

MatchMatrix: A Match Scheduler Platform

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ABSTRACT

Manually managing a sports tournament can be administrative heavy and be a source of scheduling conflicts, especially when dealing with large amounts of teams and matches. This research develops a web-based application called MatchMatrix that aids in the administration of scheduling, team rostering and contest results for a sports tournament. The application allows for the easy management of a sports tournament through an easy-to-use interface. Administrators can create contests, add teams to contests and use tournament structures, like Round Robin and Knockout, to generate the contest schedule for the tournament. Basic info, player info, match statistics and real-time standings of all tournaments are stored and updated on the system. The system uses an algorithm for automated scheduling of matches and a central database to ease administration and ensure that matches are distributed in the fairest manner possible. MatchMatrix is built on the latest web technology using a well-structured back-end and database architecture, which allows for efficient and optimal storage and management of the large amount of information in a tournament. It was demonstrated through experimental testing that the system helps in increasing the accuracy of schedules and reducing the time taken for organizing tournaments in comparison to manual approaches. Thus the proposed system can be implemented in schools, colleges as well as sports organizations for better management of sporting events.

Keywords - TMS, Sports Scheduling, Web Application, Round Robin, Knockout Tournament, Role-Based Access Control.

I. INTRODUCTION

This Sports tournaments are a common occurrence in schools and professional sports. There are several tasks that must be completed in order to organize such an event. These include team registration, scheduling games, tracking scores and keeping up-to-date standings. This is often done in a manual fashion using software such as Excel or through the use of paper-based scheduling systems. This can lead to scheduling conflicts and errors when calculating standings.

The number of participants in the Tournaments has significantly increased, demanding an automated solution that could help the Organizers in managing the fixtures and maintaining the information efficiently. Online systems can indeed facilitate a lot of work, maintain transparency and accuracy of all information on the matches and help to greatly increase the efficiency in managing the competition.

A MatchMatrix is a tool used to enable an administrator to organise and automatically populate the matches of a tournament. It is a very user friendly backend system. In MatchMatrix mode, the seeding and bracket of a tournament are defined and the matches that are to be played are clicked in on a table (MatchMatrix). The system then automatically generates a draw based on these definitions and the entries in the table. After the initial draw is created, team details can be populated in one action for all matches in the competition.

Handles registration, scheduling, match management, and result tracking. Uses advanced algorithms to construct the schedule of games, according to the competition format selected.

Our goal is to help tournament administrators and managers to fairly manage their competitions while easing as much as possible the bureaucratic and organizational part of such an event. By efficiently combining scheduling algorithms and efficient data bases, MatchMatrix achieves this ambitious goal.

II. METHODOLOGIES OF PROBLEM SOLVING

The evolution of the MatchMatrix Tournament Management System is based on the Waterfall Software Development Life Cycle (SDLC) model. Waterfall model offers a systematic and chronological system development methodology in which every stage is accomplished and the next stage follows the previous one. The choice of this model was due to the possibility of clear documentation, a planned development process, and stages.

There are several stages that make up the process of development and these are explained below.

1) Requirement Analysis

During this stage, the needs of the MatchMatrix system are defined and listed. The major aim is to get a feel of the difficulties encountered in the management of sports tournaments manually. Potential users like organizers and participants are required to provide information about such requirements like team registration, tournament scheduling, match result management, and dashboard visualization.

2) System Design

The general structure of the system is developed depending on the discovered needs. This involves the database, user interface, system workflow diagramming and module interaction design. System models like Data flow diagrams (DFDs) and UML diagrams are drawn to show how various elements of the system interact with other elements.

3) Implementation

In the implementation stage, the real construction of the MatchMatrix platform is conducted. The frontend interface will be created in such a way that it will give users the ability to create teams, games, and follow the tournament. The back end system is involved in tournament management, match scheduling and storage of results. The system design is adhered to in developing and integrating all modules.

4) Testing

Testing will be done to guarantee that every element of the system works accordingly. The unit testing will be done on individual modules and the integration testing will be done to confirm communication between various components of the system. The user acceptance testing is also undertaken to make sure the system meets the functional requirements of the organizers and users of the tournament.

5) Deployment

Once testing has been successful, the MatchMatrix system is released into a live application where the users can use the system to administer tournaments. The system is installed on a server that has database connection and accessibility via a web platform.

6) Maintenance

After deployment, the system goes into the maintenance stage. During this phase, performance bottlenecks, bug resolutions and feature additions are also done to give the platform a smooth running and system functionality is also improved.

III. IMPLEMENTING USER INTERFACE

The User Interface (UI) is the interface layer between the user and the MatchMatrix system, providing an engaging, intuitive and smooth experience to all stakeholders of the system Tournament Organizers, Teams, and System Administrators. The implementation of the UI is centred on ease of use, ease of access and efficient navigation without losing uniformity across various devices like desktop, tablets and mobiles browsers.

The interface will ensure that users can easily carry out their necessary management activities in an event like registering the teams, creating tournaments, generating schedules of matches, updating matches results and tracking the progress of the tournament. The dashboard design gives a clear visual representation of tournament brackets, match fixtures, and leaderboard information, and this allows users to find the relevant information fast.

