CS 4485 Spring 2024

UTD CS Project

‘SocialPlay: Workout Challenge’

Project Proposal

Team #: 48

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Faculty Advisor: Dr. Eric Becker

Abstract

‘**SocialPlay: Workout Challenge**’ revolutionizes social media engagement by introducing a cutting-edge platform that gamifies physical challenges through real-time image detection. Utilizing advanced camera technology, it tracks users' workout movements, providing objective scores based on different types of mini-games. This innovative approach transcends traditional social media metrics, focusing on skill and effort rather than mere popularity. By incorporating elements of gamification such as progress bars, badges, and leaderboards, "SocialPlay" motivates users, promotes healthy competition, and strengthens community bonds. Participants can effortlessly share their progress and achievements on popular social media platforms like Instagram, TikTok, and YouTube, encouraging widespread participation and visibility. Designed to merge physical activity with digital interaction, "SocialPlay" offers a dynamic and interactive experience that celebrates genuine talent and hard work. Through its user-centric design and commitment to fostering a supportive online community, "SocialPlay" aims to redefine social networking by making fitness both fun and socially rewarding.

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1. Introduction

Project: 'SocialPlay: Workout Challenge'

Objective: To create a social media game that allows users to share their participation in challenges, receive objective scores for each stage, and foster a sense of achievement and community engagement.

Uniqueness:

- Objective Scoring: Unlike existing social media challenges that rely solely on subjective user engagement (likes, shares), SocialPlay provides an objective assessment of performance through built-in scoring mechanisms tailored to each challenge.
- Gamified Experience: The game integrates elements of gamification, such as progress bars, badges, and leaderboards, to motivate users, encourage healthy competition, and enhance the overall experience.
- Seamless Social Sharing: The game is designed to be easily shared across various social media platforms, allowing users to document their progress, connect with other participants, and potentially gain wider recognition for their skills.

Comparison with Existing Solutions:

- Traditional Social Media Challenges: These rely heavily on subjective metrics like likes and shares, making it difficult to objectively assess performance and fostering competition based solely on popularity.
- Mobile Gaming Apps: While offering objective scoring and gamified elements, they often exist as standalone experiences and lack the social sharing aspect crucial for our target audience.
- Fitness Tracking Apps: Though they provide objective data and progress tracking, they are limited to specific fitness goals and lack the broader challenge variety and social interaction features offered by SocialPlay.

Benefits of SocialPlay:

- Promotes Skill Demonstration: Objective scoring allows users to showcase their true abilities and receive recognition based on their performance, not just popularity.
- Boosts Engagement: Gamification elements enhance user motivation and encourage continued participation in challenges.
- Fosters Community: Sharing and interacting with other participants creates a sense of belonging and encourages collaboration and healthy competition.
- Provides Valuable Data: By analyzing user data and performance, brands, and organizations can gain insights into user preferences and tailor future challenges accordingly.

Types of Game:

- We will track the user's body parts for the game to run. Users should strive to avoid obstacles to earn a score. We have devised three different games as follows:
    - Push Up: Tracking the user's one arm.
    - Pull Up: Tracking the user's head.
    - Hanging Leg Raise: Tracking the user's two feet.

Overall, SocialPlay offers a unique and innovative approach to social media challenges by combining objective scoring, gamification, and seamless social sharing. This creates a more engaging and rewarding experience for users while offering valuable data and insights for brands and organizations.

2. Timetable

Project Turn-ins

Date	Content	Submissions
3/1 (Fri)	Project Proposal	Initial submission outlining the concept, objectives, and unique features of the project.
3/29 (Fri)	Design Document	Submission of a comprehensive design document that includes at a minimum a top-level diagram showing the overall system communication and a write-up defining all components of the diagram. Additional lower-level diagrams for individual components are also required, each with its description.
4/26 (Fri)	Prototype, User Manual	Delivery of a functional prototype, including all original code written by the team, a works cited document for any external code used, and a change log detailing modifications to pre-existing code. The User's Manual must include installation instructions, startup and shutdown procedures, command input guidance, and output interpretation, ensuring comprehensive usability.
5/3 (Fri)	Final Report, Testing Results	This includes details of each testing session (date, time, version, testers, errors, and resolutions), ensuring the product's reliability and user satisfaction.

