Every Team Deserves a Second Chance: Identifying when Things Go Wrong (Student Abstract Version)

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Appendix

Reduced Vector of Features

As mentioned, we also study a variant of our prediction method, where we use only information about the number of agents that agreed upon the chosen action, but not which agents exactly were involved in the agreement. For that variant, we consider a reduced feature vector $\vec{\mathbf{y}} = (y_0, y_1, \ldots)$, where we define y_i to be the proportion of times that the chosen action was agreed upon by any subset of i agents:

$$y_i = \sum_{k=0}^{||\mathbf{M_j}||-1} \frac{\mathbb{I}(||\mathbf{H_k}|| = i)}{||\mathbf{M_j}||},$$

where $\mathbb{I}$ is the indicator function and $\mathbf{M_j} \subseteq \mathbf{M}$ is the set of world states from m_0 to the current world state m_j.

In order to show that we can also have high quality predictions with a much more scalable representation, we also run experiments using the reduced feature vector for all 3 teams. In Figure 3 we can see the results when predicting in the end of the games with the reduced feature vector. When comparing the results with the full representation, we notice that the accuracy does not change much for *diverse* and *intermediate*, and the difference is not significant ($p = 0.9929$ and $p = 0.8403$, respectively). For *uniform* we observe an improvement in the accuracy of 4%, but such improvement is also not statistically significant ($p = 0.2867$).

In Figure 4 we can see the prediction at each stage of the game, again comparing with Perfect's evaluation. As we can see, we can also obtain a high accuracy quickly with the reduced feature vector, reaching 60% again towards the middle of the games. This time, there is less difference in the accuracy for the *diverse* and *uniform* teams, but we can still show that the accuracy for *diverse* is significantly better than for *uniform* (with $p < 0.1$) in 15% of the stages (20% including a stage where $p \approx 0.1$). Note that, again, the accuracy for the *intermediate* team is close to the one for *uniform*, even though *intermediate* is a significantly weaker team.

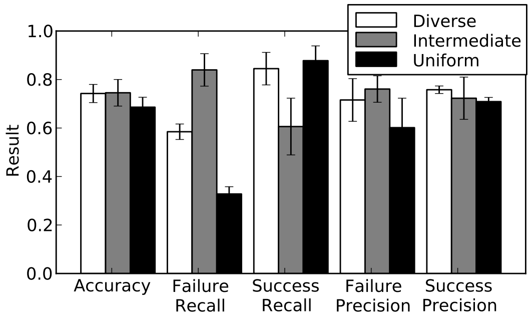
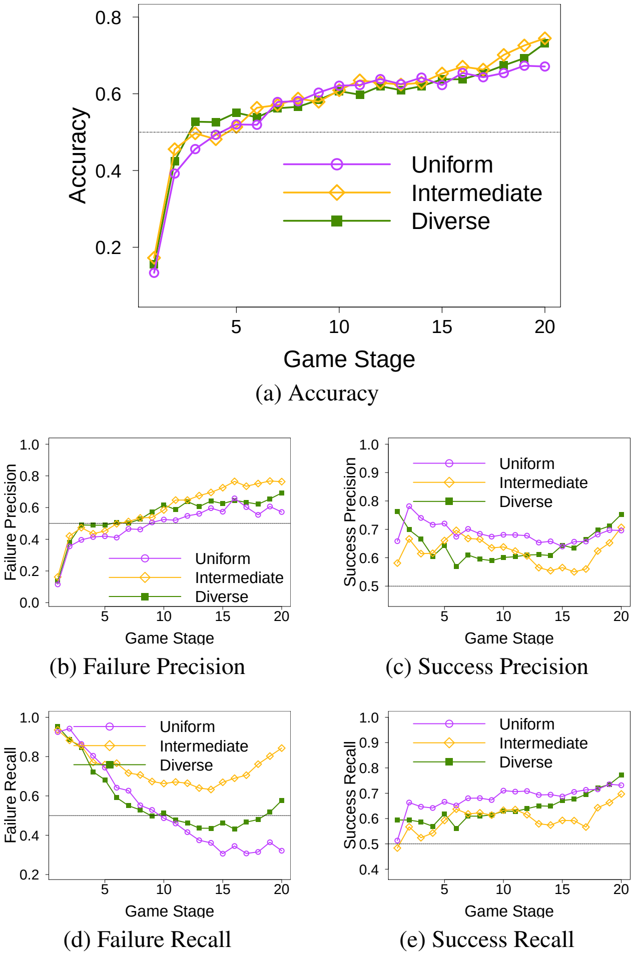


Figure 3: Performance when predicting in the end of games, using the reduced feature vector.



(a) Accuracy

(b) Failure Precision

(c) Success Precision

(d) Failure Recall

(e) Success Recall

Figure 4: Performance metrics over all turns of 691 games, using the reduced feature vector.