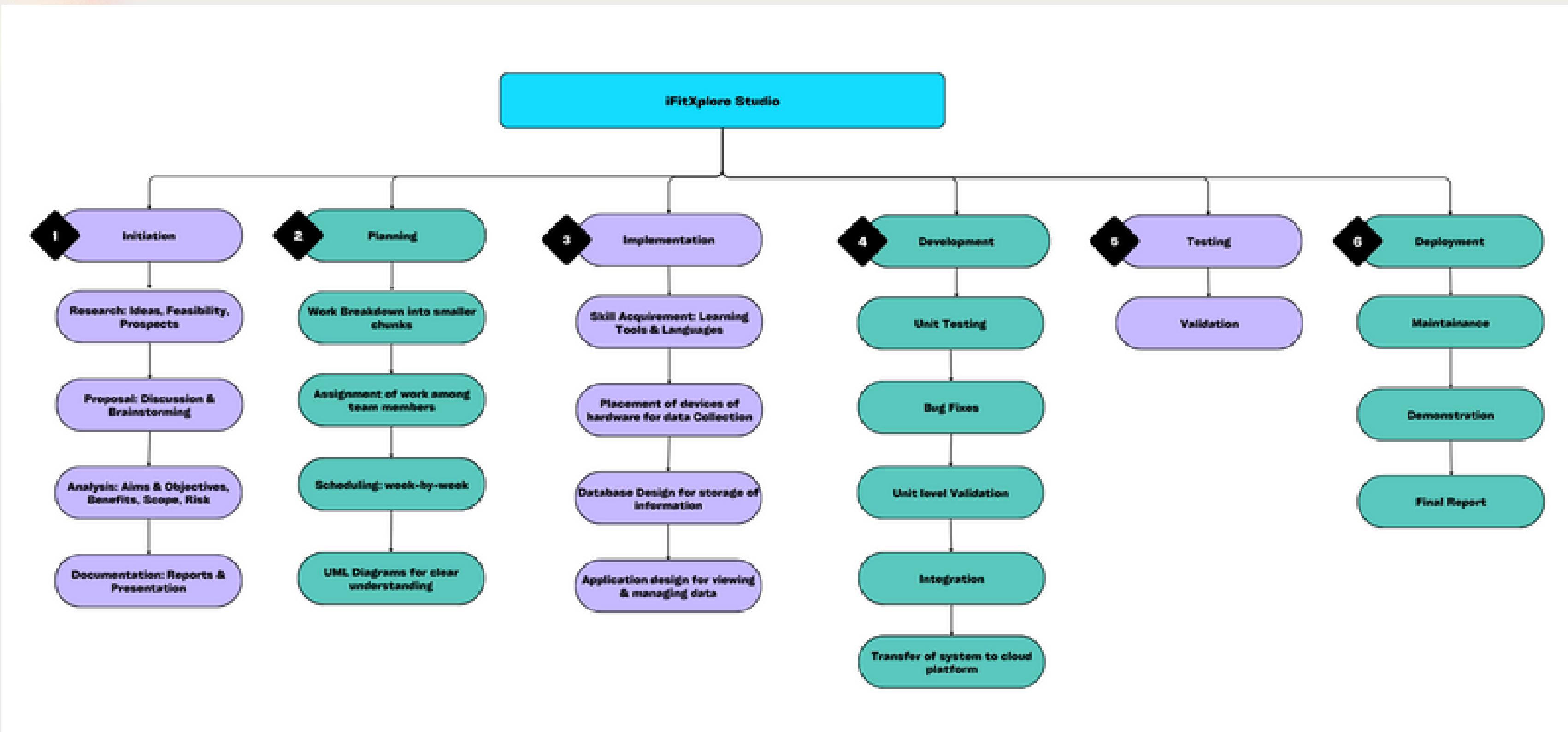
- backing from credible sources
- feedback options

# Deliverables

- Hardware - integrated Equipment
- Wearable device
- Mobile Application
- Documentation, Presentations & Demo

Our project, "iFitXplore Studio" is committed to achieving specific deliverables that align with our objectives and ethical considerations. Our primary focus is the discreet integration of IoT technology and hardware with existing equipment.

