Sports Analytics

**Designing a Game Analysis Decision-Support Tool Using Big Data Analysis**

Sarah Almujahed
Nicole Ongor
John Tigmo
Navjot Sagoo

**Sponsors:**
Coach Fred Chao
Coach Pat Kendrick
Mr. Juan Mantilla

Systems Engineering 490/495 - Spring 2013
Agenda

- Context and Stakeholders Analysis
- Problem and Need
- Design Alternatives
- Simulation
- Results and Recommendations
Context and Stakeholders

- Collegiate Athletics
- Volleyball Process
- Value Hierarchy
- Competitive Success Trend Analysis
- Stakeholders Interactions
Overview Collegiate Athletics

- Largest national non-profit collegiate sports organization U.S. (NCAA)
  - Mission promote student athlete development alongside higher education
- 1,000 colleges are affiliated with the NCAA and over 400,000 participants
- Division I, II, or III based on each school’s choice of competition level
  - Divisions are further divided into regional conferences.
- A “D-I” school is known as “major power house” (highly competitive teams).
- Historical trends show correlations between D-I team’s competitive success and
  - Large fiscal budgets
  - High expectations
  - High coach’s salary
  - Quantity of athletic scholarships

Top athletics budgets exceed $250 million in 2020

Budget projections for the top ten public institutions spending the most on athletics, 2015 and 2020

Average Budgets for Top Ten Spenders on Athletics

This figure shows future projections for the average athletics operating budget for the ten public institutions spending the most on athletics in 2009. The growth rate projections are based on the “smoothed” annual rates of change for total operating expenses during the following periods: 2005-2009, 2006-2009 and 2007-2009.

Source: USA Today NCAA athletics database using data reported by each institution on NCAA financial reports.
Value Hierarchy

- GMU Intercollegiate Athletics’ evaluation is used to measure success relative to outcomes desired.
- Value hierarchy list the criteria.
- **Competitive Success** constitutes 22.5% of the evaluation.
- Competitive success is the focus of study.

Competitive Success has one of the highest weights under leadership which comprises 75% of the evaluation.
Volleyball Functional Block Diagram Process

- **Match**
  - Objective
  - Players Performance at Full Potential

- **Training**
  - Refine Skills of Existing Players
  - Recruiting Process

- **Post Game Analysis**

- **Training Development**
  - Decision-Making Process Based on coaches’ intuitions

- **Recruiting**
GMU Women’s Volleyball Average Performance

George Mason University
Average winning percentage: **47.8%**
2.2% below CAA average

Northeastern University
Average winning percentage: **61.4%**
10.4% above CAA average

**George Mason University**
Decreasing with a slope of **-0.0283**
Winning percentage varies by **4.17%**

**Northeastern University**
Increasing with slope of **+0.0102**
Winning percentage varies by only **0.94%**
GMU Men’s Volleyball Average Performance

George Mason University
Average winning percentage: 55%
5% above EIVA average

Penn State University
Average winning percentage: 79%
29% above EIVA average

George Mason University
Decreasing with a slope of -0.0074
Winning percentage varies by 2.85%

Penn State University
Increasing with slope of +0.0068
Winning percentage varies by only 0.78%
Stakeholders Diagram

NCAA
- Staff Support
  - Sports Committee

Opponents
- Conference
- Non-Conference

Athletic Department
- Administrative Support
  - Athletic Director
  - Finance Operations
  - Academic Coordinator

Volleyball Program
- Staff Support
  - Coach
  - Assistant Coach
  - Trainer

- Team
  - New Players
  - Existing Players

Figure 1.6
Problem and Need

- Problem Statements
- Need Statement
Problem Statements

Goal: Win conference championship to qualify for NCAA championship.

Women’s Problem Statement

• Top competitor in conference is Northeastern (NE) whose win % is 61.4%
• George Mason University (GMU) win % is 47.8%
• Greater variance in their winning percentages than NE.
• Won 3 out of 13 matches against NE between years 2006 and 2012, which is only 23.07% winning percentage against NE.

