Patterns of Videogaming Experience: Implications for Game-Based Training

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Videogames are increasingly being used in military training.

The value of these tools is dependant on trainees’ motivation and ability to master interface characteristics. Prior experience with similar games has been shown to affect learner self-efficacy and motivation in game-based training environments (Orvis et al, 2005).

Beyond the most gross-level classification schemes, there is little agreement about how to classify game genres. Moreover, we do not know which game characteristics are relevant in assessing prior experience.

**Research Question:**
Can we use aggregated purchasing behavior to detect game genres and their relationships to one another?
The success of videogame-based training environments relies on learners’ motivation and ability to master game play mechanics. Understanding gaming experience and preference may enable us to predict training tool efficacy and detect the need to provide various types of pre-training instruction. Simply asking learners whether they play videogames is insufficient. We do not have a good understanding of how various types of videogaming experience predict performance and motivation in new games.

For example:

–Does chess playing experience impact performance in strategic war games?
–Would we expect players of slow turn-based war games to be interested in fast-paced first-person war games?
–Are all First-Person Shooters catering to the same audience?

If we can understand game preferences, we can inform training game implementation.
There are a variety of classification schemes for video games, each created for a particular purpose. Some focus on game audience (e.g., age group), interaction style (e.g., first- vs. third-person perspective), subject matter, or even narrative theory.

Each of these classification schemes has strengths and weaknesses, and unlike most types of classifications in psychology (e.g., personality, psychological disorders), the types of games available change as computers get more powerful, necessitating regular recategorization.

In this poster, a data-driven approach is taken. By examining aggregate game purchasing data from Amazon.com, we can discover patterns of purchasing behavior that may allow us to classify games without relying on top-down preconceptions about how games should be categorized.
Method

• Used the Amazon Web Services (AWS) API to access their computer and video game catalogs.

• Starting with the #1 seller on 10 January, 2006 (Civilization IV), conducted a breadth-first snowball sample of games based on similarity (“Customers who bought this item also bought…”)

• Retrieved 2,897 unique games connected in 17,146 ways. In this poster, we focus on the 1,841 Windows games, connected in 12,568 ways.

• Used the data to construct a series of undirected network graphs.

• Iteratively applied community detection algorithms (Newman, 2004) to determine game genres. (Newman’s (2004) fast algorithm for community detection applies an agglomerative hierarchical clustering algorithm designed to optimize for “Modularity” in a network.)
Data Collection

Name and Platform

Co-Purchased Games

Amazon Categorization

Call of Duty 2
F.E.A.R.

Battlefield 2

Age of Empires 3
Guild Wars
All Windows Games

Major Game Genres

- Cluster Name (Number of games).
- Vertex size reflects genre size
- Line width reflects strength of connection.
Example Sub-Genres

Card Games, Business, World Builders
- Less intense game play
- Single-player vs. Competitive

First Person Shooters and War Games
- Two types of First Person Shooters
- Perspective (FPS) vs. Domain (Military)
Discussion

• Aggregate sales data can be used to detect game genres
  – Results are intuitively meaningful
  – Different than other classification schemes

• Games cluster on a variety of characteristics
  – Interface style / Pace
  – Subject matter
  – Franchise / Brand name
  – Age range

• The relationship between game clusters is meaningful
  – We can look at relationships between game genres to predict game preference / experience
Future Directions

• Application of the existing data
  – Predict game play behavior and preferences
    • Determine an individual’s training game readiness
    • Inform development of pre-training protocols
  – New classification schemes
    • Statistically evaluate other classification schemes
  – Instrument creation
    • Assess game play behavior and preferences
  – Inform theories of game categorization
    • Features

• Collect additional data
  – Interviews and surveys
  – More complete data sets (beyond top N co-purchased games)
