PROBABILITY IN VIDEO GAMES

Sid Meier publicized at the Game Developer's Conference in 2010 that player's risk-estimation in probability based video games, does not always align with the actual probabilities supplied by a game (See [3]). In the case of Sid Meier's Civilizations, their play testers expected to win on three to one encounters, even though they statistically had 25% chance of losing. Furthermore testers reported that streaks of unfortunate results in two to one encounters seemed to be non-intended gameplay. The problem is grounded in the player's biased perception of probability that can be attributed to a number of psychological effects, including the 'gambler's fallacy' and the 'hot-hand fallacy'.

This project will try to see if Sid Meier's results can be reproduced in another probability based game. The game will implement four different modes of representing risk of an action in a game. The first representational strategy is verbal probability (e.g.: "*Likely* to succeed.") which is known for its ability to convey either vague or animate probabilities [1]. The second representational strategy is numerical probability, as percentage (e.g.: "60% chance to succeed.") or frequency (e.g.: "Averaged, 6 out of 10 attempts will succeed."), which is known for its ability to convey precise or inanimate probabilities [1]. A graphical representation is also considered.

To measure the emotional impact of the outcome of the probability based actions used in the game, the Regret and Disappointment Scale (RDS) explained in [2] is used to assess the regret and disappointment experienced in association with player actions which has only a chance of succeeding. This measure of emotional impact can then be used to compare the different representations against each other, to see whether one is better at giving players insight and understanding of the choices they make, and the outcomes they lead to.

Further research could then focus on whether skewing the representation to match player expectations, will make them less disappointed and regretful of their actions. This could include a memory management of past outcomes so that if an unfavorable outcome has happened recently, it could either secretly or as an integrated part of the game continually increase the chance of success until a favorable outcome is achieved.

LITTERATURE

[1] Du, Xue-Lei, Liu, Shi-Hong, Xu, Jie-Hong, Rao, Li-Lin, Jiang, Cheng-Ming and Li, Shu, (2013), When uncertainty meets life: The effect of animacy on probability expression, *Judgment and Decision Making*, 8, issue 4, p. 425-438, http://www.sjdm.org/home/baron/public_html/journal/13/13120/jdm13120.html.

[2] Marcatto, Francesco and Ferrante, Donatella, (2008), The Regret/Disappointment Scale: An instrument for assessing regret and disappointment in decision making, *Judgment and Decision Making*, 3, issue , p. 87-99, http://journal.sjdm.org/bb8/bb8.html.

[3] Meier, Sid (2010), Everything you know is wrong, Game Developers Conference 2010, Keynote Speaker.