WinExpress

projectName
Project702_0502_10_Slides

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Background

Background

- Apply concepts from Database Management Systems course to integrate UMD Men's Soccer data with data from other schools. This will create a comprehensive database to support performance analysis and improvement strategies.

Users

- **Coaches:** Performance review, planning, game strategy, and opponent analysis.
- **Players:** Game tracking, skill improvement, and opponent analysis.
- **School Management:** Manage operation, plan resource allocation, and oversee team performance.

Data

- **Men's Soccer Annual Stats:** Historical team performance statistics (shots, penalties, goals, etc.).
- **Men's Soccer Game-by-Game Stats:** Detailed statistics for each match, including game result, offensive stats and goalie stats.
- **Additional Data Sources:** NCAA stats and other relevant metrics for deeper insights.

Sources

- **UMD Men's Soccer Annual Data:** https://umterps.com/sports/mens-soccer/stats
- **UMD Men's Soccer Game-by-Game:** https://umterps.com/sports/mens-soccer/stats
- **Michigan Men's Soccer Annual Data:** https://mgoblue.com/sports/mens-soccer/stats/2024

Introduction

Mission Statement:

Create a UMD Men's Soccer statistics database with annual and game-by-game data (shots, penalties) to aid support and players in strategic planning and skill enhancement. Leverage to analyze strengths and weaknesses of the game, improving performance statistically.

Mission objectives:

Short-Term

Provide insights from UMD and Michigan data to improve performance in the **October 25th** game in **Ann Arbor**.