Technology Stack and Frameworks

The web technologies employed in the development of the UI guarantee the scalability, responsiveness, and the effective interaction between the frontend and the backend components:

- Frontend Technologies: HTML, CSS and JavaScript are applied to design and organize user interface that allows responsive layout and user interaction.
- UI Design Tools: Figma will be utilized to design wireframes and prototypes of the application interface prior to development, which will be arranged so as to consider the layout properly and be usable.
- Integration: RESTful APIs are used by the user interface to interact with the backend services to enable real-time data transfer of tournament schedules, team information, and match results.
- Authentication: It also has a secure login system, with the help of which authorized users can access the platform and manage the activities related to tournaments.
- Notification Service: The system has real-time updates and notifications related to the tournament schedules, match results, and system announcements.

Table 2: Programming Languages Used

Technology	Purpose
HTML5	Used to structure the web pages and create the basic layout of the application interface.
JavaScript	Handles dynamic behavior on the client side, including form validation and interactive elements.
PHP	Implements the backend logic of the system, including tournament scheduling, user authentication, and server-side processing.
Tailwind CSS	Provides responsive and modern styling for the user interface and improves the overall visual appearance of the platform.
MySQL	Relational database used to store system data such as users, tournaments, players, matches, and scores.

XAMPP / Apache Server	Provides a local development environment for running the PHP backend and managing the database during development and testing.
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IV. OUTCOMES

The created MatchMatrix system is an effective tool in managing and structuring sports tournaments in a web-based platform with a centralized system. Some of the tasks that are otherwise performed manually, including player registration, match scheduling, scoring, and tracking tournament results are made easier on the platform. Automation of these processes saves a lot of time and effort of organizers of the tournament and ensures the lowest likelihood of human error.

The system allows administrators to set up tournaments and automatically generate match fixtures depending upon the formats of the tournaments selected including Round Robin and Knockout tournaments. With this automation, there is fairness in the scheduling, the general management of the sports events is better. A special interface is offered to referees to update match scores and, therefore, the results of the tournament and leaderboards are updated instantly.

Tournament status is easily displayed to participants and organizers in structured match schedules, leaderboard standings and bracket visualizations. The transparency will facilitate better communication between players, referees and administrators and make sure that information regarding the tournaments can be easily obtained and interpreted.

The centralized database system will be capable of providing security in the storage and retrieval of related tournament data, such as the data concerning the players, match details, and past results. This organized data storage is also useful in the analysis of performance and statistics of the tournaments in the future.

In general, the MatchMatrix system makes the organization of sports competitions easy by giving it a well-structured and simplified platform to organize a tournament. The scalable nature of the application can also be upgraded in the future with higher analytics, mobile applications support, and other forms of competition. The given project proves that the use of modern web technologies may be successfully implemented to enhance the efficiency and reliability of sports tournament management.

V. RESULT

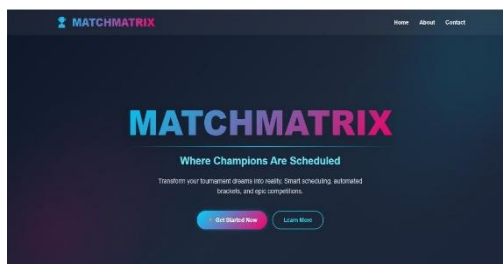


Figure 1: Home Page



Figure 2: Sport Selection Page



Figure 3: Referee Management Page



Figure 4: Tournament Dashboard Page

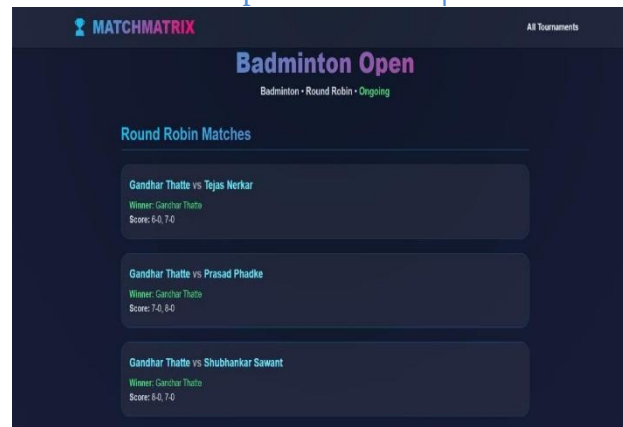


Figure 5: Tournament Match Result Page

VI. CONCLUSION

The MatchMatrix tournament management system is an illustration of how web technologies can be successfully applied in order to make sports competitions organization easier and more efficient. The system allows the tourism companies to control the tournament more effectively and accurately by substituting the old system of manual work with a centralized platform.

Some of the features that the application incorporates include player registration, automatic match scheduling, managing scores and updating the real time tournament happenings in one web based environment. The fact that such widely used tournament formats like Round Robin and Knockout are supported allows stating that the platform can be utilized in a large variety of sport events. The structured database and automated scheduling logic helps to reduce number of errors and administration workload involved in running the tournament.

Moreover, the system offers easy access to tournament updates (bracket displays, leaderboard updates) enhancing the clarity of the progress of the tournament to both participants and the organizers. Modular nature of the platform will be easily maintained and enhanced in future like addition of new tournament formats, statistical analysis tools and support of mobile applications.

In general, MatchMatrix system represents the way a properly designed web application can solve the real-life problems of managing sports events by enhancing efficiency, precision, and access to all the parties concerned.

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