Review of Esports and Video Game Research with Analysis of "Among us" Game Casting

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ABSTRACT

Although research in esports is getting more attention, both in quantity and in scope, the number of publications is still low compared to other important themes. This article aims at introducing researchers from different fields to esports research, thus inspiring more interdisciplinary research regarding this exciting topic. In addition, the article analyzes the currently popular game of "Among Us" in the context of law and criminology. Along this direction, online game streaming and casting are suggested as a means for data collection in qualitative research.

Keywords: Esports; Qualitative research; Game streaming; Game casting, Artificial intelligence (AI)

1. INTRODUCTION

Around the beginning of this millennium, video games have established themselves as a new kind of sports, called esports. Instead of playing for fun, video games become more competitive and serious. For some researchers, they are not only serious, but also interesting enough for research.

When watching esports games or video game streaming, we are often awed by players' hand-eye coordination as well as their speed of thought. We may feel that we cannot make it that way ourselves. How can we research about it?

For the moment, let us put aside the aspect of hand-eye coordination and focus on the strategy aspect of the game. As researchers, we have time to observe and analyze the essence of the games we choose. Once the essential principles are within our grasp, we can choose which moves to make and when to make them. Then we can imagine developing computer programs in order to beat the best professional game players, in the same way IBM's Deep Blue beat Garry Kasparov in chess or DeepMind's AlphaGo beat Lee Sedol in Go.

Although research in artificial intelligence (AI) or informatics mentioned in last paragraph is probably one of the first area of esports research that one can think about, most research are in other disciplines. According to Table 1, until the year 2018, esports research publication in the field of informatics accounted for only one-fifth of the whole esports research corpus. The field of media studies took the largest proportion with 24.7%, business came third and sports science came fourth with 17.3% and 13.3%, respectively. If we combine sociology and law together as social science, they took as much as 18% proportion [1].

Table 1 Distribution of Esports Research Corpus Per Area of Study Through March 2018 [1]

Discipline	Number of Publications	Percentage of Corpus (%)
Media Studies	37	24.7
Informatics	30	20
Business	26	17.3
Sports Science	20	13.3
Sociology	15	10
Law	12	8
Cognitive Science	10	6.7

We can also see that, with a common theme of esports, various disciplines with different research methodologies are involved. In this article, however, we focus on qualitative research, discussed in detail in Section 5. Prior to that Section, the growth of esports, different types of esports and gamers, as well as some inspiring AI research are discussed in Sections 2-4.

In Section 6, the author chooses one of the most currently popular game, "Among Us," as a special case and discusses a possible research direction in law and criminology in Section 7. In Section 8, the author proposes the use of game streaming and casting as a data collection method for qualitative research with an example. Then, the last section concludes this article.

2. THE GROWTH OF ESPORTS

Nowadays, the video game industry is one of the most steadily growing markets, gaining hundreds of billion dollars each year with the growth of approximately 6.2% [2].

High-speed communication in the Internet has enabled real-time online gaming and high-quality live streaming of videos. This leads to the emergence of new professions, such as e-sportspersons and video game casters. Like traditional sportspersons, e-sportspersons compete with one another in sporting events, from which they receive prize money. Video game casters, on the other hand, functions like sports commentator who explains the audience what happens in the game. Some casters in YouTube channels can even make comments about their own games while they are playing non-competitively.

World Cyber Games (WCG), sometimes called Esports Olympics, had been held for two decades since the year 2000 and become more popular each year until the year 2014, when it was halted. The event re-established itself in 2019 in Xi'an, China. This year, the event took place online due to the COVID pandemic. Apart from WCG, there are popular North American events such as Championship Gaming Series (CGS) and Major League Gaming (MLG) [3].

Figure 1. World Cyber Games 2004 at the Bill Graham Civic Auditorium in San Francisco. [4]

3. GAMERS, GAME STREAMERS, GAME CASTERS, AND ESPORTS VIDEO GAMES

"Gamers" is the word used for those who play video games, often as their profession. Other two technical terms widely used are game caster and game streamer. Game streamers are gamers who live broadcast their games while playing. Unlike game streamers, game casters may do more than them by recording the games into interesting videos available online, e.g., in YouTube.

Good casters have their unique style of narrating their games to make audience more emotionally engaged. They also edit their videos to make them more interesting. It is not unusual for a famous caster to be viewed millions of times on YouTube within a few days after publishing his or her videos.

Not every popular video game is suitable for esports. Video games is a generic term used for all types of games played on and used by some kind of screen. Among a vast amount of video games developed, only some are selected for esports tournaments. Examples of established esports games include SC2, CS:GO, Halo 4, SSF4, LoL, and FIFA12 [5]. Based on their study on the next generation of esports infrastructure, Rai and Yan gave the following conclusion [6].