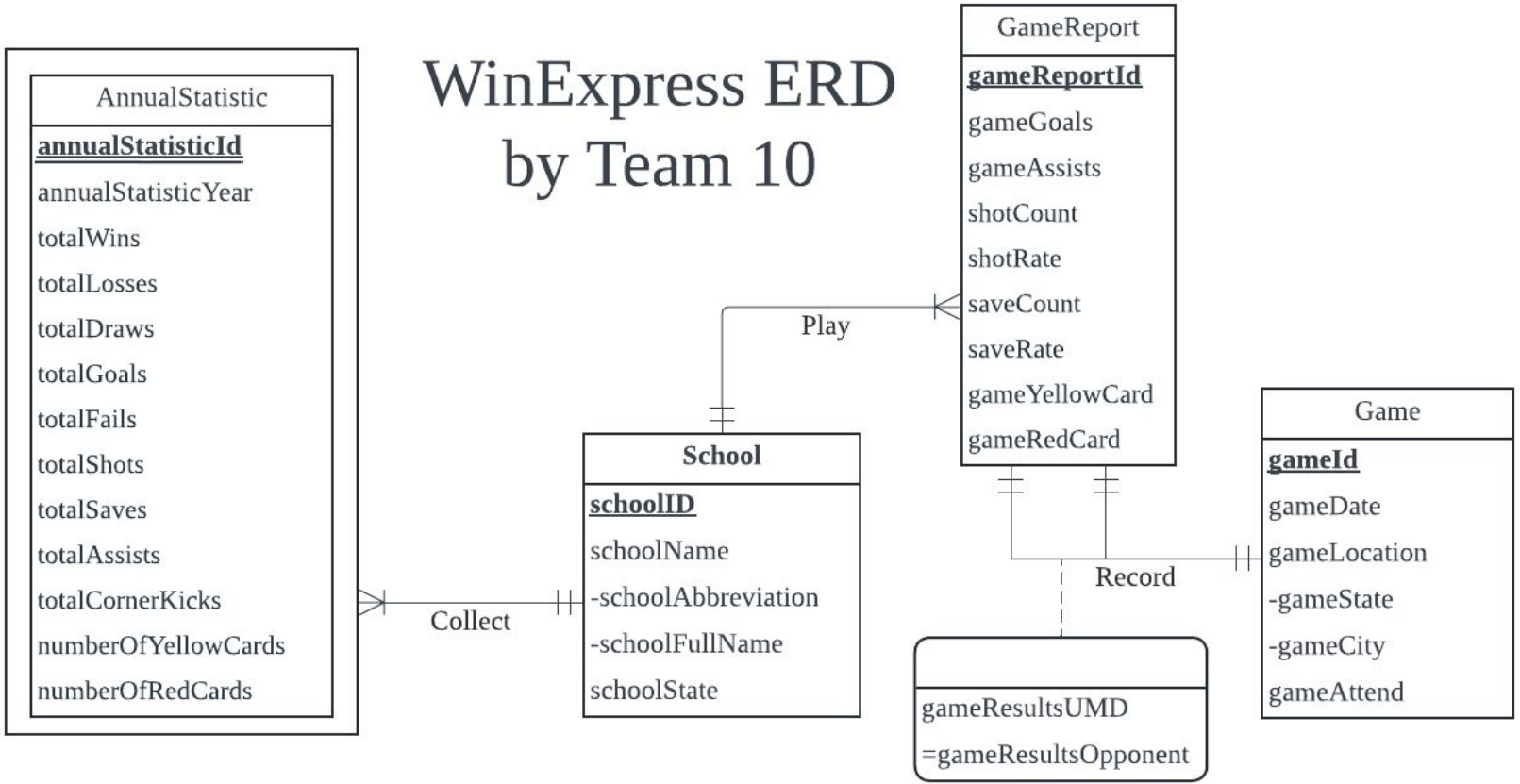
Mid-Term

Expand the database to include historical data, creating a strategic tool for performance analysis.

Long-Term

Maintain a multi-year database to track opponent strategies, adapt training, and analyze individual player performance.

Conceptual Database Design: ER Diagram



Logical Database Design: relational schema

Relational Schema:

School (**schoolId**, schoolAbbreviation, schoolFullName, schoolState)

Game (**gameId**, gameDate, gameState, gameCity, gameAttend)

GameReport (**gameReportId**, gameGoals, gameAssists, shotCount, shotRate, saveCount, saveRate, gameYellowCard, gameRedCard, *schoolId*)

AnnualStatistic (***schoolId***, **annualStatisticId**, annualStatisticYear, totalWins, totalLosses, totalDraws, totalGoals, totalFails, totalShots, totalSaves, totalAssists, totalCornerKicks, numberOfYellowCards, numberOfRedCards)

Record (***gameId***, ***gameReportIdUMD***,***gameReportIdOpponent***, gameResultsUMD)

Physical Database Design: SQL CREATE TABLEs

Considerations:

After we finished analyzing the relation schema and business rules, we need to follow these rules. Relevant regulations are:

1. Set primary key constraint
2. Set foreign key constraints
3. Set data type for various attributes

```
CREATE TABLE [Football.School] (
      schoolId CHAR(4) NOT NULL,
      schoolAbbreviation VARCHAR(10),
      schoolFullName VARCHAR(50),
      schoolState CHAR(2),
      CONSTRAINT pk_Football_School_schoolId PRIMARY KEY (schoolId) );

CREATE TABLE [Football.AnnualReport] (
      annualReportId CHAR(5) NOT NULL,
      schoolId CHAR(4) NOT NULL,
      annualReportYear CHAR(4),
      totalWins INT,
      totalLosses INT,
      totalDraws INT,
      totalGoals INT,
      totalFails INT,
      totalShots INT,
      totalSaves INT,
      totalAssists INT,
      totalCornerKicks INT,
      numberOfYellowCards INT,
      numberOfRedCards INT,
      CONSTRAINT pk_Football_AnnualReport_reportId PRIMARY KEY (annualReportId),
      CONSTRAINT fk_AnnualReport_schoolId FOREIGN KEY (schoolId)
            REFERENCES [Football.School] (schoolId)
            ON DELETE NO ACTION ON UPDATE CASCADE);
```

Physical Database Design: SQL CREATE TABLEs

Code:

```
USE BUDT702_Project_0502_10

--SQL create tables:

CREATE TABLE [Football.School] (
        schoolId CHAR(4) NOT NULL,
        schoolAbbreviation VARCHAR(10),
        schoolFullName VARCHAR(50),
        schoolState CHAR(2),
        CONSTRAINT pk_Football_School_schoolId
                PRIMARY KEY (schoolId) );
```

```
CREATE TABLE [Football.AnnualStatistic] (
        annualStatisticId CHAR(5) NOT NULL,
        schoolId CHAR(4) NOT NULL,
        annualStatisticYear CHAR(4),
        totalWins INT,
        totalLosses INT,
        totalDraws INT,
        totalGoals INT,
        totalFails INT,
        totalShots INT,
        totalSaves INT,
        totalAssists INT,
        totalCornerKicks INT,
        numberOfYellowCards INT,
        numberOfRedCards INT,
        CONSTRAINT pk_Football_AnnualStatistic_annualStatisticId
                PRIMARY KEY (annualStatisticId),
        CONSTRAINT fk_AnnualStatistic_schoolId
                FOREIGN KEY (schoolId)
                REFERENCES [Football.School] (schoolId)
                ON DELETE NO ACTION ON UPDATE CASCADE );
```