Men’s Problem Statement

• Top competitor in conference is Penn State (PSU) whose win % is 79%
• George Mason University (GMU) win % is 55%
• Greater variance in their winning percentages than PSU.
• Won 2 out of 26 matches against PSU between years 2006 and 2012, which is only 7.7% winning percentage against PSU.
Need Statement

• For both teams, there is a need for a decision-support tool that can identify and quantify sequences of events that will yield at least a 50% winning percentage against the top competitor.
Design Alternatives

- Design Alternatives
- Derivation of Design Alternatives
GMU’s Men’s and Women’s Volleyball Team’s Design Alternatives

• **Alt. 1: Increasing Serves to Points (Aces)**
  - A service ace occurs when a team serves the ball and that ball transitions directly to a point for that team without undergoing any other transitions.

• **Alt. 2: Increasing Blocks to Points (Blocks)**
  - Blocks are used to strategically land the ball in the opposing team’s side of the court or deflect the ball from being spiked by the opposing team, resulting in a point.

• **Alt. 3: Increasing Attacks to Points (Kills)**
  - A kill is a particular type of an attack that results in a direct point by grounding the ball in the opposing team’s side of the court.

• **Alt. 4: Decreasing events that increase opposing teams points (Errors)**
  - Errors include multiple transitions because an error can occur between multiple actions. Includes service errors; ball-handling errors, from passes and sets; blocking errors; receptions errors; and attacking errors.
Volleyball Hypothesis Testing

- Statistical Analysis was used determine how the occurrence of one event correlates with a particular outcome in comparison to the opposing teams
- T-test looks at the difference in means between the two teams
- 95% CI where, Null hypothesis ($H_0$): $X_1 = X_2$ (no difference in means) Alternative hypothesis ($H_A$): $X_1 \neq X_2$ (difference in means) and $\alpha=0.05$

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## Volleyball T-Test Results

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<td>$t = 2.228$ $\alpha = 0.05$</td>
<td>$t = 2.228$ $\alpha = 0.05$</td>
<td>$t = 2.228$ $\alpha = 0.05$</td>
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**Note:** The graphical comparison showed the distributions of the two groups. If the p-value is low, chances are there will be little overlap between the two distributions. If the p-value is not low, there will be a fair amount of overlap between the two groups.
Simulation

- CAAT
- Updated Volleyball Process
- Simulation Process
- Simulation Assumptions
# Computer-Aided Analysis Tool (CAAT)

## What is the tool?

- **Robust Volleyball Decision Support-Tool**
  - New approach at volleyball data analysis
  - Built and reformed through professional expertise of stakeholders (coaches) and the design

- **Knowledge and Mathematical-based system**
  - Models Markov Chain to depict volleyball game’s states and transitions
  - Complied of combinations of historical data, statistics and data from match videos

- **Computer-based program**
  - Game Model Program uses eclipse IDE written in java
    - Uses ‘Uncommon Math API’ class Random Number generator for Java
  - Python program used for data parsing
    - Calculates probabilities and occurrences

## What does it do?

- **Simulate Matches**
  - Monte Carlo simulation of scenarios given the probabilities of actual events occurring within a volleyball game

- **Analyze**
  - Cause and effect relationship between transitional probabilities and the outcome of the match.
  - Identify target transitional probabilities that will optimize winning percentage
  - Post analysis - Optimize decision making in training strategies and recruiting

- **Evaluate**
  - Assess the performance of team and player positions in games
Absorbing Markov Chain Game Model

- Mathematical system, the simulation is modeled by an Absorbing Markov Chain (AMC) process
- Representative of a volleyball game’s actions and transitions
- Model defines serves, pass/receives, sets, and blocks as transient states and points as absorbing states
- Accounts for two teams, GMU as ‘A’ and their associated top opponent as ‘B’
- Involves Matrix Calculations
Absorbing Markov Chain Matrix Calculations

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If we are present in transient state $t_p$, the probability that the team will eventually be absorbed in absorbing state $a_j$ is the $ij$th element in matrix $(I - Q)^{-1}R$.