"Usually, e-Sports put a higher demand on the players' abilities than common computer games, not only superb coordination capacity between hands and eyes, rapid response capacity and skillful handling capacity of mouse and keyboard, but also complex strategic and tactical thinking ability."

4. ROLES OF ARTIFICIAL INTELLIGENCE (AI) IN VIDEO GAMES

In December, 2017, AlphaZero (AZ), a computer program developed by an AI research company named DeepMind, showed that it could teach itself to beat best players in chess, Go, and Shogi. Note, however, that all of the aforementioned best players in three games are not human beings. They are all computer systems named Stockfish, elmo, and AlphaGo Zero, respectively.

The supremacy of artificial intelligence (AI) in board game starts with the breakthrough achieved by Deep Blue, a chess playing computer developed by IBM. In May 1997, Deep Blue became the first computer to beat the reigning world champion, Garry Kasparov, in chess. This win was seen as a sign that artificial intelligence was catching up with human intelligence [7].

DeepMind stated in its preprint, "The game of chess represented the pinnacle of AI research over several decades. State-of-the-art programs are based on powerful engines that search many millions of positions, leveraging handcrafted domain expertise and sophisticated domain adaptations. AlphaZero is a generic reinforcement learning algorithm – originally devised for the game of go – that achieved superior results within a few hours, searching a thousand times fewer positions, given no domain knowledge except the rules [8]."

In May 2017, AlphaGo did similar thing to Deep Blue by beating the world champion Ke Jie, but this time the game was Go instead of chess [9]. In the same year, deep reinforcement learning is applied to "Doom," a more complicated, 3-dimensional, first-person shooter video game [2], [10].

Figure 2. World Cyber Games 2004 at the Bill Graham Civic Auditorium in San Francisco. [11]

In addition, if we consider some other strategic video games, such as "Among Us," we can easily see that the complexity far exceeds the board game of Go and chess. To begin with, the problem formulation is much more difficult because there are several ways to win the game. The player can move almost arbitrarily as opposed to the regulated move within designated square.

Therefore, since the board game is now completely conquered, it is interesting for AI to enhance its research horizon to more complicated video games.

5. QUALITATIVE RESEARCH AND ESPORTS

Qualitative research is an important research type with established and reliable methodology, applicable to a large span of disciplines. In Table 1, almost all disciplines of esports research publication relies heavily on qualitative procedures.

There are several strategies of inquiry used in qualitative research. Creswell discussed five of them, namely, ethnography, grounded theory, phenomenological research, narrative research, and case studies [12].

5.1 Research in Business

The business discipline concerns exploring motivations for esports consumption, understanding the networks and organizations surrounding players, and designing effective marketing techniques. The esports research publications are found in quantitative approach using surveys and case studies as well as qualitative one using grounded theory as the strategies of inquiry [13], [14], [15].

5.2 Research in Sports Science

Most qualitative research of esports in sports science use case studies as the strategies of inquiry. For example, Rambusch, Jakobsson, and Pargman [16] conducted interviews with players at World Cyber Games (WCG) and discussed important elements shaping and influencing gameplay in Counter-Strike on four levels: player actions during play, interactions within and between teams, players and fans on the Internet, and the Counter-Strike gaming scene [1].

5.3 Research in Cognitive Science

Research in cognitive science and psychology focuses on player performance as well as cognitive and behavioral differences between novices and experts. The qualitative research works use case studies and grounded theory as the strategies of inquiry. They collected data from naturalistic observations to better understand the cognitive processes required for competitive play [17], [18].

5.4 Research in Informatics

Qualitative esports research is not the majority in this field. Many publications focus on developing sophisticated processes of data collection using information technology, including physiological data collection [19], text mining [20], and players' input from esports matches such that the data can later be used for machine learning [21].

However, qualitative investigation using case studies and collecting data from interview can be found in [22], [23]. In [22], Freeman and Wohn interviewed esports player to understand how they give and receive social support among themselves. In [23], the researchers conducted interviews of esports players to provide qualitative context for their quantitative findings, the performance metrics in the LoL game.

6. CASE STUDY: AMONG US

In order to study strategies used in video games, we focus on "Among Us" due to its popularity. The popularity partly stems from its appeal to human intuitive mechanism of finding out who belongs to our side, whom we should trust and who lies to us.

Just imagine yourself with a group of astronaut colleagues in a spaceship with two serial killers and try to survive. You feel terrified, don't you? That's the essence of the game "Among Us," in case you are chosen to be a "crewmate" (good guy). If you listen to game casting, you'll often hear such things as "will he kill me?" or "that guy walks strangely." But since it is just a game, these words are somehow spoken while laughing at the same time.