Physical Database Design: SQL CREATE TABLEs

Code:

```
CREATE TABLE [Football.Game] (
        gameId CHAR(4) NOT NULL,
        gameDate DATE,
        gameState CHAR(2),
        gameCity VARCHAR(20),
        gameAttend INT,
        CONSTRAINT pk_Football_Game_gameId PRIMARY KEY (gameId) );

CREATE TABLE [Football.GameReport] (
        gameReportId CHAR(5) NOT NULL,
        schoolId CHAR(4) NOT NULL,
        gameGoals INT,
        gameAssists INT,
        shotCount INT,
        shotRate DECIMAL(4, 3),
        saveCount INT,
        saveRate DECIMAL(4, 3),
        gameYellowCard INT,
        gameRedCard INT,
        CONSTRAINT pk_Football_GameReport_gameReportId PRIMARY KEY (gameReportId) ,
        CONSTRAINT fk_GameReport_schoolId FOREIGN KEY (schoolId)
                REFERENCES [Football.School] (schoolId)
                ON DELETE NO ACTION ON UPDATE CASCADE );
```

Physical Database Design: SQL CREATE TABLEs

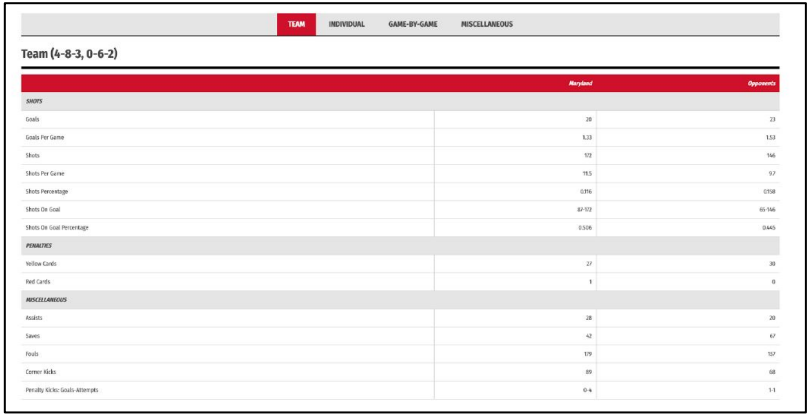
Code:

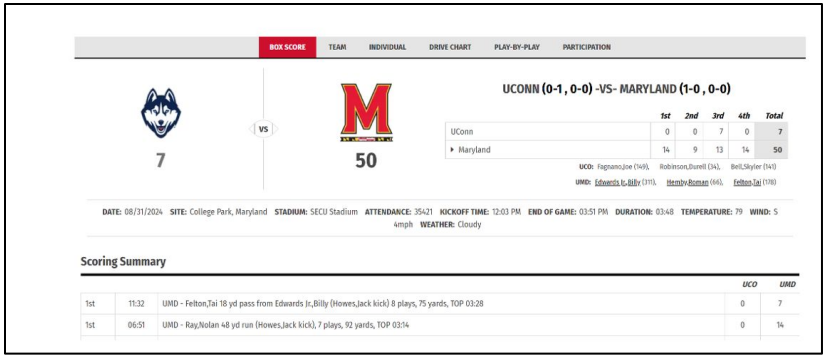
```
CREATE TABLE [Football.Record] (
        gameId CHAR(4) NOT NULL,
        gameReportIdUMD CHAR(5) NOT NULL,
        gameReportIdOpponent CHAR(5) NOT NULL,
        gameResultsUMD CHAR(1)
        CONSTRAINT pk_Football_Record_gameId_gameReportIdUMD_gameReportIdOpponent PRIMARY KEY (gameId,
gameReportIdUMD, gameReportIdOpponent),
        CONSTRAINT fk_Record_gameId FOREIGN KEY (gameId)
                REFERENCES [Football.Game] (gameId)
                ON DELETE CASCADE ON UPDATE CASCADE,
        CONSTRAINT fk_Record_gameReportIdUMD FOREIGN KEY (gameReportIdUMD)
                REFERENCES [Football.gameReport] (gameReportId)
                ON DELETE NO ACTION ON UPDATE NO ACTION,
        CONSTRAINT fk_Record_gameReportIdOpponent FOREIGN KEY (gameReportIdOpponent)
                REFERENCES [Football.gameReport] (gameReportId)
                ON DELETE NO ACTION ON UPDATE NO ACTION);
```

