**Objective**

This project aims at developing a system that can learn human motion, and apply the learnt models to analyze how to improve performance for a given motion stream.

**Key Questions**

- How to learn the relation between motion streams and performance?
- As this relation is evolving, how to design an online learning algorithm to learn the evolution?
- Provided models of motion streams with different performances, in which way does the system provide feedback to learners so that they can improve performance effectively and efficiently?

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**Feasibility Study: Improve Darts Performance**

To teach a player to play dart better is an application of the system shown in Figure 1. In the scenario of playing dart: human is substituted by a player; the player throws a dart (Action) to a dartboard (Environment) and gets score (Reward); machine receives player’s dart throw and scores, and provides feedback to the player.

**Dataset and Scoring Rule**

In this study, we first collect 1853 dart throws from a player with the five features of dart throws with different scores. The x-axis indexes five features: 1. Location of first valley; 2. amplitude of first valley; 3. amplitude of peak; 4. location of second valley; 5. amplitude of second valley. The y-axis collectively denotes values for position and amplitude depending on attributes in x-axis.

**Characteristics of Dart Throw With Different Performance**

The mean and standard deviation for five features of dart throws with different scores. The x-axis indexes five features: 1. Location of first valley; 2. amplitude of first valley; 3. amplitude of peak; 4. location of second valley; 5. amplitude of second valley. The y-axis collectively denotes values for position and amplitude depending on attributes in x-axis.

**Evolution of Latent Force**

After confirming Style 5 matches the feedback, we collect another set of 360 dart throws when the same player plays dart using Style 5. The proportion of 3/4 is 20.56%. Compared with 16.05%, the best performance over 10 training days, his performance is improved by 28.1%.

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**Conclusion**

In this research, we attempt to study the feasibility of developing an intelligent system that can help human to improve performance. Results on improving darts performance indicates the feasibility of this system.