Sentiment Analysis on Game Reviews

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Abstract

Sentiment analysis(SA) is the measurement of positive and negative language. It is one of the fastest growing research areas in computer science. SA uses natural language processing. This article shows, how Sentiment Analysis or the classification of opinions is used in a text and relationship between those words in the domain of video games. This technique is done by collecting a significant corpus of online video game reviews from popular sites. Furthermore, exploring whether existing theory in the form of comprehensive gaming classification suitably finds the issues that players raise when they review games. Results are found to be supportive to old classifications that where used in game reviews [2]. Players often reviewed video games by: a) whole game; b) comparing it with other games; c) judging the values of games in terms of money, time and effort.

Keywords

game reviews, sentiment analysis, NLP, NLP techniques, game classifications, corpus and video games.

Introduction

Natural Language Processing (NLP) refers to AI method of communicating with an intelligent systems using a natural languages such as English. This process is done when you want an intelligent system like to robot to perform as per your instructions. The input and output of an NLP system can be speech and written text [7]. Games could benefit from NLP's sophisticated human language technologies in designing natural and engaging dialogues to bring novel game experiences [8], or in processing texts to conduct formal game studies. Games with NLP techniques are fast growing nowadays.

Why Games ?

Games are often touted as an engaging and enjoyable medium. Nearly 155 million Americans played computer games in 2015. The average age of gamer is 35. The average number of years gamers have been playing games is 13. That’s the same amount of time most students spend from pre-school through high school graduation. That’s quite a lot of gaming education! And video game industry has, in terms of revenue, surpassed the movie, music, and television industries (Entertainment Software Association, 2015). This growth and enthusiasm is mirrored in the growing community surrounding these games, which now consists of people of all ages and from all continents who are collectively investing millions of hours and billions of dollars in this hobby (figure 1).

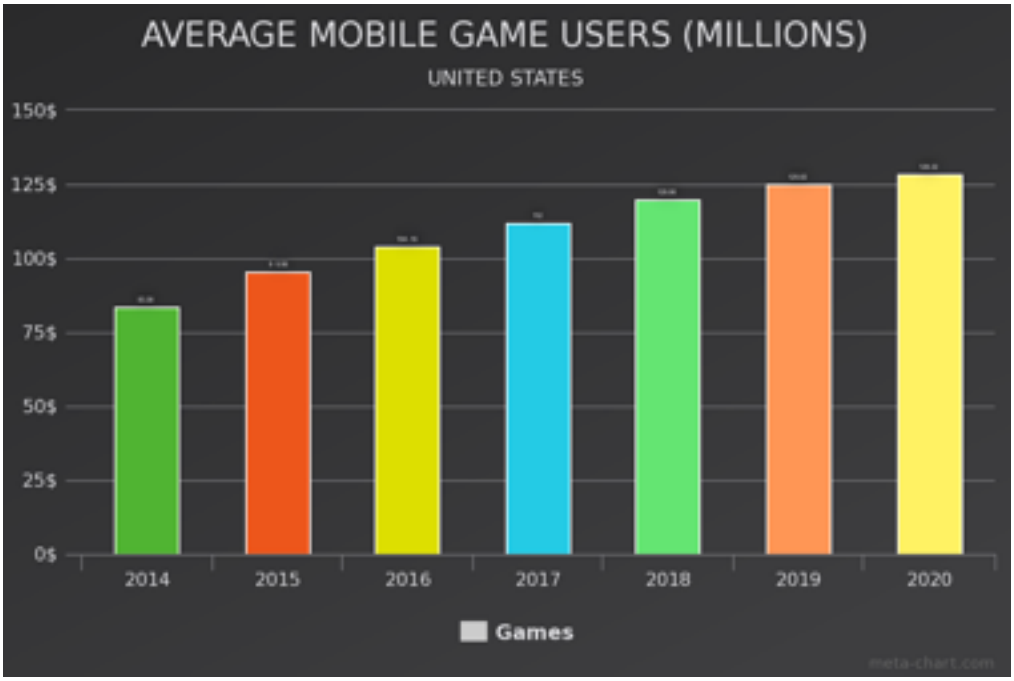

Figure 1. Game Stats

From the above figure1, it has been found out that females outplayed males in the year 2015. These details come from a popular game website [6]. Most of the research is done on commercial games (as opposed to games developed by researches). Men were 47.82 and women were 49.36.

