Internet Of Things-Changing The Game

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Abstract: Internet of things is emerging to be a promising trend towards an era of connectivity. IoT is powered by the internet boom and all the different devices connected to it that share data and communicate with each other. The applications of IoT range from smart clothes to smart cities to healthcare and security and so on. This paper deals with the scope of gaming as an application of IoT. Gamers today demand complete freedom in gaming experience and are always asking for more. To provide this, the technology must be invisible yet omnipresent-that's the essence of IoT. Alternate reality gaming is the genre of gaming that has close resemblance to the essence of IoT. ARGs are driven by storyline and typically supported through some type of online game portal that manages the game. Websites, social media tools, media broadcasts, phone calls, text messages, and sometimes person-to-person interactions are all potential elements that move the storyline along. In ARGs a story drives the game play and players are performing activities that mirror their real life. It also explores the scope of IoT games beyond just gaming and into the business world.

Index Terms: Alternate Reality, ARG, Applications of IoT, IoT Games, Iot Impact, Smart Environment, TINAG.

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1. INTRODUCTION

Gaming in the world of internet of things: The emergence of the IoT will lead to a connected world with more gadgets and devices networked together. These devices will communicate with each other and share data. This connectivity and data sharing can be exploited for many applications. This paper deals with tapping the IoT for developing games and gaming platforms. The reduced popularity of console based games paves way for the introduction of IoT games. This is because human computer interaction is changing significantly. While using any kind of technology, the users demand complete freedom in user experience and are always asking for more. To achieve this, technology has to be invisible yet omnipresent. This is the essence of IoT. Certain trends in the gaming industry are opening doors of opportunities for IoT games. The 3-D technology has revived recently due to reduced technological costs. This has led to an increase in the graphical quality of video games. They are becoming more and more realistic with surreal visuals and increased levels of interaction. Thus, there is a movement towards immersive digital entertainment. Virtual reality has seen a comeback as major leaps in technology has improved hardware capabilities. Also, today games are not restricted to gaming consoles alone. IoT provides an expanded platform as well as audience due to the boom in the number of smartphones and tablets and other intelligent devices connected to the internet. The use of these smart devices allows the gamers to play anywhere on the go and everywhere without being latched to their gaming stations. Thus the screen is everywhere and the console is anything. Open source games have increased competition for proprietary games as they offer more variety, accessibility and thrilling user experience for free. Even though every major brand is venturing into IoT gaming, the variety and range of technologies used in IoT has provided even small developers with number of opportunities.

2. DEATH OF CONSOLE GAMING.

Console gaming is basically about having a dedicated workstation i.e. screen, peripherals and processing units for solely gaming purpose. These PlayStations have been popular over the years and the targeted audience were hard core gamers. So for quite some time the gaming industry flourished by tapping this market. Enter the mobile and internet boom. The advent of internet led to millions of connected devices paving way for the internet of things. So

then what happened to console gaming? It led to significant reduction of market share till the point of no return. There can be two ways how this can happen-either user would leave for something else or the market expands without you [3]. Example of first scenario would be the various genres of games introduced by IoT. there are ARGs then also social interactive games, these genres are outside the domain of console gaming and since they are exciting and provide a different user experience sometimes at a cheaper rate attracts users towards them. Also the sales dropped in relative terms because the mobile devices like smartphones and tablets coupled with connectivity and data sharing are becoming a new class of products that provides exciting gaming opportunities and expands the market so much that the market share of console gaming shrinks. Ben Cousins, general manager of NGMOCO, formerly of EA DICE, Sony, and Lionhead outlined how and why he believes freemium and mobile will effectively kill game consoles in 2013.Also the user base of console gaming is far less as compared to the ever growing number of mobile or on the go gamers. Also the cost of transition from a conventional gaming company to an online gaming company is more than starting a new online company altogether. Innovations in technology and introduction of multipurpose serving devices have reduced hardware sales as well. The common victims nowadays being Blu-ray players, camcorders, GPS systems, mp3 players, point and shoot cameras and so on. It is predicted that console would be the next to go. During the next console generation, globally, both the revenue and the market-share for games will be larger in mobile than it is for console (Cousins, 2013).In the Western world, revenue from freemium will be bigger than that from full priced packaged and digital goods in the very near future. Though Nintendo Wii-U, Xbox one, PlayStation are dominant platforms for hard-core console gamers. However, Android console offerings from Amazon, Google, and others are projected to grow at a much faster rate, and offer the casual to mid-core gamer an affordable way to play from the couch. NVidia's Shield is also breaking new ground and can run Android games as a console or handheld. The device may also appeal to the hard-core with its ability to stream PC games[2].Much of this phenomenon can be traced to the incredible leaps in general and graphics oriented processing power of the mobile chipset industry. Companies like Qualcomm, Nvidia, Imagination Technology, and Samsung are improving the capabilities of mobile chipsets by leaps and bounds. The mobile world is moving at lightning speed as it adds features for movies,

