A Survey on E-sport Tournament Manager Gaming Tournament Platform

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***Abstract*—This essay provides a perspective on how technology developments have profoundly changed everyday activities and community connections, especially with the use of online applications.**

In the dynamic E-Sports industry, the task of managing and organizing tournaments presents challenges, as traditional methods often rely on fragmented tools and manual workflows. This can lead to issues such as scheduling conflicts, participant mismanagement, and delays in real-time updates. To enhance competition fairness, the application categorizes teams into two groups based on player profiles, such as the number of matches played, won, and lost. A priority based algorithm is implemented to support the grouping process. The mobile application was developed using Android Studio, with Firebase serving as the database backend.

Keywords: E-Sport mobile application, Android Development, Android studio, Firebase, PHP.

I. INTRODUCTION

The primary goal of this application is to provide a dedicated platform for building careers in E-sports and gaming. This application focuses on facilitating video game sports competitions, typically structured as multiplayer games, involving professional players either as individuals or in teams. The first chapter of this research paper introduces the selected area, covering the need for a new system and presenting the problem statement and definition. The eSports community is experiencing rapid growth, both in terms of participation and audience. This study proposes an Android application designed to streamline E-Sports tournament management. The app allows users to create, register for, and manage tournaments with ease. Registered participants can enter their details, including previous match records, and view tournament posts.

This application provides a centralized platform for tournament organizers, teams, players to streamline event management. It automates essential processes such as registration, match scheduling, bracket generation, result tracking, and live updates, ensuring a seamless and professional tournament experience. An esports tournament management application contributes to the expansion and sustainability of the esports ecosystem by streamlining and digitizing tournament operations, lowering manual labour, minimizing human error, and improving the competitive experience for all parties involved.

II. LITERATURE SURVEY

Esports has emerged as a significant digital phenomenon, with gaming tournament platforms playing a crucial role in organizing competitive events. These platforms provide structured competition formats, automated scheduling, matchmaking, and monetization features, making esports more accessible and professionally managed. Various research studies have explored the technological, managerial, and regulatory aspects of gaming tournament platforms.

A study conducted by Lavhare et al. (2021) introduced an app-based esports tournament platform aimed at empowering the esports industry in India. The system provides a structured approach to organizing gaming competitions, integrating business analytics and IT management technologies to improve user engagement and reward mechanisms (Lavhare et al., 2021). In our proposed system, we aim to enhance this approach by introducing AI-driven matchmaking and real-time analytics for better tournament management.

Another study by Shivaramkrishna et al. (2015) focused on developing an Android-based tournament management system, particularly for football events. Their system enables players to register, schedule matches, and receive real-time updates on fixtures (Shivaramkrishna et al., 2015). While this study primarily targets traditional sports, its matchmaking algorithms and user interface principles can be adapted for esports platforms. Our proposed system extends this research by incorporating cloud-based scalability and multi-game support.

Ardha et al. (2024) conducted a bibliometric analysis on esports research and technology trends over the past 30 years, identifying key advancements in gaming infrastructure, AI integration, and audience engagement. Their study highlights the increasing focus on human-computer interaction and AI-driven tournament automation (Ardha et al., 2024). Our system will incorporate these insights by leveraging AI for automated tournament management, ensuring a seamless user experience.

Naruka (2023) critically analyzed India's new online gaming regulations, emphasizing their impact on gaming tournament platforms. The study discusses the implementation of KYC norms, taxation policies, and the role of self-regulatory bodies in ensuring fair play and compliance with legal standards (Naruka, 2023). In our proposed system, we plan to integrate compliance mechanisms that align with these regulations while maintaining user data security.

Reitman and Anderson-Coto (2019) examined audience engagement strategies in esports tournaments, emphasizing the role of live-streaming, virtual rewards, and interactive features in sustaining player interest. Their study provides a framework for enhancing user retention and increasing monetization opportunities through gamification techniques (Reitman & Anderson-Coto, 2019). Our system will build upon these findings by integrating social media connectivity and in-app engagement tools.

From these studies, it is evident that gaming tournament platforms are evolving through technological advancements, regulatory adaptations, and enhanced user engagement strategies. Our proposed system will integrate AI-driven tournament management, real-time analytics, and compliance frameworks to create a comprehensive esports competition platform.

III. METHODOLOGY

Method and analysis which is performed in your research work should be written in this section. A simple strategy to follow is to use keywords from your title in first few sentences.