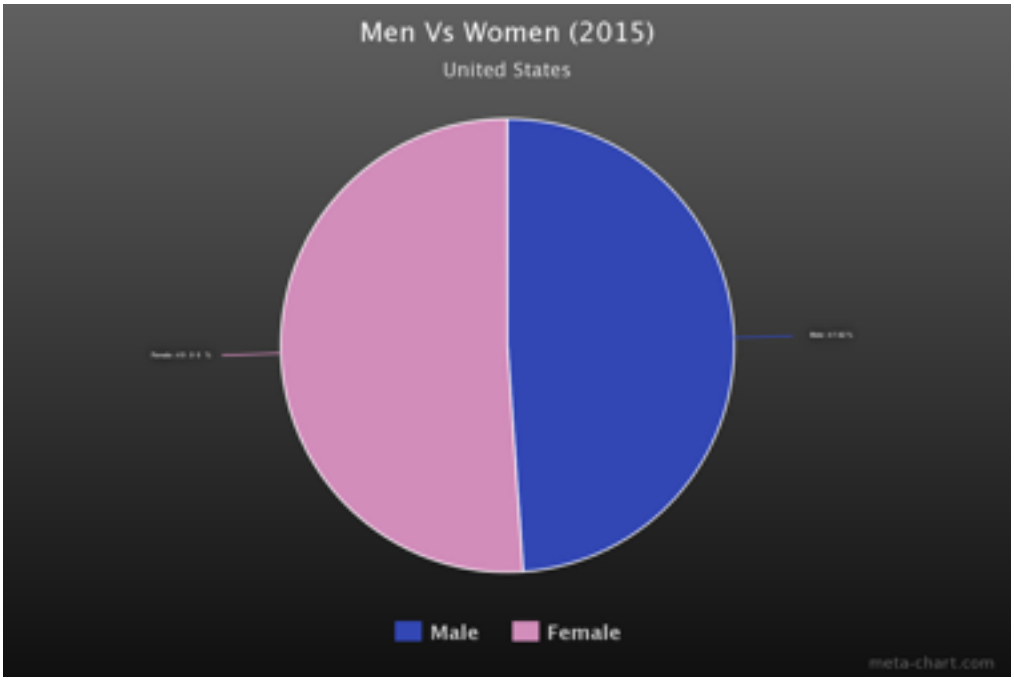

Figure 2. Gender in Gaming

This article explores how NLP can be used to identify use of language. The language is consider to be text of input from human's natural language. It also discusses the techniques that can be used in game studies research by analyzing a significant corpus of game reviews.

What are Game Reviews ?

Player-generated reviews of video games represent a large, rich, and under-explored source of data for exploring what makes for an effective game. These user-submitted game reviews were coded along the dimensions of the comprehensive gaming classification to test the frequency of usage of each dimension. Video Game journalism (VGR) plays a major role in development of video games. VGR is concerned with the reporting and discussion of video games [9]. As a result, Game companies and developers are now reaching out directly to quasi-amateur enthusiasts as a better way to build their brands, both because the gamers are more influential than the gaming journalists, and because these enthusiasts have far better relationships with their audiences than gaming journalists do. The growth of World Wide Web has made a massive change to video game industry. Huge number of user-submitted game reviews are available online as a resource for an analysis. Some popular websites are VideoGameGeek, GameSpot and IGN have huge amount of game reviews submitted by their users. [10] found that students taking video game-related classes will often, when asked to describe, analyze and talk about specific games, and write in a tone and style evocative of the game reviews they are familiar with. Most of games played in United States are rated by ESRB (Entertainment Software Rating Board) that assigns age and content ratings for video games (Figure 3).

Figure 3. ESRB Ratings

The ESRB maintains a code of ethics for the advertising and promotion of video games—ensuring that marketing materials for games are targeted to appropriate audiences.