"Among Us" is a game of 4-10 players of which objectives can be briefly summarized as follows. A spaceship consists of crewmates and imposters. If you are imposters, you win by killing all crewmates. If you are crewmates, you win by completing all tasks or vote out all imposters. For crewmates, you can discuss with other spacemen to find out who imposters are. This, however, can only be done in two occasions, either when a corpse is found or an emergency button is pressed. Note that the roles of crewmates and imposters are randomly assigned just before the game starts.

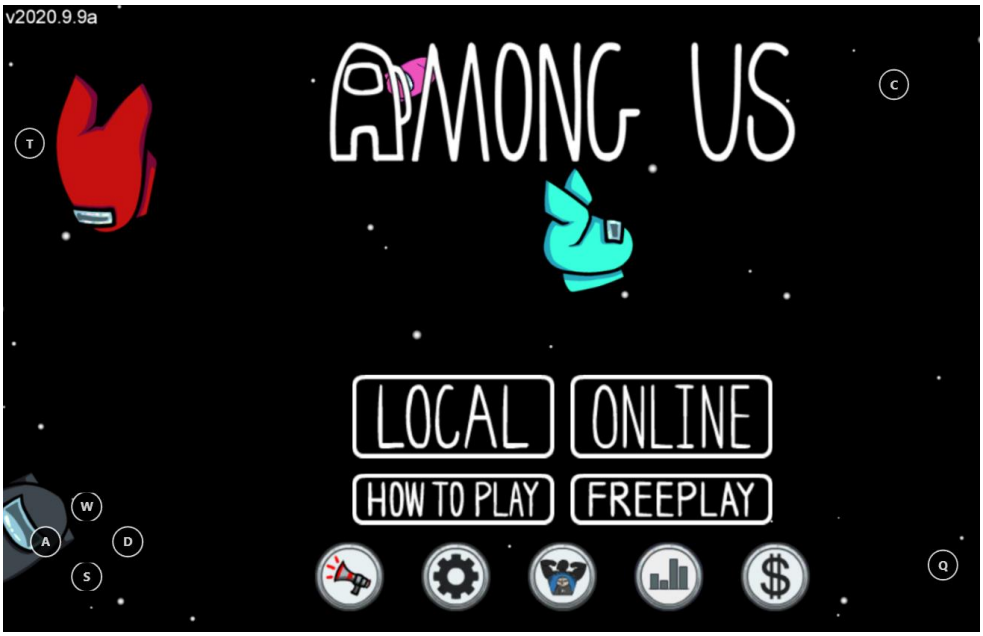

Figure 3. Capture of "Among Us" Introduction Screen.

7. AMONG US' RELATIONSHIP TO LAW AND CRIMINOLOGY RESEARCH

In "Among Us," once a corpse is reported or the emergency button is pressed, all players can discuss about the situation and decide whom will be voted out of the spaceship. The discussion can resemble a non-traditional courtroom where everybody can simultaneously be the prosecutor, defendant, lawyer, detective, witness, and judge. However, when a group of players play together so many games, they will become attached to a specific role. Any behavior that is deviant from that role will be suspiciously observed by others, for example, a "detective" who suddenly stops asking questions in a particular game.

In research related to criminal interrogations and crimes in the court, game theory is frequently applied to analyze the players' rational choices in strategic situations. In "Among Us," as players discuss about which players should be voted out, each player's welfare depends on his/her as well as other players' strategies, words, and actions.

In the following, we will summarize the essence of real-world crime, comparing it with that in the game "Among Us."

7.1 Asymmetry of Information

In real-world criminal interrogation, there is asymmetry of information among different parties involved. For example, guilty suspects know that they have committed the crimes, whereas innocent suspects know that they have not. The police, on the other hand, may or may not be able to distinguish guilty suspects from innocent ones. Even if the police know who is guilty, they have to present the evidence to convince the trier of fact in the interrogation [25].

In "Among Us," there is similar asymmetry of information to that in real-world criminal interrogation. Additionally, the game imposes more asymmetry by allowing the imposters more visual range than normal crewmates. The imposters can even turn off the light (which any crew can later turn on) to further limit the visual range of crewmates.

There are two ways that an individual crewmate can certainly know the identity of an imposter. The first, of course, is to be near enough to the crime scene when the murder takes place. Secondly, if the murder is committed near the camera, the crewmates can see it from the monitor room.