Physical Database Design: SQL INSERT DATA

Considerations:

1. Data Source





Basing on our research goal, we found the annual report and individual game report from ‘Maryland Men's Soccer Statistics’. For our opponents’ statistics, we reached to the school’s official soccer websites and found relevant statistics.

From different statistics, the attributes we chose in our ERD can all be used to show a trend about the performance of the team, instead of just copying them all.

Physical Database Design: SQL INSERT DATA

Considerations:

2. Data Processing

SOG%	YC-RC	GW	PK-ATT	Min	Date	Opponent	Score	Minutes	GA	GAAvg	Saves	Save %	W	L	T	SHO
0.333	3-1	0	0-0	981	09/14/2023	Michigan	2-2	90:00:00	2	1	0	0	0	0	1	0
0.506	1-27	4	0-4	14841	Totals		-	1350	23	1.53	40	0.635	4	8	3	4
0.445	30-0	8	-	14850	Opponent		-	1350:00:00	20	1.33	63	0.759	8	4	3	5
0.267	3-0	1	0-0	990	09/16/2022	Michigan	2-1	90:00:00	1	1.17	5	0.833	1	0	0	0
0.508	1-36	11	4-6	19762	Totals		-	1800	25	1.25	53	0.679	11	4	5	4
0.503	1-43	4	-	19800	Opponent		-	1800:00:00	39	1.95	78	0.667	4	11	5	1
0.625	1-0	1	0-0	990	09/17/2021	Michigan	2-1	90:00:00	1	1	1	0.5	1	0	0	0
0.48	1-22	12	2-5	18377	Totals		-	1670	14	0.75	47	0.77	12	4	2	8
0.418	3-35	4	-	18307	Opponent		-	1670:59:00	29	1.56	94	0.764	4	12	2	5
0.556	1-0	1	0-1	990	03/11/2021	Michigan	2-1	90:00:00	1	1.4	4	0.8	1	0	0	0
0.38	18-0	4	3-6	11330	Totals		-	1030	16	1.4	33	0.673	4	5	2	1
0.495	2-17	5	-	11211	Opponent		-	1030:00:00	13	1.14	36	0.735	5	4	2	3
0.556	0-0	0	0-0	989	11/03/2019	Michigan	2-4	90:00:00	4	1.02	3	0.429	0	1	0	0
0.449	1-25	11	2-3	21581	Totals		-	1958	22	1.01	70	0.761	11	8	2	11
0.42	29-0	8	-	21641	Opponent		-	1959:54:00	28	1.29	74	0.725	8	11	2	5

gameId	gameReportId	gameResult	gameGoal	gameAssist	gameShot	gameShot%	gameSave	gameSave%	gameYellowCard	gameRedCard
G001	GR001	D	2	3	15	0.133	0	0	3	1
G002	GR002	W	2	1	15	0.133	5	0.833	3	0
G003	GR003	W	2	2	16	0.125	1	0.5	1	0
G004	GR004	W	2	2	9	0.222	4	0.8	1	0
G005	GR005	L	2	3	9	0.222	3	0.429	0	0
G001	GR006	D	2	3	6	0.333	3	0.6	3	0
G002	GR007	L	1	0	15	0.067	2	0.5	2	0
G003	GR008	L	1	1	6	0.167	8	0.8	2	0
G004	GR009	L	1	1	11	0.091	3	0.6	1	1
G005	GR010	W	4	2	16	0.25	3	0.6	0	0

After we collected the reports, we use various tools to found out the target data and then recorded them in excel. The chart we created in excel follows exactly the same regulations as we set in ‘CREATE TABLE’ part.