Increasingly, professional and amateur reviewers are taking to the Internet to share their opinions of and experiences with games. For example, by 2012, Gamespot.com had accumulated over 29 million reviews on over 12,000 video games [5]. Review data on sites such as GameSpot, IGN , and VideoGameGeek represent very large corpora of ecologically-valid experiences generated by gamers, who have considerable experience playing and interacting with games.

Literature Survey

A classification specifically created to describe the most important features of video games (Action language, control, environment, game fiction, rules, human interaction); In doing so, we hope to better understand if current theories of game design and game features, as represented in classification, are rich enough to capture the experiences and reviews of actual gamers. The few studies that have used game review data come from studies of commercial gaming, and those studies were conducted to understand disparate topics, including the readability of reviews [1], salient features of game reviews [1] [10], usability [5].

Related Works

Many recent game studies have showed that NLP can be used to find patterns and themes in text. Researchers using Natural Language Processing approaches on game reviews have investigated such issues as the readability of reviews [1] [10], the positive and negative sentiments contained in reviews [1] [10], the aesthetics of game play [1], the similarity between games [1], cultural differences in game appraisal [1], and the use of adjectives in game reviews [5]. Two NLP studies are of particular interest because they directly explore specific features that users find salient when reviewing games. [1] investigated the aesthetic language used in reviews, and [5] examined typical adjective groupings in game reviews. Some of the techniques used in these researches studies are text splitting, where text is divided into single sentences (“sentence-based”) and words (“words-based”) or ver short texts from a single source. In order to use this process, sentence should be reasonably short and not too complex. The Oxford Dictionaries serves well in this process.

Sentiment Analysis: An Overview

The purpose of this paper is sentiment evaluation which means to find the sentiment polarity (positive, negative, or neutral) of a text reviews data and evaluate the sentiment score of the text review. The researches proposed two techniques for assigning polarity and sentiment score; 1) Natural Language ToolKit : They produce the Natural Language Toolkit (NLTK) . NLTK is a text analysis technique that evaluates cognitive and constitutional components of a given text reviews based on using lexicon including words. 2) NLP Stanford sentiment (NLPS): The researchers introduce recursive neural models have in common: word vector representations and classification.The authors released a tool named “NLP Stanford” NLPS , which develops an integration of learning techniques that produces better results and higher accuracy training model empirically [3]. These techniques may be used in several ways for game studies research.

Figure 4. Mode Evaluation

Figure 4, gives the general idea of sentiment evaluation process where the data is first reviewed and it follows series of steps to get the required result.

DataSet

There are two datasets specified in this section ; 1) Real data set, 2) Verified data set. 1) real data set: which splits into two data sets with training set (1000 game text reviews) and test set (5000 game text reviews), 2) verified data set: which is a real set with unknown evaluation around 10.000 game text reviews (including more than 5.000 positive words, 5.000 negative words). Increasingly, professional and amateur reviewers are taking to the Internet to share their opinions of and experiences with games. For example, by 2012, Gamespot.com had accumulated over 29 million reviews on over 12,000 video games [5]. Games with the same title, but on different platform, were counted separately as we know that a game's narrative, controls, and resulting gameplay experience can vary significantly across platforms even when the game title is the same. These data sets are from popular websites such as GameSpot, IGN, and VideoGameGeek represent very large corpora of ecologically-valid experiences generated by gamers, who have considerable experience playing and interacting with games. Random test cases were applied together with the datasets [3]. Test cases are normal English Language Coverage . This technique examined the following test cases ; 1) Expressions, 2) Suffixes & Prefixes, 3) Verbs, 4)Adjectives & Adverbs, 5) Nouns, 6) Phrases and 8) Wish.