ALGORITHM:

[1] Tournament Scheduling Algorithms:

i)Round Robin - Each team plays against every other team. This is useful for league-style tournaments. The Round Robin algorithm is a great way to organize online eSports tournaments in a mobile app, ensuring that every player or team gets a fair chance to compete. In this system, each participant plays against every other participant, and matches are scheduled in rounds. The app can use Firebase Realtime Database or Cloud Fire store to store match schedules, results, and leaderboards, keeping everything updated in real time. At the beginning of the tournament, all players or teams are registered, and the algorithm creates a match schedule so that everyone plays against different opponents in an organized order.

ii)Single-Elimination - Teams are eliminated after a single loss. This works for shorter tournaments or high-stakes elimination rounds. The Single-Elimination Algorithm is a popular method for managing esports tournaments in mobile apps because it is fast and fair. In this system, players or teams compete in one-on-one matches, and the loser is removed from the tournament, while the winner moves to the next round. This continues until only one player or team is left, making them the champion. The algorithm first lists all participants and creates a tournament bracket, usually in groups of 2, 4, 8, 16, etc. If the number of players doesn't fit this pattern,

some higher-ranked players get a bye (automatic advancement) in the first round. A matchmaking system updates the tournament as matches are completed.

[2] Matchmaking Algorithms:

i)K-Means Clustering - To group players or teams of similar skill level. The K-Means algorithm can help manage an online esports tournament by grouping players based on their skill level, game performance, and ranking to create fair matchups. This is an unsupervised machine learning method that places players into different groups (clusters) based on factors like win/loss ratio, reaction speed, and achievements. When a player signs up for a tournament, the system looks at their past performance and assigns them to a suitable group, ensuring that beginners do not compete against highly skilled players. As more players join or improve, the algorithm updates the groups, keeping the matchmaking fair and competitive.

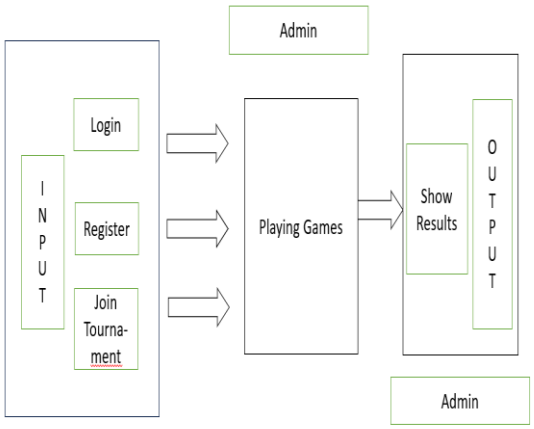
[3] Score and Statistics Management:

i)Dynamic Ranking Tables - Sorts players/teams based on scores, win-loss ratios, and other metrics to give a real-time view of standings. A dynamic ranking table is very important for managing an online esports tournament in a mobile app because it provides real-time updates on player rankings, performance, and standings. Using Firebase Realtime Database or Firestore, the ranking table can be automatically updated based on match results, wins, losses, and player stats. Cloud Functions can quickly calculate points, kill-death ratios, and other scores, adjusting rankings instantly. The ranking system can be designed for individual leaderboards, team rankings, or tournament brackets, depending on the game.

[4] Push Notifications and Reminders:

i)Scheduling Algorithms - For notifying players of upcoming matches, reminders
about deadlines, or updates about standings. A scheduling algorithm for an online eSports tournament app should ensure fair matches, proper time management, and smooth player coordination. One common method is the Round-Robin Algorithm, where each player or team competes against every other at least once, making it ideal for league-style tournaments. For knockout tournaments, the Single or Double Elimination Algorithm is useful, where players are eliminated after losing once or twice. Matchmaking systems can use Elo or Glicko ratings to pair players with similar skill levels for fair competition. For large tournaments, a multi-threaded scheduling system can organize matches into different time slots based on player availability and server capacity. Greedy algorithms or graph-based methods (like Bipartite Matching) can help efficiently schedule team-based tournaments..

IV. SYSTEM ARCHITECTURE



The Esports Tournament Manager Application begins with users signing up or logging in to reach the home page. From there, they can either access the admin panel or continue as a player. The admin manages the system by setting up new game schedules and providing login credentials. Players can select either a free/trial game or a paid game, while also handling their wallet by adding money or withdrawing through UPI. If they choose a paid game, they must complete the entry fee payment before the game starts. Once the game begins, players compete, and the outcome is either a win or a loss, marking the end of the process. This system ensures an organized and smooth experience from registration to result tracking.

Event Management: - A special kind of project management. This involves choosing the right platform, managing registrations, creating event schedules, and ensuring smooth technical support for participants. Organizers must promote the event

online, handle live interactions, and ensure that content is engaging

Gameplay Design: -Develop the rules, objectives, and user experience flow Art diagrams. It involves designing the game's rules, objectives, challenges, and rewards to ensure players remain interested and motivated. This can include developing levels, character progression, and interactive elements like leaderboards or multiplayer features.

V. CONCLUSION

This is a better platform to show your gaming skills and earn reward, this will also help on account of increased prize moneys, more games, localization, regional adaptation and growth of smartphone, laptop and broadband infrastructure. It guarantees a hassle-free experience for administrators and players alike by incorporating features like money administration, game selection, user registration, automated scheduling, and result monitoring.

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