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gaming, and even content creation. 4K video is already a reality and it seems there are no boundaries on the public's appetite for better graphics and video (Jon Peddie, Senior Gaming Analyst at JPR).The console market in general has recently come under pressure from tablets and PC gaming. However the monetization of the hard-core console players, who remain at a stabilizing 90 million plus globally, will keep the business model for the top end going. Over time, the broader base of console gamers will likely consider Android, cable box, and other types of consoles such as the Sony Vita TV for more casual to mid core pursuits. Apple is always a potential threat as well. The market will expand further as China opens its doors to traditional but locally built consoles, which will cannibalize more of the lower end PC gaming sales. China has a potential console market of 50 - 100 million gamers who would prefer to play on TV versus the traditional desktop setup. The middle class have increasingly more disposable income and mobile devices, causing the role of the internet café to lessen. Another trend in the console market is the decline in sales of handheld gaming devices like the Sony Vita and Nintendo D3D. Much of this has to do with the influence of tablets and smartphones for portable gaming. However, as Android games are increasingly designed for use with gamepads, Android handhelds like the Nvidia Shield may stabilize the market in a few years. Sony and Nintendo's commitment to handhelds and the economics of lower volumes will have a drastic effect on the segment. Gaming is a serious business and if consumers are content with an iPhone for music, video, and games there is absolutely no practical need to carry around another bulky piece of hardware that is more than twice a smartphone's size and needs to be recharged after five hours of play time. It is not that smartphone and iPad games are better than those found on Nintendo and Sony's portables. They are just extremely accessible and can satisfy gaming hunger pangs on the go. There are enough affordable titles with flashy graphics and cute creatures to pacify anyone who's sitting in a waiting room for 25 minutes. The stock market analysts testify the death of handhelds and for a dynamic user there is nothing better than being able to game on the go. The console games will have market only from users who are willing to go the extra mile or pay the extra dollar to experience the best the industry has to offer (Andy McNamara, Editor-in-Chief, Game Informer). Thus it follows though hardcore gamers or a dedicated amount of users may root for console games but the internet boom has expanded the market without them. There is a new market created by a new class of connected smart devices that is waiting to be tapped and when tapped properly will change the way the people play and would revolutionize gaming and take it to the next level where gaming would not be just for fun but also as an interface between humans and technology.