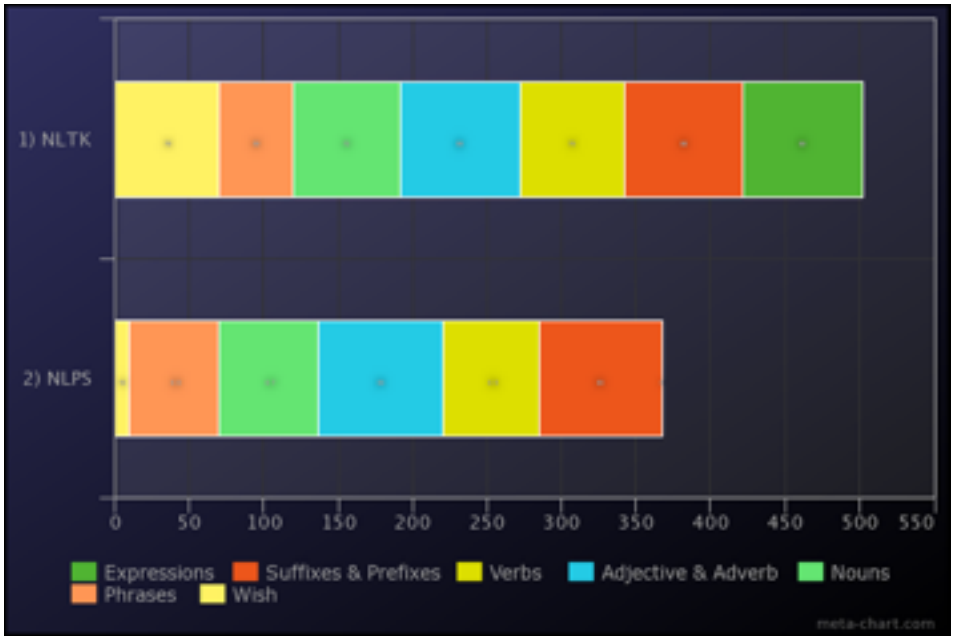

Figure 5. NLTK vs NLPS test cases

Figure 5, clearly shows the comparison of NLTK vs NLPS with the same data sets. The proposed technique enhances reviews spam and fake. It helps to avoid 1) Remove empty reviews: To calculate the real number of reviews, 2) Delete duplicate reviews by considering the same reviewer: To Calculate the real sentiment score of the paper [3]. For example, one paper has 10 reviews, 3 of them for the same text review and with the same user, and 2 is empty reviews , in most sentiment application, if having 10 reviews number and the same repeated reviews will calculate together, the sentiment score is not real because having fake reviews and the results became fake also. And also there are some reviews are general are not related to the paper actually. The proposed technique can provide solution to the problem mentioned above. This technique is implemented by using C# programming language working on Microsoft visual studio 2010 platform [3]. From table 1, we can find general english coverage.

Table 1. English Language Coverage

Cases	Definition & Examples
1. Expressions	one's thought, based on syntax.
2. Suffixes & prefixes	Beginning and end words. (Eg. useless, supernatural)
3. Verbs	describe an action or state. (Eg. hear)
4. Adjective & Adverb	attitude of noun. (Eg. Well, improved)
5. Nouns	identify people etc. (Eg. any place or person)
6. Phares	group of words together gives meaning (Eg.leaving behind the dog)
7. Wish	Eg. hope, wish (mostly gives negative)

Connections to Prior Research

This study adds support to the important of these design features as raised in previous studies [11] [1] [5]. Also frequent in the present study was the use of Value Judgments (e.g., players' perceptions of what they gained or lost from playing in terms of time, money, experience, or return on investment). Value is also examined in the [1] study of cross-cultural differences in games reviews—they found that a game's Replay Value was an especially important consideration for American reviewers.

Conclusion

Sentiment analysis is one of the most important source in decision making. Almost people becomes depends on it to achieve the efficient product. This article explained some of the methods and techniques in NLP that can be used in game studies research. The comparison results illustrate how our technique can increase accuracy and performance with facing many language coverage cases and solving some sentiment analysis challenges. The accuracy results show in NLTK (62%) and NLPS (70%). NLP is not without its limitations. Some common drawbacks are these NLP cannot be directly address any particular theory (or code for) - repeated use of NLP approach risks creating an overabundance of theories. Only professional reviews are used as data neglecting amateur reviews. The main reason why researchers are choosing professional reviews instead of amateur is to have a detailed, structured tasks.
My future work involves exploring the use of taxonomies like [11] for examining longer, comprehensive, and more detailed accounts of gamers' experiences.

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