Milestones

a. Phase I (Due 3/1) - Conceptualization and Planning:
   - Sprint 1: Project initiation, team roles assignment, and brainstorming (1/26 - 2/2).
   - Sprint 2: Defining project scope and objectives (2/3 - 2/16).
   - Sprint 3: Project Proposal, and detailed planning (2/17 - 3/1)

b. Phase II (Due 3/29) -
   - Sprint 1: Initial development and environment setup (3/2 - 3/15)
   - Sprint 2: Creation of the design document, focusing on system architecture and user interface (3/16 - 3/29)

c. Phase II (Due 4/12) - Initial Development:
    - Sprint 1: Beginning prototype development and establishing core functionalities (3/30 - 4/12).

d. Phase III (Due 4/26) - Prototype Finalization and Manual Preparation:
    - Sprint 1: Finalizing prototype development and integrating feedback (4/13 - 4/19).
    - Sprint 2: Finalizing the User's Manual and ensuring the prototype's readiness for testing (4/20 - 4/26).

e. Phase IV (Due 5/3) - Testing and Reporting:
    - Sprint: Conducting comprehensive testing, documenting results, compiling the final report, and preparing for project presentation (4/27 - 5/3).

3. Project Metrics

Quantitative Metrics:

1. User Engagement: Track the number of active users, frequency of challenge participation, and daily/weekly/monthly active users to measure engagement levels.
2. Challenge Completion Rates: Analyze the percentage of challenges started versus those completed to gauge the difficulty and interest levels.
3. Growth Metrics: Monitor user growth rate, including new sign-ups and referral sources, to assess the platform's attractiveness and user acquisition effectiveness.
4. Retention Rates: Calculate daily, weekly, and monthly retention rates to understand how well the platform keeps users coming back.
5. Social Sharing Metrics: Count the number of shares per challenge and the average shares per user to evaluate the platform's virality and social engagement.

Qualitative Metrics:

1. User Satisfaction Surveys: Regularly distribute surveys to collect feedback on user experience, challenge variety, scoring system satisfaction, and overall platform usability.
2. Feature Request Tracking: Implement a system for users to submit feature requests and improvements, providing insight into user needs and desires.
3. Mentor and Expert Feedback: Engage with industry experts and mentors to gather feedback on the platform's design, functionality, and potential areas for improvement.
4. User Interviews: Conduct periodic interviews with a diverse group of users to gather in-depth insights into their experiences, challenges faced, and suggestions for enhancement.
5. Social Media Sentiment Analysis: Monitor social media channels for mentions of the platform and analyze the sentiment of the discussions to gauge public perception and areas of improvement.

Plan to Collect/Obtain Metrics:

- Analytics Integration: Implement analytics tools within the platform to automatically track user engagement, retention, and social sharing metrics.
- Surveys and Feedback Forms: Utilize in-app prompts and email campaigns to distribute surveys and collect feedback at different stages of the user journey.
- Feature Request Portal: Develop an in-app feature request portal to allow users to easily submit their ideas and vote on others' suggestions.
- Expert Consultation Sessions: Schedule regular consultation sessions with mentors and industry experts to review platform progress and gather professional feedback.
- Social Media Monitoring Tools: Use social media monitoring tools to track mentions and analyze sentiment, complemented by a manual review of discussions on relevant forums and platforms.

These metrics and methods of collection will provide a comprehensive understanding of the platform's performance, user satisfaction, and areas for improvement, enabling data-driven decisions to enhance the SocialPlay project's success.

4. Key Roles

- **Faculty Sponsor: Dr. Eric Becker**

- **Machine Learning Team**

    - Jihyung Park, Jeongsik Park, Andrew Choi

    - The machine learning team will focus on implementing image-tracking technology and developing competitive exercise games using it.

- **Server, Frontend, and Database Team**

    - Het Patel, Santana Lopez, Hoang Nguyen

    - Server, Frontend, and Database team will focus on designing and developing the login functionality, the shareable feature on social media, and leaderboard websites, and establishing connections with databases for a web application.\

- **Point of Contact**

    - Het Patel

    - Since he can reach Dr.Becker in person from his class, Het will be our point of contact to actively communicate with Dr.Becker.

