With the goal of providing quantitative insights for the Duke Women’s Soccer team, we built numerous tools to visualize and quantify player and team performance. Our work culminated in a dashboard containing all the analysis tools which will be available to the coaching staff and players. Below is a sample pre-match and post-match report highlighting the different analyses we developed.

**Pre-Match Report**

**Duke vs West Virginia Mountaineers on 8/17/2023**

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Opponent</th>
<th>Final Score</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022-11-10</td>
<td>Away</td>
<td>West Virginia State</td>
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<td>L</td>
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<tr>
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<td>2-0</td>
<td>L</td>
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<tr>
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<td>1-0</td>
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<td>Oklahoma State</td>
<td>2-0</td>
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</tbody>
</table>

**VAEP Models**

**Top 3 Players’ VAEP Actions**

- Rodriguez
- Vallerand
- Cooper

**Team’s Top VAEP Actions**

- Successful passes to final third
- Touches in box
- Aerial duels won
- Counterpressing recoveries
- Successful defensive duels

**Most Similar ACC Teams**

- Louisville Cardinals
- Virginia Tech Hokies
- Clemson Tigers

**Most Influential Metrics**

- Successful passes to final third
- Touches in box
- Aerial duels won
- Counterpressing recoveries
- Successful defensive duels

**xThreat**

*xThreat: quantifies how effectively an action progresses the ball*

**Radar Plots**

**PCA**

Collaborating with the coaching staff, we developed and collected metrics to quantify team playing styles, which are visualized in a radar plot. From this, we conclude that West Virginia played faster compared to the average Power 5 team during the 2022 season but had fewer counter attacks. We extended this tool to our post-game analysis to visualize how both teams performed compared to the average and how Duke performed compared to Duke’s average. For example, South Carolina had a low number of fast tempo actions.

**Post-Match Report**

**Duke vs South Carolina Gamecocks on 11/21/2022**

<table>
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<th>Opponent</th>
<th>Final Score</th>
<th>Result</th>
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</tbody>
</table>

**VAEP (Valuing Actions by Estimating Probabilities)**

- Quantifies how an action changes the net goal difference within the next three plays

**VAEP (Valuing Actions by Estimating Probabilities)**

- Quantifies the impact of actions on the net goal difference

**xThreat**

*xThreat: quantifies the impact of actions on the net goal difference*

**We can display the most dangerous player connections using a passing network weighted by xThreat. The flow centrality chart illustrates how much of the team’s xThreat an individual player is responsible for, using an electrical current model to quantify important nodes. This demonstrates that Moreau and Vallerand are central to West Virginia’s attack.**