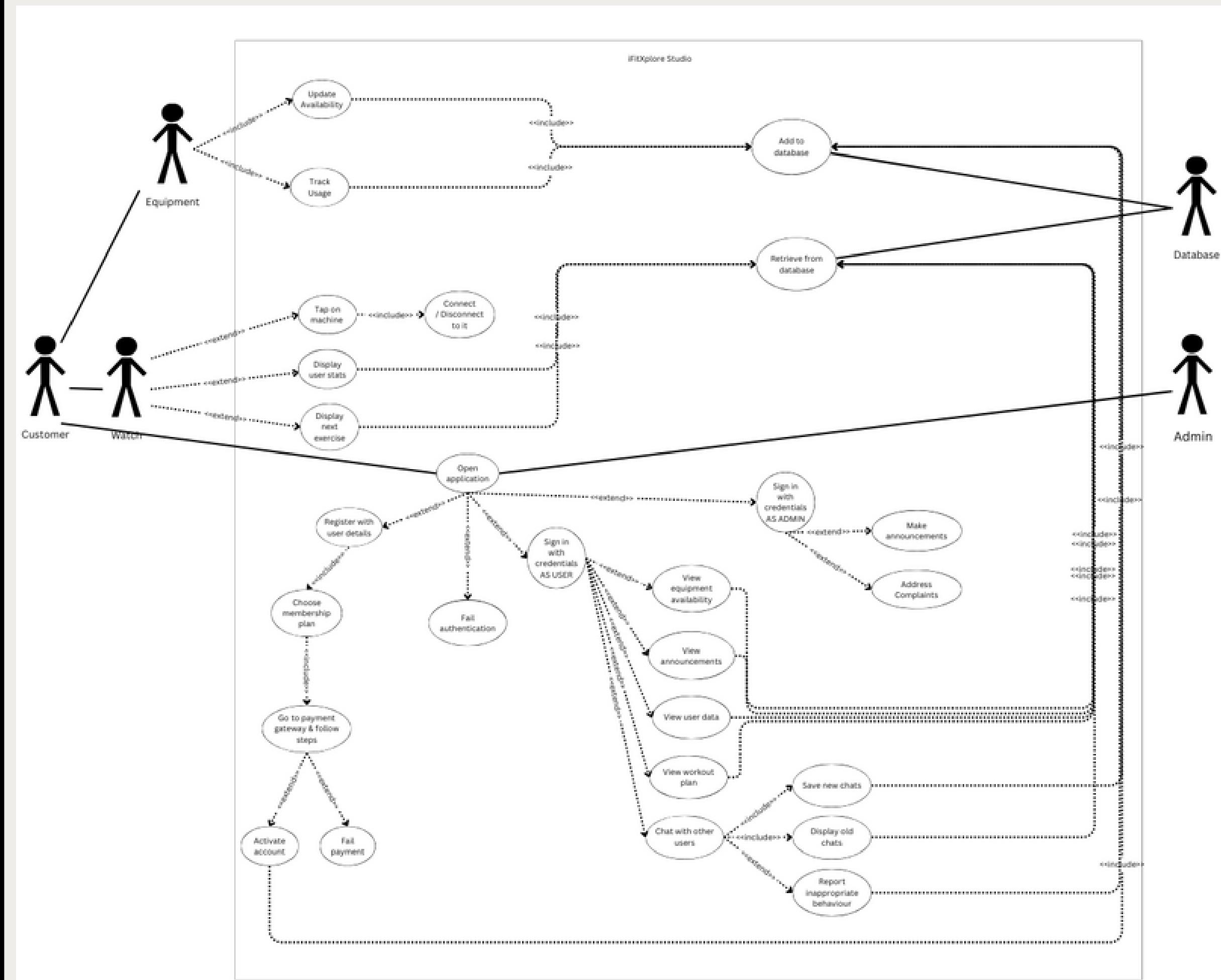
# Work Breakdown Structure



# Gantt Chart



# Use-Case Diagram





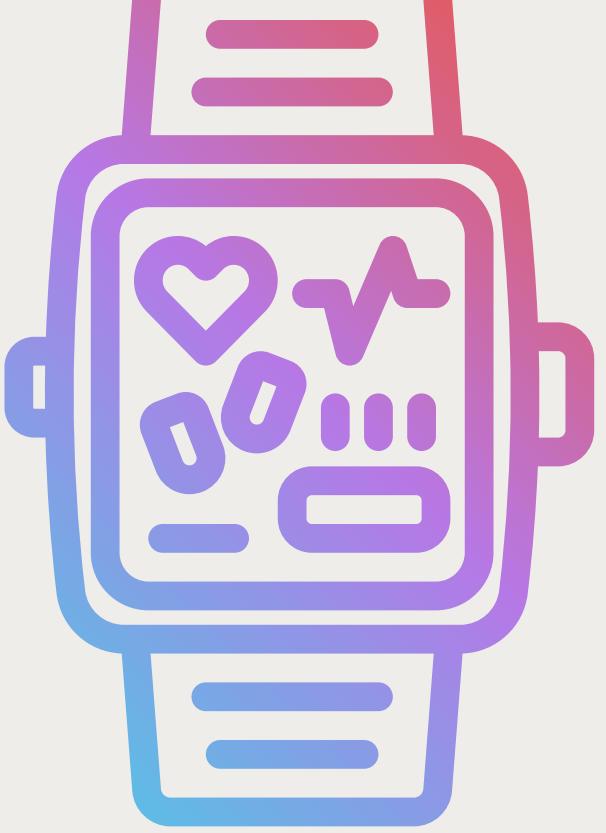
# Conclusion

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Our project stands to revolutionize the gym industry. In a nutshell, our project not only enhances the overall gym experience, making it more efficient, engaging, and safer, but also improves membership retention, elevates customer satisfaction, and optimizes gym operations.