- **Note-Taker**

    - Andrew Choi

    - He will take care of the overall documentation, task management, and material submissions throughout the project.

5. Communication Plan

- **Meeting with Professor Eric Becker**
    - Meetings with Professor Eric Becker will be held once a week between kickoff and April 9th. MS Teams will be used for these meetings. Meetings will be every Tuesday at 1:45 pm.
    - Meetings may continue after spring break if desired.

- **Group Meetings**
    - Andrew, Het, Hoang, Jeongsik, Jihyung, and Santana will meet virtually once a week every Friday to check their progress and identify issues.
    - Each subgroup (Server, Frontend, and Database Team, Machine Learning Team) will meet virtually several times a week. We will be using the Discord system for communication. GitHub will be used for storing documents and code as the semester progresses.

6. Risk Analysis/Contingency Plan

Identify Risks:

a. List potential risks related to security, privacy, technical issues, user behavior, legal compliance, etc. For example:
    i. Data breaches lead to unauthorized access to user information.
    ii. Technical failures cause interruptions in challenge participation.
    iii. User-generated content violates community guidelines or legal regulations.
    iv. Non-compliance with data protection laws leads to legal consequences.

Assess Risks:

b. Evaluate the likelihood and potential impact of each risk. Prioritize risks based on their severity and likelihood of occurrence.

Develop Contingency Plans:

c. For each identified risk, develop a contingency plan to mitigate its impact. This may include:
    i. **Preventive Measures**: Steps to reduce the likelihood of the risk occurring. For example, implementing robust security measures to prevent data breaches.
    ii. **Mitigation Strategies**: Actions to lessen the severity of the risk if it occurs. For instance, having backup servers in case of technical failures.
    iii. **Response Plans**: Procedures to follow if the risk materializes. This could involve incident response protocols to address data breaches promptly.
    iv. **Communication Plans**: Guidelines for communicating with stakeholders, users, and regulatory authorities in the event of a risk or incident.

Implement Controls:

d. Put in place necessary controls and safeguards to mitigate identified risks. This may involve:
    i. Implementing encryption and access controls to protect user data.
    ii. Regularly testing systems for vulnerabilities and addressing any security weaknesses.
    iii. Providing user education on safe participation in challenges and community guidelines.
    iv. Establishing clear procedures for moderating user-generated content and enforcing guidelines.

7. Evaluation/Tracking Plan

To ensure the success of our project, ‘SocialPlay’ by the end of the semester, we will implement a multifaceted evaluation and tracking plan that integrates both quantitative and qualitative measures. This plan will enable us to monitor progress, assess the effectiveness of our solution, and ensure timely completion of tasks. Our approach includes the following key components:

Project Success Indicators:

1. User Engagement Metrics: A significant increase in user sign-ups, daily active users, and challenge participation rates post-launch will indicate successful user engagement and adoption.
2. User Satisfaction: Positive feedback from user surveys and reviews, with high satisfaction scores and constructive suggestions for further improvements.
3. Performance Benchmarks: Achievement of predefined performance benchmarks, including system responsiveness, uptime, and error rates, to ensure a smooth user experience.
4. Achievement of Project Objectives: Completion of all listed functionalities, such as the objective scoring system, gamification features, and seamless social sharing capabilities, as outlined in the project proposal.

Task Timeliness and Project Control:

- Parallel Methodology: We will adopt the Parallel Methodology approach for project management, allowing multiple project components to be developed simultaneously to expedite the delivery process. This strategy enables different teams to work on various aspects of the project—such as image detection algorithms, user interface design, and social media integration—in parallel, ensuring efficient use of time and resources.
- Burnout Charts: Burnout charts will be employed to visually track the completion of tasks versus time, helping us to monitor whether the project tasks are on schedule and identify any deviations from the planned timeline.
- Defect Tracking: A defect tracking system will be implemented to log, monitor, and resolve issues and bugs identified during the development and testing phases. This will help in maintaining the quality of the project and ensuring timely deliverables.

