Reinforcement & Feedback based Personalization System

We are looking to personalize the play style required by a game based on “actions” taken by the player or “signs” of preference for a particular play style. So we follow a simple feedback mechanism to ensure that the game morphs itself to provide the experiences expected by each player.

Terminology:

- *Output*: The personalized feature of the game. For simplicity, the personalization will be categorized as positive or negative.
- *Intent*: The personalization determined by the game AI to cater to the player. Keep in mind this is not the actual personalization itself it is merely the personalization determined by the game to be most suited to the player.
- *Feedback*: Indication if the player exhibited the intended playstyle given personalization of the scenario.

Steps:

1. Determine personalization based on probability-based function.
2. Implement the personalization for a level.
3. Measure metrics of the player relevant to the personalization.
4. Reconcile after the level ends to determine the new weightage of personalization

Probability-Based Determining Function

Keep in mind that this system is merely for two personalization outputs positive and negative. So the personalization to be implemented is determined through a probability using the sigmoid function of the total reward which starts at 0 (P = 0.5).
Now the total reward is updated at each stage in the following manner:
Note: *Intent -> -1 or 1, Feedback -> -1 or 1, and Output -> -1 or 1. Weightage -> increment of total reward, and the Multiplier is for reward in extreme conditions.*

- Intent == Feedback
  - Intent == Output
    - Increase total reward by Intent x Weightage
  - Intent != Output
    - Increase total reward by Intent x Weightage x Multiplier
- Intent != Feedback
  - Intent == Output
    - Decrease total reward by Intent x Weightage
  - Intent != Output
    - Decrease total reward by Intent x Wegihtage x Multiplier