3. THIS IS NOT A GAME!

The internet of things will give rise to self-sustaining autonomous systems. Humans on the other hand are uncomfortable in handing over too much control to machines. IoT can make life much easier with its smart solutions but it also needs a lot of experimenting and training to the users. To make this training less tedious and to reduce the overhead for non-technical users games can come to our rescue. Gaming may shape the first real commercial forays into the Internet of Things. Games have proven over and over to be the staging area for new technologies and new interactions. The first home computers were really game systems like the Atari. The PC itself owes a huge debt to the success of the Commodore 64, which was used in large part for games. You can draw a straight line from early game portables like the Game Boy to today's mobile phones. Gestural interaction enjoyed its first great success with the Wii and now the Kinect [4]. Sometimes technologies incubate in R&D, then enterprise, then consumer - but not always, and maybe not even usually. People are ready to experience new interactions first as fun before they're ready to replace their pre-existing, known (potentially dated) tools. So new technology is often deployed first to the consumer. Thus, games and play having a huge potential role in activating and connecting the physical objects in the world around us, and paving the way for broader application across the range of human experiences. The IoT gaming revolution is upon us. Our vision is to massively disrupt the interactive gaming experience. To bring games to people never thought possible. Nowadays, many games from major brands are being built using The Internet of Things technologies. The International Data Corporation predicts that there will be 212 billion 'things' connected to the web by 2020.Sensor technology is going to continue to pervade our lives. This should mean the cost for sensors, chips and low power processors will continue to decline, enabling new and affordable technologies. Corporates are competing to be in the forefront of this disruptive experience and are amassing the innovation and leadership to pioneer The IoT gaming revolution. Quickly emerging from the fast-paced growth of mobile communications and wireless technologies, pervasive games take gaming away from the computer screen and back to the three-dimensional world. Now games can be designed to be played in public spaces like hospitals and rehabilitation centres, shopping malls, conferences, museums and other non-traditional game venues. The increasing deployments of Internet of Thing (IoT) technologies are opening up new avenues of research and deployment opportunities towards that future of pervasive games design. Game designers need to understand how to use the world as a game space-and both the challenges and advantages. Technological advancement in IoT can enable gaming companies to solve myriad problems and make impactful decisions. The basis of most of the games is the human experience. Essentially, our life is a game that often has many more options than a computer game. Therefore the only way to make an all-pervasive game is to increase game's informational content. The games should not only perplex us. But a fully pervasive game should also help to understand the rapidly changing processes around us. The demand will quickly find ways of delivering such a game to us.

4. PSYCHOLOGY OF IOT

Not all humans are tech savvy. People take their own time to adapt to a system or a new technology. Things are a tad bit easy in the developed countries but in developing countries the gap between technology and people exists and is significant. Already the internet of things has been hyped and speculated a lot and it is still an intimidating idea before the masses. For the smooth implementation smart

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system developers should also take into consideration the thinking of the people and the psychological demands of technology. The psychology of FI and IoT deals with the relationship between human thoughts and behaviour and the design, development and deployment of these technologies[6]. Rather than technology changing people's social and psychological reality, people can change their use of technology to facilitate their creation of a desired social and psychological reality (Taylor, 2002).With increased connectivity and data sharing users would be able to interact and share data globally but with large amounts of data being generated they will not be able to keep track of the data they share and how the data will be used. Context aware self-sustaining autonomous omnipresent systems may be developed that would provide real-time identification and location tracking information. Users would then have to choose how much data to share and till what degree privacy can be compromised for the sake of convenience. Security concerns may rise as to decide what policies will govern these systems and who would dictate them. Only a secure smart environment will be able to invoke trust in the minds of users. But implementing security policies would be difficult due to the vast scale and pervasiveness of the systems. These technologies must not lead to any technological gap much like the class or income gap among people. It must be equally available to people from all strata of life. Future Internet or IoT must bring people together rather than isolating them also it should lead to human wellbeing in both mental and physical fronts. It is important that we understand human and the psychology of FI and IoT first, and understanding how these technologies is then a channel for helping human achieve our goals. A good IoT system that provides effective service can only be developed if it satisfies the psychological demands of the users. So these factors must be thoroughly studied before any venture. IoT brings people, process, data and things together by combining machine-to-machine (M2M), person-to-machine (P2M), and person-to- person (P2P) connections. After all a fully functional system that is not good for the health of user or is cumbersome to operate is not at all desirable. The developers also need to tap into the required emotions to draw people to use a technology. Fear and desire are two driving forces that have strong implications as well as the desire for freedom. A system that makes a user lazy can benefit the business but harm the user. So all aspects must be studied and balanced well to get outstanding results.