Test Plans and Quality Assurance:

- Manual Testing: A comprehensive testing plan, including manual testing (for user experience and usability), will be executed.
- Feedback Loops: Regular feedback sessions with users, stakeholders, and mentors will be scheduled to gather qualitative feedback on the project’s progress and user satisfaction. This feedback will be crucial for iterative improvement and addressing any concerns promptly.

Lessons Learned Reflection:

- Regular Retrospectives: At the end of each sprint, the team will hold retrospective meetings to discuss what went well, what could be improved, and how to incorporate lessons learned into future sprints. This reflective practice will help in continuously improving our project management and development processes.

  By implementing this comprehensive evaluation and tracking plan, we aim to ensure that ‘SocialPlay’ not only meets but exceeds the expectations set forth at the beginning of the semester, delivering a valuable and engaging product to our target audience.

8. Ethics Discussion

In the development of the Face recognition game, we will have to examine key elements in ethics such as project integrity, honesty, and respect for the team's ideas, while also respecting the stakeholder's rights (Professor Becker).

1. **Borrowing software and other utilities**:
    - Intellectual Property and Plagiarism.
    - While this project will use other software in support or development on this project, we will need to address the ethics behind ensuring the use of the software in terms of rights and plagiarism.
    - To make sure of this, software and other utilities will be researched on their licensing agreements and permissions. Foremost, open source will be prioritized to maintain honesty and respect for the creators' rights.

2. **Share of Work among Members**:
    - Fairness and Equity
    - In this project, face recognition game, or any other project, it is key that work is distributed fairly among the members. Work must be distributed fairly to avoid low morale, infighting, and the outcome of the project being not on par with the group's and shareholders' ideas.
    - To establish roles and responsibilities for each team member there needs to be a fair distribution of the workload based on skill, availability, and comfortability. Communication will be encouraged as can address any concerns among the group regarding workload. Also, encourage questions regarding assignments throughout the project lifetime.

3. **Project Alignment and Goals:**
    - Values Alignment
    - We need to evaluate whether the goals of this project align with the purpose and objectives of the project. Projects cannot encourage inappropriate behavior, stereotypes, or user privacy that will raise flags.
    - Ensure that all software and code align with the purpose as stated above which will be achieved with a thorough analysis. The project will need to be sure to encourage positive values, privacy, and independence among the users. If issues do come up with ethical values, development will need to reassess and update the project goals.

9. Impact, Security, and Privacy

Impact:

- **Engagement**: Gamification can increase user engagement by making participation in challenges more enjoyable and rewarding.
- **Community Building**: It can foster a sense of community among participants who engage with each other through challenges, sharing experiences, and competing for high scores.
- **Behavior Change**: Gamification can be used to encourage positive behaviors or promote specific causes by incentivizing participation in challenges related to those behaviors or causes.

Security Considerations:

- **Data Security**: Ensure that user data collected through gamified challenges is securely stored and transmitted to prevent unauthorized access or data breaches.
- **Authentication**: Implement secure authentication mechanisms to prevent unauthorized access to user accounts and prevent fraudulent participation in challenges.
- **Data Integrity**: Verify the integrity of user-generated content submitted as part of challenges to prevent the submission of inappropriate or harmful content.

Privacy Concerns:

- **Data Collection**: Communicate to users what data will be collected as part of their participation in gamified challenges and obtain their consent before collecting any personal information.
- **Third-party Sharing**: Be transparent about any third parties with whom user data collected during challenges will be shared, and ensure compliance with applicable data protection laws and regulations.
- **User Consent**: Obtain explicit consent from users before using their data for purposes beyond the original scope of the gamified challenges.
- **Anonymization**: Consider anonymizing or pseudonymizing user data whenever possible to protect user privacy while still enabling participation in challenges.
- **User Control**: Provide users with control over their privacy settings and the ability to opt out of participating in gamified challenges or sharing certain types of personal information.