# References

- 1.Z. Liu, X. Liu and K. Li (2020). "Deeper Exercise Monitoring for Smart Gym using Fused RFID and CV Data". Available at: <https://ieeexplore.ieee.org/document/9155360>
- 2.Galetsi, P., Katsaliaki, K. and Kumar, S. (2022). "Exploring benefits and ethical challenges in the rise of mHealth (mobile healthcare) technology for the common good: An analysis of mobile applications for health specialists". Available at: <https://doi.org/10.1016/j.technovation.2022.102598>
- 3.Dinesh Kumar, A., Bhargav, K., Rayal, R. and Saraswathi, M. (2020). "Smart Gym Management System. International Journal of Scientific Research & Engineering Trends". Available at: [https://ijsret.com/wp-content/uploads/2020/05/IJSRET\\_V6\\_issue3\\_493.pdf](https://ijsret.com/wp-content/uploads/2020/05/IJSRET_V6_issue3_493.pdf)
- 4.Gubbi J, Buyya R, Marusic S, Palaniswami M (2013). "Internet of things (IoT): A Vision, Architectural Elements, and Future Directions". Available at: <https://www.sciencedirect.com/science/article/pii/S0167739X13000241>
- 5.Bhatia M, Sood SK (2018). "An intelligent framework for workouts in gymnasium: M-health perspective". Available at: <https://www.sciencedirect.com/science/article/pii/S004579061732236X>
- 6.Thompson, Walter R. Ph.D., FACSM - "Worldwide Survey of Fitness Trends for 2022". Available at: [https://journals.lww.com/acsm-healthfitness/fulltext/2022/01000/worldwide\\_survey\\_of\\_fitness\\_trends\\_for\\_2022.6.aspx](https://journals.lww.com/acsm-healthfitness/fulltext/2022/01000/worldwide_survey_of_fitness_trends_for_2022.6.aspx)
- 7.Binbin Yong, Zijian Xu, Xin Wang, Libin Cheng, Xue Li, Xiang Wu, Qingguo Zhou - "IoT-based intelligent fitness system". Available at: <https://www.sciencedirect.com/science/article/pii/S0743731517301570>
- 8.Lyons, Elizabeth J. Ph.D., M.P.H.; Swartz, Maria C. Ph.D., M.P.H., RD. (2017). "Motivational Dynamics of Wearable Activity Monitors". Available at: [https://journals.lww.com/acsm-healthfitness/fulltext/2017/09000/motivational\\_dynamics\\_of\\_wearable\\_activity.8.aspx](https://journals.lww.com/acsm-healthfitness/fulltext/2017/09000/motivational_dynamics_of_wearable_activity.8.aspx)
- 9.Hu, J., He, W., Zhang, J.J. and Song, J. (2023). Examining the Impacts of Fitness App Features on User Well-Being. *Information & Management*. Available at: <https://www.sciencedirect.com/science/article/pii/S0378720623000447?via%3Dhub>
- 10.Günter Alce, Jakob Hakansson, Andreas Espinoza (2021). "Exploring Different User Interfaces for Velocity-based Training using Smart Gym Machines: Pilot Study". Available at: <https://lup.lub.lu.se/record/337773b7-e730-48b3-a9c4-42685cf86fb7>
- 11.Yaacoub, J.-P.A., Noura, M., Noura, H.N., Salman, O., Yaacoub, E., Couturier, R. and Chehab, A. (2020). "Securing internet of medical things systems: Limitations, issues and recommendations". Available at: <https://www.sciencedirect.com/science/article/pii/S0167739X19305680>
- 12.Sestino, A., Prete, M.I., Piper, L. and Guido, G. (2020). "Internet of Things and Big Data as enablers for business digitalization strategies". Available at: <https://www.sciencedirect.com/science/article/pii/S0166497220300456>
- 13.Alireza Farrokhi, Javad Rezazadeh, Reza Farahbaksh, John Ayoade (2021). "A Decision Tree-Based Smart Fitness Framework in IoT". Available at: <https://link.springer.com/article/10.1007/s42979-021-00940-x>
- 14.Torgeir Dingsøyr, Sridhar Nerur, Venu Gopal Balijepally, Nils Brede Moe (2012). "A decade of agile methodologies: Towards explaining agile software development". Available at: <https://www.sciencedirect.com/science/article/pii/S0164121212000532>



Thank you.  
Any Questions?