AnnualReport | School | Game | GameReport | Play | definition | Game by Game | Game by Game Offensive Goalie | Our | Opponent

Physical Database Design: SQL CREATE VIEW

Code:

```
USE BUDT702_Project_0502_10

--SQL create view:

DROP VIEW IF EXISTS gameResultUMDUMich
GO
CREATE VIEW gameResultUMDUMich AS
    SELECT g.gameDate AS 'Date', g.gameCity AS 'City', s2.schoolFullName AS 'Opponent School',
          r.gameResultsUMD AS 'UMD Result'
    FROM [Football.Record] r
    JOIN [Football.Game] g ON r.gameId = g.gameId
    JOIN [Football.GameReport] gr1 ON r.gameReportIdUMD = gr1.gameReportId
    JOIN [Football.GameReport] gr2 ON r.gameReportIdOpponent = gr2.gameReportId
    JOIN [Football.School] s1 ON gr1.schoolId = s1.schoolId
    JOIN [Football.School] s2 ON gr2.schoolId = s2.schoolId
    WHERE s1.schoolAbbreviation = 'UMD'
GO
SELECT *
FROM gameResultUMDUMich
```

Physical Database Design: SQL SELECT DATA

Which aspects of the UMD men's soccer team's performance have been the most inconsistent in the past? Which games have had poor results and large gaps in performance against their opponents?

Considerations:

- What is the UMD Men's Soccer team's average shot accuracy compared to their opponents in all games?
- Where are the locations (states or cities) where UMD performs the best or worst?
- Which players contribute most to the team’s wins in terms of goals and assists?
- How does UMD's defense compare to opponents in terms of goals conceded and saves made?

Physical Database Design: SQL CREATE VIEW

- **Using CREATE VIEW shows all UMD vs. Michigan match results, with UMD as the perspective**

```
DROP VIEW IF EXISTS gameResultUMDUMich
GO
CREATE VIEW gameResultUMDUMich AS
   SELECT g.gameDate AS 'Date', g.gameCity AS 'City', s2.schoolFullName AS 'Opponent School',
        r.gameResultsUMD AS 'UMD Result'
   FROM [Football.Record] r
   JOIN [Football.Game] g ON r.gameId = g.gameId
   JOIN [Football.GameReport] gr1 ON r.gameReportIdUMD = gr1.gameReportId
   JOIN [Football.GameReport] gr2 ON r.gameReportIdOpponent = gr2.gameReportId
   JOIN [Football.School] s1 ON gr1.schoolId = s1.schoolId
   JOIN [Football.School] s2 ON gr2.schoolId = s2.schoolId
   WHERE s1.schoolAbbreviation = 'UMD'
GO
SELECT *
FROM gameResultUMDUMich
```

Results | Messages

	Date	City	Opponent School	UMD Result
1	2023-09-14	College Park	University of Michigan	T
2	2022-09-16	Ann Arbor	University of Michigan	W
3	2021-09-17	College Park	University of Michigan	W
4	2021-03-11	Legacy Center	University of Michigan	W
5	2019-11-03	College Park	University of Michigan	L

Query executed successfully.

Physical Database Design: SQL SELECT DATA

- **What is the UMD Men's Soccer team's average shot accuracy compared to their opponents in all games?**

```
SELECT g.gameDate AS 'Game Date', grU.shotCount AS 'UMD Shots', grU.shotRate AS 'UMD Shot Accuracy',
        grO.shotCount AS 'Opponent Shots', grO.shotRate AS 'Opponent Shot Accuracy'
FROM [Football.Game] g
        JOIN [Football.Record] r ON g.gameId = r.gameId
        JOIN [Football.GameReport] grU ON r.gameReportIdUMD = grU.gameReportId
        JOIN [Football.GameReport] grO ON r.gameReportIdOpponent = grO.gameReportId
WHERE grU.schoolId ='S001'
```

	Game Date	UMD Shots	UMD Shot Accuracy	Opponent Shots	Opponent Shot Accuracy
1	2023-09-14	15	0.133	6	0.333
2	2022-09-16	15	0.133	15	0.067
3	2021-09-17	16	0.125	6	0.167
4	2021-03-11	9	0.222	11	0.091
5	2019-11-03	9	0.222	16	0.250

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Physical Database Design: SQL SELECT DATA

- **Where are the locations (states or cities) where UMD performs the best or worst?**

```
SELECT g.gameState AS 'Game State', g.gameCity AS 'Game City',
        AVG(CASE WHEN r.gameResultsUMD = 'W' THEN 1 ELSE 0 END) AS 'Win Rate'
FROM [Football.Game] g
        JOIN [Football.Record] r ON g.gameId = r.gameId
        JOIN [Football.GameReport] grU ON r.gameReportIdUMD = grU.gameReportId
WHERE grU.schoolId='S001'
GROUP BY g.gameState, g.gameCity
ORDER BY 'Win Rate' DESC
```