10. Meeting Minutes

1. February 6th: Meeting for topic selection and scheduling adjustments.

2. February 9th: Meeting for workflow setup and discussing individual expertise.

3. February 16th: Meeting for detailed topic adjustments and team formation.

4. February 23rd: Meeting to finalize the project topic and share progress from the server and database teams.

5. March 1st: Meeting to plan the proposal for the project.

11. Signatures, Names, and Date

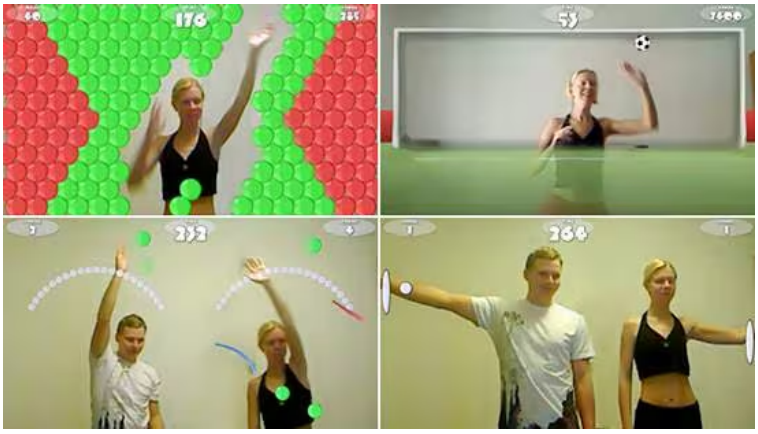
Student #1	**Student #2**
Andrew Choi	Jihyung Park
Student #3	**Student #4**
Het Patel	Santana Lopez
Student #5	**Student #6**
Hoang Nguyen	Jeongsik Park
	Faculty Advisor
	Dr. Eric Becker

12. Reference

- **Face Tracking Algorithms**
  - Pre-trained model for face detection: https://huggingface.co/arnabdhar/YOLOv8-Face-Detection
  - yolo5 (pre-trained model for object detection): https://github.com/ultralytics/yolov5?tab=readme-ov-file

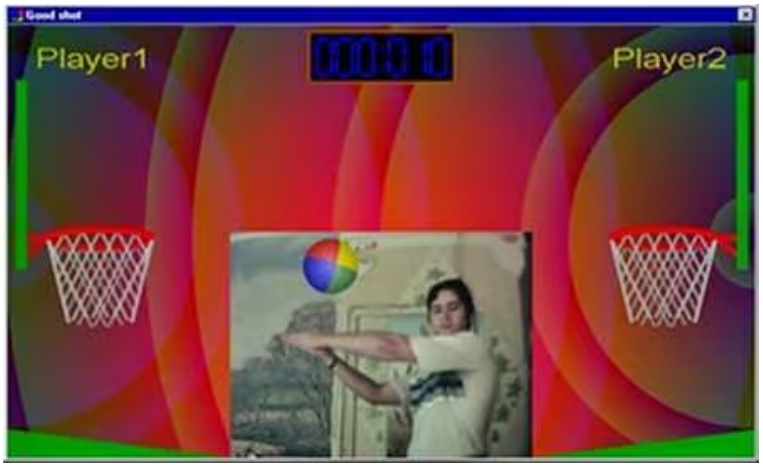
- Can I beat the flappy bird push-ups record
  - This is the form of the challenge-style game we desire. The game character tracks the user's motion and moves, avoiding obstacles within the screen. The difficulty level varies depending on the stage, and you can share your gameplay video on social media.
  - Meanwhile, when considering this game as an example, research in the field of computer vision is needed to determine if it's possible to implement the technical aspects related to users scoring correctly, and so on. Additionally, there is a need for discussion regarding whether to use a mobile camera or a tablet PC/laptop to play this game. Furthermore, we should consider whether other forms of games are possible instead of this type of game.

- 6 Awesome Free Webcam Games for Computer
  - 1. WebCam Mania



  - In order to make your characters do something on the screen, you need to move your limbs, especially arms in a specific direction with exact motion so that the desired job can be done.

- 2. Good Shot



  - This game is available with single player and two player version that work perfectly on an interactive interface. Players simply need to manipulate the virtual balls with the help of body movements and hand-based controls.

- 3. PlayDoJam

  - This game can be accessed directly from browser and Mac systems as well. Players can control ball motion by moving their hands in front of the camera. Although the graphics quality of this game is above average, most players rate it lower due to messy motion detection and ball physics abilities.