1. $(I - Q)$
2. $(I - Q)^{-1}$ Markov Chain’s Fundamental Matrix
3. $(I - Q)^{-1}R$
Validation
Derived Equation for Simulation

- Changes in original transitional probabilities in the original matrix reflect a cause and effect relationship in the final resulting matrix.
- The value of a probability determines the sensitivity of an outcome.
- Probabilities in the original matrix are adjusted to analyze the outcome of the match within the simulation.

\[ P_{ps} = \sum_{s} [(I-Q)^{-1}R]_{aj} \]

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Functional Block Diagram Process

Computer Aided Analysis Tool

Absorbing Markov Chain Volleyball Game Simulation

Input

Output

Winning Percentage
Point Scoring Probability
Occurrences

Decision-Making Process Statistically supported by Big Data Analysis

Training Development

Recruiting

Recruiting Process

Refine Skills of Existing Players

Objective

Players Performance at Full Potential

Match

Training
Simulation Process

Data Collection and Parsing Phase

- Videos
  - Data Collection
  - Data Parsing

Raw Data
- Sequence of Events

Transitional Probabilities

Simulation Phase

- Simulation
  - Win %
  - Point Scoring Probability

- Data Collection and Parsing Phase
  - Raw Data
  - Sequence of Events
  - Transitional Probabilities

- Simulation Phase
  - Simulation
  - Win %
  - Point Scoring Probability

- Sensitivity Analysis
  - Team A Occurrences
  - Transitional Occurrences

- Data Parsing
  - Sequence of events
Data Collection and Simulation

User Input

Data Parsing

Parsing Processor Function

Matrix Transitional Probabilities

Design alternatives implementation occurs in the above text file

Text File Input

Simulation

Win %

Point Scoring Probability

Systems Engineering 490/495 - Spring 2013
Simulation Assumptions

1. Design alternatives were tested under the assumption that the opposing team’s performance remains consistent in the transitional distributions with low variations in their performance.

2. Design alternatives were tested under the assumption that all other transitions in all other states remain at their current transitional status (original probability).

3. GMU’s probabilities are the controlled variables while opponent’s probabilities are the uncontrolled variables.
Simulation Interface

http://www.youtube.com/watch?v=c4HlhmcGqOY
Sensitivity Analysis
Sensitivity Analysis

Serves, Blocks and Attacks Transitional Probability VS Point Scoring Probability

Errors Transitional Probability VS Point Scoring Probability
Design of Experiment

- Simulated Scenarios
- Design of Experiment
Design of Experiment

**Men’s Volleyball Team**

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**Women’s Volleyball Team**

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Results & Recommendations

• Simulation Results
• Utility Results
• Risk Analysis
• Recommendations
• Future Work
Simulation Results

- The comparative analysis indicated that each type of alternative will need a significant amount of improvement in order to achieve a winning percentage of 50% and 90% from the current winning percentage.

<table>
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<th>Rank</th>
<th>Design Alternative</th>
<th>Amount of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Increasing Kills</td>
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<tr>
<td>4</td>
<td>Increasing Aces</td>
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<td>+9</td>
</tr>
<tr>
<td>3</td>
<td>Increasing Kills</td>
<td>+12</td>
</tr>
<tr>
<td>4</td>
<td>Decreasing Errors</td>
<td>-22</td>
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### Utility Function

\[
U(x) = (0.5)TR + (0.5)MO \quad \quad TR(x) = (0.5)EFFY + (0.5)EFFT
\]

- Two main categories: Trainability (TR) Modifiability (MO)
- Trainability has two sub-categories: Efficiency (EFFY) Effectiveness (EFFT).
- Scale 0(worst) - 3(best)
Risk Analysis

Women's Utility vs Risk

Risk

High
Medium
Low

Utility

0 0.5 1 1.5 2 2.5 3

Increasing Aces
Increasing Blocks
Decreasing Errors
Increasing Kills

Men's Utility vs Risk

Risk

High
Medium
Low

Utility

0 0.5 1 1.5 2 2.5

Increasing Aces
Increasing Blocks
Decreasing Errors
Increasing Kills
## Recommendations

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<th>Team</th>
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<th>Ranking By Utility Analysis Results</th>
<th>Ranking By Risk Analysis Results</th>
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<td>Increasing Serve - Point</td>
<td>Decreasing Errors</td>
<td>Increasing Attack - Point</td>
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<td>Increasing Serve - Point</td>
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<td>4</td>
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<td>Increasing Attack - Point</td>
<td>Increasing Serve - Point</td>
</tr>
</tbody>
</table>

- **Men’s Team:**
  - Although decreasing errors has the highest utility, it’s also associated with high risk. Therefore, increasing kills would be the best alternative to improve the men’s team’s performance and compete at Penn State’s level.
  - Since focusing training is also associated with blocks training, the focus of recruiting would be directed towards strong servers.