	Game State	Game City	Win Rate
1	MI	Ann Arbor	1
2	MI	Legacy Center	1
3	MD	College Park	0

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Physical Database Design: SQL SELECT DATA

- **How do UMD's wins compare to their losses in terms of total goals scored by UMD and their opponents?**

```
SELECT g.gameDate, grU.gameGoals AS' UMD Goals', gro.gameGoals AS 'Opponent Goal',
                CASE
                WHEN r.gameResultsUMD ='W' THEN ' Win'
                WHEN r.gameResultsUMD='L' THEN 'Loss'
                ELSE 'Draw'
                END AS 'Game Result'
FROM [Football.Game] g
        JOIN [Football.Record] r ON g.gameId = r.gameId
        JOIN [Football.GameReport] grU ON r.gameReportIdUMD= grU.gameReportId
        JOIN [Football.GameReport] grO ON r.gameReportIdOpponent = grO.gameReportId
WHERE grU.schoolId = 'S001'
```

	Game Date	UMD Goals	Opponent Goal	Game Result
1	2023-09-14	2	2	Draw
2	2022-09-16	2	1	Win
3	2021-09-17	2	1	Win
4	2021-03-11	2	1	Win
5	2019-11-03	2	4	Loss

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Physical Database Design: SQL SELECT DATA

- **How does UMD's defense compare to opponents in terms of goals conceded and saves made?**

```
SELECT g.gameDate AS 'Game Date', grU.saveCount AS 'UMD Saves', grU.saveRate AS 'UMD Save Accuracy',
                grO.saveCount AS 'Opponent Saves', grO.saveRate AS 'Opponent Save Accuracy',
                grU.gameGoals AS 'UMD Goals Allowed', grO.gameGoals AS 'Opponent Goals Allowed'
FROM [Football.Game] g
        JOIN [Football.Record] r ON g.gameId = r.gameId
        JOIN [Football.GameReport] grU ON r.gameReportIdUMD = grU.gameReportId
        JOIN [Football.GameReport] grO ON r.gameReportIdOpponent = grO.gameReportId
WHERE grU.schoolId = 'S001'
```

	Game Date	UMD Saves	UMD Save Accuracy	Opponent Saves	Opponent Save Accuracy	UMD Goals Allowed	Opponent Goals Allowed
1	2023-09-14	0	0.000	3	0.600	2	2
2	2022-09-16	5	0.833	2	0.500	2	1
3	2021-09-17	1	0.500	8	0.800	2	1
4	2021-03-11	4	0.800	3	0.600	2	1
5	2019-11-03	3	0.429	3	0.600	2	4

Query executed successfully. | doitsqlx.rhsmith.umd.edu,97... | AD\wangx721 (89) | BUDT702_Project_0502_10 | 00:00:00 | 5 rows

Conclusion

- **Shot Accuracy Difference**
  - **UMD's shot accuracy has been lower than its opponents in recent games, especially in losses (e.g., Nov. 3, 2019.) UMD's offensive efficiency is in dire need of improvement, and the team needs to improve its shot accuracy to increase its chances of winning games.**
- **Impact of Gme Location**
  - **The location of the game has a significant impact on UMD's performance. At College Park, UMD performed more consistently and had a higher winning percentage. However, in road games (e.g., Ann Arbor), UMD's performance declined, suggesting that the team needs to improve its adaptability and performance in road games.**
- **Goals and Wins Correlation**
  - **UMD's wins are directly correlated to its goal scoring. In winning games (e.g., Sept. 16, 2022 and Sept. 17, 2021), UMD scored more goals than its opponents, while in losing games (e.g., Nov. 3, 2019), UMD scored fewer goals than its opponents. Increasing offensive firepower will be key for UMD to achieve more victories in the future.**
- **Defensive Consistency**
  - **UMD's defensive performance has been relatively consistent, especially in terms of save percentage. In most games, UMD's goalies outperform their opponents (e.g., 0.800 save percentage in the Sept. 17, 2021 game). Despite the similar number of goals allowed by UMD and its opponents, UMD can continue to maintain its defensive dominance while stepping up on the offensive end.**