If a crewmate does not see the murder, either at the crime scene or in the monitor room, he at least has some ways to identify fellow crewmates, thus reducing the number of potential imposters. The first is by having an alibi, in case one can make sure that some fellows are with them all the time when the murder occurs. Secondly, the game allows a few crewmates a privilege of being able to scan their identity. If all crewmates with such a privilege go to the scanner together, they all will know that imposters are not among them.

At the start of the game "Among Us," everybody is a suspect. As the game proceeds, someone has been killed and some meetings have taken place, some players will become more suspicious than others. Some players, including imposters, may take the police role by asking more questions than others, but his or her role can be switched to suspects at any time if the evidence suggests.

7.2 Asymmetry of Information

In real-world criminal Apart from having more information regarding the crime, the guilty suspects or "imposters" know more than others about the available or potentially available evidence. Therefore, they know roughly in advance what the witnesses will say. Innocent suspects cannot predict this due to their innocence [25].

In "Among Us," let us consider an innocent suspect who did not report the corpse by him/herself. In this case, he or she cannot even know for sure which useful alibi can be given.

The one who reports the corpse location may lie about it for some reasons. For example, the reporter who is not an imposter may lie about the location in order to confuse the imposters. (In one Among Us match observed by the author, this strategy worked so well that it made the imposter exclaim "How can that be?" after the reporter gave false murder location. The poor imposter is then voted out due to his remark.)

7.3 Possible Research Questions

The above analysis may lead to the following research questions: Which methods of interrogation are used to find imposters in the game? How effective and efficient are such methods? Comparing these methods with real-life criminal interrogations used by police or jury in the court, what are similarities and differences? Also, by observing interrogation methods in the game, what insight can be applied to real-life criminal interrogations?

8. AN EXAMPLE OF DATA COLLECTION FOR QUALITATIVE RESEARCH FROM GAME CASTING OF "AMONG US"

To quote from Creswell [12], "The idea behind qualitative research is to purposefully select participants or sites (or documents or visual material) that will best help the researcher understand the problem and the research question." In this case, we select to observe "Among Us" games played by a famous group of Thai gamers who have been playing together for more than a year. They regularly stream their plays online via YouTube with more than one million views per clip. After playing, each individual player usually edits the streamed video and publishes the edition on his/her own YouTube channel. These videos are therefore perfect qualitative audio and visual materials for research. The researcher can investigate them both

objectively as well as subjectively, since these gamers are also very good at expressing their inner thought while playing games.

In this article, the author takes a note from a situation in the game when the players are discussing who should be voted out of the spaceship. For the sake of readers who might not be familiar with the game, we take a simple example that can be understood easily.

Figure 4. Screen Capture As Sometimes Kills Zylnazter. [26]

Situation: Sometimes killed Zylnazter right before MISTERHE4's eyes. Sometimes reported the corpse himself as if he was innocent.

Discussion

MISTERHE4: Well, Tae (Sometimes' real name).

Sometimes: What I want to report is …

MISTERHE4: Do you have something to tell me?

Sometimes: Did you see something? I…I…

MISTERHE4: Keep talking. Make it reliable, though.

Sometimes: Let me ask first. Who walks past me a moment ago from the camera room? Is it Es (Arifeenz's real name), right?

MISTERHE4: The green one.

NongPat: Es and James.

Sometimes: Did you see like what I saw?. It is Ake (MISTERHE4's real name), right before my eyes. What have you done, Ake?

Jamezconer: Calm down. What happened?

(Sometimes and MISTERHE4 told their stories while accusing each other)

MISTERHE4: The one who could do this was Tae (Sometimes' real name). If it had been me, I would have reported the corpse myself.

Sometimes: I see. And you would have blamed me, right?

MISTERHE4: Yes, but it is you in reality. Why do you have to do this to me?

Result: Sometimes is voted out of the spaceship with three votes. MISTERHE4's got two votes.

Interpretation: MISTERHE4's last three sentences are one of the factors in the decision to eject Sometimes out of the spaceship. To report the crime for which one is guilty is one way to direct attention to someone else. This strategy does not work this time, but it might work in other situations.

Figure 5. Screen Capture As Sometimes Is Being Voted Out. [26]

Figure 6. Screen Capture As Sometimes Is Ejected Into Space. [26]

It can be seen from the case study of Among Us that, while game casting and streaming conveniently provide us qualitative audio and visual materials, it is important to code and interpret in a suitable way such that useful knowledge is derived and irrelevant information is discarded.

9. CONCLUSION

With the current trend, research in esports and video games are expected to continue increasing in scope and number. In this article, several research disciplines of which some attention are drawn to esports are discussed. Although our case study just shows how a simple game of "Among Us" can be researched in a particular discipline, there can also be several related fields of research. For example, one might think about the area of game theory and focus on the tactics used to support one's own strategy as well as destroy the opponent's.

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