5. THE GAME BEGINS

Pervasive games exist in the intersection of phenomena such as city culture, mobile technology, network communications, reality fiction and performing arts combining bits and pieces from various contexts to produce new play experiences.A game is a rule based system with a variable and quantiable outcome where different outcomes are designed different values, the player exerts effort in order to influence the outcome,the player feels attached to the outcome and the consequences of the activity are optional and negotiable. A magical circle is the boundary of a game in time space. All the events of the game take place within this boundary.A pervasive game is a game that has one or more salient features that expand the contractual

magic circle of play spatially temporally or socially. As these games blur the line between game and reality they need to be studied as non-game phenomena. This gives them more reason to exist because they can be manipulated to benefit both game and ordinary life. They can take the pleasure of game to ordinary life as well as take the thrill of immediacy and tangibility of ordinary life to the game. The various genres of pervasive or open world gaming are discussed. Treasure hunts and assassination games are the most oldest and established genres. In treasure hunts the players have to transcend physical, mental or social challenges to uncover a result or treasure. In assassination the players are assigned a target whom they are supposed to find and assassinate using playful weapons. Pervasive larps are a style of pervasive gaming that utilizes live action role playing techniques. Alternate reality gaming (ARG)-the ARG interest group of the international game developers association describes them as follows-ARG take the substance of everyday life and weave it into narratives that layer additional meaning, depth and intersection upon the real world.[5]

6. CONCLUSION

The advent of IoT is sure to revolutionize the way we play. Major game companies are already tapping into this market to make the most of the IoT game revolution. But the opportunities provided by the myriad technologies that are a part of IoT encourage small scale developers to leap into this venture as well. IoT games can not only be used for entertainment and fun but can be extended further to act as an interface between humans and high end technologies that are emerging in the near future. With the IoT promising to provide smart solutions to a number of problems, one of the ways to bridge the gap between complex technology and novice users can be games. Further they can be manipulated to solve many real world problems as well. To create an efficient and smart IoT system, psychological demands of technology along with many other aspects should be considered. For the successful development of an IoT game the various technologies at play must be studied thoroughly. The game must be able to seamlessly connect people and gameplay. IoT games when implemented successfully can help people to undergo a smooth transition from current environment to a smarter context aware environment.

7. FUTURE SCOPE

Just as the scope of IoT is vast the concept of gaming in IoT can be extended in other applications as well. Business analytics do believe that for an IoT world to be a lucrative world, it needs to be fun and rewarding. Because humans are often not comfortable with giving up control to autonomous systems, these systems need to be autonomous as human interaction in each and every level of system processing would increase overhead and turn off users. Thus the human computer or human system interaction must be fun and relieving. Before too long it can be predicted that low-cost sensors and apps will be incorporated into just about everything even in the things we throw away. We'll have smarts built into everything from soda cans to toothbrushes to fashion apparel. Some will be basic and promotional, while others will be more sophisticated [7]. A simple example can be of a game that

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gave the user a badge every time he takes the train, and after so many trips gives him a free family ticket, and the system compensated the user in a small way when a train was late. The user would then want to play that game and also use that system. Thus while introducing complex systems to a novice user gaming can act as the ice breaker and even interest the user to move a bit out of his comfort zone into the world of technology. Like the technology involved, the business implications of IoT game-playing are profound and complex. And any business that taps it properly is sure to be the game winner [7].

8. ACKNOWLEGMENTS

9. REFERENCES

[1] Game Design in an Internet of Things Paul Coulton, Dan Burnett, Adrian Gradinar, David Gullick & Emma Murphy.

[2] Ted Pollak, Senior Gaming Analyst at JPR.

[3] Ben Cousins, general manager of Ngmoco, formerly of EA DICE, Sony, and Lionhead.

[4] The IoT gaming revolution- Sabertron.com

[5] Pervasive Games-Theory and Design by Markus Montola, Jaakko Stenros, Annika Waern.

[6] Psychology of Future Internet (FI) and Internet of Things (IoT) by Ai Keow Lim (PhD), Edinburgh Napier University.

[7] Playing games with the Internet of Things. For Information Week by Peter Waterhouse- senior technical marketing advisor ,CA Technologies' strategic alliance