WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

Research Seminar Series | Department of Marketing | WU Vienna

Puneet Manchanda, University of Michigan

June 23rd, 2016 | AD.0.090

"Just One More Level": Leveraging Skill & Engagement to Maximize Player Retention in Online Video Games

Abstract: An important factor that affects player retention rate and player lifetime value in multiplayer online video games is how players are assigned to available game rounds. Traditional matching algorithms currently used in most online video games either match players randomly, or use simple assignment rules such as matching players with similar skill levels into the same round. In this study, we propose a novel two-stage data analytic modeling approach, combining statistical methodologies with optimization techniques to maximize player retention. In the first stage, we build a Hidden Markov Model (HMM) to capture the evolution of players' latent "engagement" state and the state-dependent participation behavior. We then calibrate the HMM using a longitudinal dataset obtained from a major international video gaming company, which contains detailed information about 1,309 randomly sampled gamers' playing history over a period of 29 months (more than 700,000 unique game rounds). The estimation results from the HMM provide rich insights about how players' engagement state evolves as a function of total scores they collect in each period and how frequently their rank "levels up." In the second stage, we design and implement a "greedy" algorithm we call "learn and exploit matching" that has player retention maximization as its objective. It uses the estimated HMM parameters to generate predictions vis-a-vis gaming behavior and then matches each player to a game round that is the most promising in guaranteeing that the player will be in the high engagement state in the next period. Our benchmark analysis shows that, relative to the current practice of random/skill--based matching, the proposed algorithm improves the average number of active periods (periods in which a gamer plays the game) by up to 27%. In terms of the expected total number of rounds played, our algorithm can produce an up to a 30% improvement.