- **Women’s Team:**
  - Since increasing blocks has the highest utility and lowest risk, the recommendation would be to focus training on blocks in order to improve the team’s performance and compete at Northeastern’s level.
  - The recommendation for recruiting would be to focus on attaining strong hitters and strong servers.
Testimonial

“In less than one academic year, the group learned about five years worth of volleyball. The level of ambition of the project was matched by their tenacity and enthusiasm. Their model is a good first attempt at informing on meaningful components of success and failure in the sport.”

– Coach Fred Chao
References

Questions?
Method of Analysis

**Video Analysis**
Sample size for 12 Games, 4-year period, pilot study estimated 1,400 data points per game with maximum of 70 transition combinations and population size 224 games

**Markov Chain Game Model Simulation**
Calculate average of each transition line per game and input values into transition matrix

**Markov Chain Game Model Simulation**
Output Design Alternatives with New Transition Probabilities for a number of runs

**Design Alternatives with New Transition Probabilities and run through simulation**

**Sensitivity Analysis**
Conduct Sensitivity Analysis on Design Alternatives to measure Impact (Weights)
Evaluate the effects of future games based on Criteria and Utility Score

**Selection Criteria**
Evaluate the effects that optimize Performance and Cost/Benefits

Use simulation to calculate each state’s probability distribution based on current data

Refine Design Alternatives if needed

Sampling Baseline Distribution and standard deviation for each transition with desired 95%-CI

Figure 1.12
Program Inner Workings

Simulation

State's Probabilities Sum up to 1 in Matrix

Yes

Random Number Generation

Yes

Distribution Interval

No

Generate New Number

Correct Entries in Matrix

Prints Sequence of Events

Counter for Occurrences and Score

Yes

Match 3 out of 5 And up by 2

No

Continue Rally by RGN

Calculate Winning Percentage

Probability of Scoring Points

Parses Simulated Data into matrix

Converts Probabilities into Occurrences
George Mason University Men’s Volleyball

- Collegiate Volleyball Division I
- Eastern Intercollegiate Volleyball Association (EIVA) Conference
- 27 D-I teams
- Head Coach Fred Chao, 1998-present
- Best conf. record 22-6, 2005-06
  - 2011-12 record 13-17
  - Career W/L 202-170 (.543)
  - 20 players, 16 active
- Best overall record 37-5, 1986-87
- In 1988 competed in the NCAA championship placing 4th
George Mason University Women’s Volleyball

- Collegiate Volleyball Division I
- Colonial Athletics Association (CAA) Conference
- 327 D-I teams
- Head Coach Pat Kendrick, 1985-present
  - Best record 26-3, 1996-97 season
  - 2011-2012 record 7-19
  - Career W/L 449-377 (.544)
- 16 players, 14 active
- Won the conference championship 7 times (5 in a row 1992-96 and most recent 2009)
- 2009 reached NCAA tournament losing in first round to Iowa State
Mathematical Calculations

- \( Q \) is an \((s-m) \times (s-m)\) matrix that represents transitions between transient states.

- \( I \) is an \(m \times m\) identity matrix reflecting the fact that we can never leave an absorbing state.

- \( R \) is an \((s \times m)\) matrix representing transitions from transient states to absorbing states.

- \( \theta \) is an \((s \times m)\) matrix consisting entirely of zeros. \( P \) correspond (in order) to the states \( t_1, t_2, \ldots, t_{s-m}, a_1, a_2, \ldots, a_m \).

- \( S \) (transient state) = 10

- \( M \) (absorbing state) = 2
Utility Results

Utility values are based on achieving a 50% chance of winning because this is the minimum target outcome that will address the problem and satisfy the need.
Deriving Design Alternatives

After assessing 640 data points (from NCAA official box scores) of 3 non-winning and 3 winning seasons for all opponents of those years, we have assessed the following information:

<table>
<thead>
<tr>
<th>Team</th>
<th>Service Aces and Points</th>
<th>Blocks and Points</th>
<th>Points Contributed from Opposing Team’s Errors</th>
<th>Attacks and Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>GMU</td>
<td>6.2%</td>
<td>9.2%</td>
<td>28.9%</td>
<td>55.6%</td>
</tr>
<tr>
<td>Opponents</td>
<td>6.16%</td>
<td>7.7%</td>
<td>30.78%</td>
<td>55.36</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Team</th>
<th>Service Aces and Points</th>
<th>Blocks and Points</th>
<th>Points Contributed from Opposing Team’s Errors</th>
<th>Attacks and Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>GMU</td>
<td>4.71%</td>
<td>12.30%</td>
<td>31.23%</td>
<td>51.76%</td>
</tr>
<tr>
<td>Penn State</td>
<td>6.55%</td>
<td>10.26%</td>
<td>26.68%</td>
<td>56.51%</td>
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</table>
Simulated Scenarios

- **Scenario 1**: GMU’s teams are able to win at least half of the matches played against their top competitors. (50%)

- **Scenario 2**: GMU’s teams are able to win most of the matches played against their top competitors. (90%)

  - These two scenarios were then compared to the current average winning percentage of GMU’s volleyball teams against their associated top competitor in terms of the transitional probabilities associated with each winning percentage.
# Simulation of Input Data

## Transitional Probabilities

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
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</table>

Design alternatives implementation occurs in the above text file.
Volleyball

- Volleyball is played by two competitive teams, each team made up of six players.

- Involves events such as: serves, passes, sets, attacks, blocks and points.

- With an objective of scoring the most points, the combinations of sequences of these events determines the outcome of games.
Women’s Problem & Need Statement

Problem

- Goal: Win conference championship to qualify for NCAA championship.
- Top competitor in conference is Northeastern (NE) whose win % is 61.4%
- George Mason University (GMU) win % is 47.8%
- Greater variance in their winning percentages than NE.
- Won 3 out of 13 matches against NE between years 2006 and 2012, which is only 23.07% winning percentage against NE.

Need

Over the next 6 years

- Increase their overall conference winning percentage by more than 27.15% to compete, as a top contender, for the lead in their conference.
- Reverse the decreasing trend and maintain consistency by reducing the variance of their winning percentages by about 77.5%.
- Win at least 50% or more of their matches, each season, against their top competitor.
Men’s Problem & Need Statement

Problem

- Goal: Win conference championship to qualify for NCAA championship.
- Top competitor in conference is Penn State (PSU) whose win % is 79%
- George Mason University (GMU) win % is 55%
- Greater variance in their winning percentages than PSU.
- Won 2 out of 26 matches against PSU between years 2006 and 2012, which is only 7.7% winning percentage against PSU.

Need

Over the next 4 years

- Increase their overall conference winning percentage by more than 43.7% to compete, as a top contender, for the lead in their conference.
- Reverse the decreasing trend and maintain consistency by reducing the variance of their winning percentages by about 72.25%.
- Win at least 50% or more of their matches, each season, against their top competitor.
Sample Transitional Probabilities

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<th>From</th>
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Sensitivity Analysis

### Increasing Serve Aces for Team A

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<tr>
<th>Amount of Increase</th>
<th>Current Status</th>
<th>0.1</th>
<th>0.15</th>
<th>0.2</th>
<th>0.3</th>
<th>0.4</th>
<th>0.5</th>
<th>0.6</th>
<th>0.7</th>
<th>0.8</th>
<th>0.9</th>
<th>0.95</th>
<th>0.96</th>
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<tbody>
<tr>
<td>Serve A to Point A</td>
<td>0.0224</td>
<td>0.1224</td>
<td>0.1724</td>
<td>0.2224</td>
<td>0.3224</td>
<td>0.4224</td>
<td>0.5224</td>
<td>0.6224</td>
<td>0.7224</td>
<td>0.8224</td>
<td>0.9224</td>
<td>0.9724</td>
<td>0.9824</td>
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<tr>
<td>Serve A to P/R B</td>
<td>0.8912</td>
<td>0.8000</td>
<td>0.7544</td>
<td>0.7088</td>
<td>0.6177</td>
<td>0.5265</td>
<td>0.4354</td>
<td>0.3442</td>
<td>0.2531</td>
<td>0.1619</td>
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<td>0.0252</td>
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<tr>
<td>Serve A to Point B</td>
<td>0.0805</td>
<td>0.0776</td>
<td>0.0732</td>
<td>0.0888</td>
<td>0.0599</td>
<td>0.0511</td>
<td>0.0423</td>
<td>0.0334</td>
<td>0.0246</td>
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<td>0.0089</td>
<td>0.0024</td>
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### Point Scoring Outcome

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<th>0.4782</th>
<th>0.5097</th>
<th>0.5268</th>
<th>0.5440</th>
<th>0.5789</th>
<th>0.6157</th>
<th>0.6577</th>
<th>0.7058</th>
<th>0.7627</th>
<th>0.8297</th>
<th>0.9089</th>
<th>0.9543</th>
<th>0.9639</th>
<th>0.9812</th>
</tr>
</thead>
</table>

Equation for adjusting probabilities:

\[ W_j = (I - W_j) \left( \frac{W_j^o}{\sum_{i \in I} W_i^o} \right), \quad j \neq i \]
Future Work

• Rank passes, sets and other events to determine bottleneck transitions to attacking.

• Assess first-phase side-out efficiency of the team. This can be done using a similar approach but by treating transitions between two or more events as one state.

• Real-time assessment of opponent’s weakness to determine opportunities to take risks in the game.
Project Management

- WBS
- Project Schedule
- Earned Value Management
- CPI and SPI
- Risk and Mitigation
Work Breakdown Structure

- **0.0 Sports Analytics**
  - **1.0 Management**
    - **1.1 Presentations**
    - **1.2 Reports**
  - **2.0 Research & Analysis**
    - **2.1 Statistical Analysis**
      - **2.1.1 Game & Video**
      - **2.1.2 Coaches Evaluations**
      - **2.1.3 Conference Analysis**
      - **2.1.4 NCAA Analysis**
    - **2.2 Economic Analysis**
    - **2.3 Stakeholders**
    - **2.4 VB Research**
  - **3.0 Development**
    - **3.1 System Design**
      - **3.1.1 Game Model**
    - **3.1.2 Physical Design**
      - **3.1.2.1 Game Model**
    - **4.0 Deployment**
      - **4.1 Game Model**
        - **4.1.1 Preliminary**
        - **4.1.2 Final**
    - **5.0 Results**
      - **5.1 Solution**
      - **5.2 Alternatives**
Project is on track, the team is currently finalizing papers, posters and preparing for upcoming conference presentations.
Earned Value Management

EARNED VALUE MANAGEMENT

- Planned Value
- Actual Cost (AC)
- Earned Value [EV]
CPI & SPI

Cost and Schedule Performance Indexes

- Cost Performance Index (CPI)
- Schedule Performance Index (SPI)
# Risk and Mitigation

<table>
<thead>
<tr>
<th>Risk #</th>
<th>Risk</th>
<th>Timeframe Start</th>
<th>Timeframe End</th>
<th>Risk Level</th>
<th>Mitigation</th>
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<tr>
<td>1</td>
<td>Incompletion of video analysis</td>
<td>12/10/2012</td>
<td>03/1/2013</td>
<td>High</td>
<td>• Implementation of a python parser to accelerate process</td>
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<tr>
<td>2</td>
<td>Simulation errors</td>
<td>12/27/2012</td>
<td>02/15/2013</td>
<td>High</td>
<td>• Testing and validation of results using markov chain hand calculations and official box scores to measure adequate percent error</td>
</tr>
<tr>
<td>3</td>
<td>Sensitivity analysis errors</td>
<td>02/20/2013</td>
<td>03/20/2013</td>
<td>High</td>
<td>• Research proper formula to adjust changes in probabilities</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Ran 10 simulations (5000 runs each) to validate results</td>
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</table>
Lessons Learned

- Identify bottlenecks early in the project plan.

- Develop back-up plans to ensure smooth processing of bottlenecks.

- Conflicts may arise within the group as well as between stakeholders, its important to always find a way to move forward.

- Identify limits of project given the timeframe.

- Communicating ideas to different audiences.
Volleyball Functional Block Diagram Process

Players Performance at Full Potential

Match

Objective

Training

Post Game Analysis

Refine Skills of Existing Players

Training Development

Recruiting Process

Recruiting

Decision-Making Process Based on coaches’ intuitions

Training Development

Refine Skills of Existing Players

Recruiting Process

Players Performance at Full Potential

Post Game Analysis

Match

Objective

Training
Objective

Decision-Making Process
Statistically supported by
Big Data Analysis

Players
Performance at Full Potential

Match

Post Game Analysis

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Recruiting Process

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Refine Skills of Existing Players

Recruiting Process