Exploring the viability of Conversational AI for Non-Playable Characters: A comprehensive survey

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***Abstract*— Following the surge in AI advancements in the gaming industry, there has also been a drastic shift in the very concept of Non-Playable Characters (NPCs) and the roles they play in games. Over the evolution of the gaming sphere, there has a been a shift of focus towards NPCs, primarily in RPG games. Game developers have realized the potential that well scripted NPCs can carry to deliver a much more refined and immersive experience. Despite the aforementioned, NPC interactions are still at their infancy when compared to the strides in development made on their surrounding aspects. Additionally, we also explore conversational AI, the successor to the conventional chatbot as many call it, an emerging domain that has applications stretching to a multitude of different fields. Conversational AI is essentially an extended branch of Machine Learning to develop language-based frameworks that allows users to naturally interact with machines, providing a more enhanced and refined user experience. In this review paper, we glance over evolution, methodologies and uses cases of both NPCs and conversational AI. Towards the latter half we discuss the viability of fusing the two domains to enrich and potentially redefine NPC interactions via the sea of functionalities offered by conversational AI.**

Keywords*— *Non-Playable Characters (NPCs), Conversational AI, AI, Natural Language Understanding (NLU)

I. INTRODUCTION

AI in the gaming industry has seen some unprecedented advancements over the course of the last decade. The way people perceive certain aspects in games have been completely re-imagined simply because of the involvement of different AI methodologies. However, when it comes to the topic of NPCs, we feel that there are vast number of possibilities that haven't been explored to their fullest. NPCs have quickly become an integral part of many story-intensive games, but majority of them still seem fundamentally pre-scripted and isolated. They're generally used to interact with the user to further the plot or sometimes even initiate different side stories. These NPCs however are ridiculed with primitive conversing abilities, making them feel robotic and forced in ways. This is a problem that has infested even some triple-A titles. Even though a considerable amount of these titles boast enormous 3D-worlds, with graphics nearing photorealism to show for it, player immersion is still somewhat lackluster when it comes to the behavior of the NPCs inhabiting these worlds [1]. Taking a generic instance of any tripe A RPG, they all cater towards the conversing aspects of their games in practically the same ways. Players are given a set of dialogue choices that at most lead to contrasting replies from the NPC. The norm set for conversing with NPCs today feels almost like a set path that the players are left on to explore the plot, making them feel like they're at the driver's seat when it's the pre-scripted dialogue choices that are diving the conversation. Taking the aforementioned into account, we can segue into a domain that could potentially re-define the said conventional conversing framework – Conversational AI.

Conversational AI is essentially a branch of artificial intelligence that facilitates real-time human-like conversations between a human and a computer. It works by breaking sentences down to their root level, handling the many quirks of human language, and by acknowledging that there is information or a command to be parsed. From context management to sentiment analysis and multilingual support, the advancement in this new domain is pushing the boundaries for synthesizing "human-esque" conversations. Said to be the logical successor of the chat-bot, today conversational AI has already been deployed and is being used in a multitude of fields to enhance human- machine interactions. From voice assistants that can come up with real-time context-based replies to automated language translators that house capabilities to efficiently translate numerous languages in accordance with the intent of entered input, conversational AI has already begun reforming the norms and setting new standards. We feel that the conversational AI architecture enabled by the array of supporting technologies could very well be, up to some extent, integrated into games to particularly enhance and potentially re-define NPC interactions. By performing an extensive survey on both the state of NPCs and the advancements in conversational AI, this paper focuses on exploring the viability of using conversational AI in games to enhance and refine the conversing experience surrounding NPCs.

We start off with a somewhat generic introduction to AI in the gaming sphere and how it has, over time, evolved the industry. Further we shift focus to NPCs, exploring their evolution through different approaches, be it simple enhancement in their approachability or novel methods that have redefined their very role in open world games. Additionally, we point out how "NPC interactions" with the player are still at an infancy when compared to their surrounding aspects by exploring aspects like character believability. Through this we segue into our conversational AI approach, where we look at the spike in recent advancements in different avenues for conversational AI. Towards the latter half, we shift the focus of the review towards some of the more recent developments and the many possibilities conversational AI brings to the table. In doing so, we look to answer our main research goal - justifying the viability of a conversational AI driven approach to enhancing player interactions with NPCs.

II. AI IN THE GAMING SPHERE

Artificial intelligence (AI) is a wide spread range of computer science that creates smart machines capable of executing tasks which usually require human intelligence. A number of computer programs use AI [2]. Market Simulators, economic planners and logic systems are a few domains where AI is used. Artificial intelligence stimulates human intelligence in machines in order to make them smarter and capable of make decisions and thinking like a human where it is used in cases of problem solving, learning and reasoning[3].

Artificial intelligence is classified in 4 types namely: Relative machines, limited memory, theory of mind and self – awareness. Being said Relative machines tends to attend the most basic principles of AI which is using its intelligence to recognize and react to the problem. Limited memory refers to capability of an AI to store antecedent data and predictions, with it, Machine learning become a bit complex [3]. Theory of mind AI refers to the ability to predict actions of oneself and others i.e. we can anticipate how one behaves in a specific circumstance, so basically making a model efficient enough to understand and feel like living beings and emotions that guide our decisions. Self-awareness is the one where machines/systems can portray itself i.e., being aware of themselves as well as their internal states [4].

Moving on to AI in gaming domain, it refers to adaptive and interactive gaming experiences. AI in games is generally driven by non-playable characters or NPCs and the behavior of NPCs is driven by AI [4].

Game AI is broad and flexible and anything that gives an illusion of intelligence is considered game AI which should make the game more challenging, immersive and fun. Generally, game AI has 2 techniques: deterministic and non-deterministic [6].

Deterministic AI are the predictable, hard coded AI programs that are used in every game…a simple example would be " follow the player ", but with the use of Finite State Machine and Behavior tree, a rather complex and challenging AI can be developed.

Non-deterministic AI cites uncertainty in decision making where the opponent can adapt to the techniques based on what has previously occurred where using Machine algorithms to get stronger each time in order to fill the gamer's appetite [5].

Game industry has drastically changed over the years through new business models that changed the fundamental aspects of making and playing games. The new sections the game companies use to create games are: (1) Persistent Games (2) Ecosystem of Games (3) Player Communities (4) Coupling of real and virtual worlds. The three roles of game AI include:

a) AI as Actor – research is focused on NPC path planning and decision making that enhances player experience.

b) AI as Designer – augmented development of individual games through procedural content generation.

c) AI as Producer – scaling game production pipeline, enhancing strong game interpolations etc. to be defined.

B. Evolution

Gaming has evolved over the years starting as early as 1950s with computer chess developed using Minimax algorithm…later in the 1970s, while video games and entertainment revolutionized the market, Artificial intelligence started playing a key role in the concepts to be made. In the 1980s, Pac-Man featured a route search system which was the first of its kind. Moving on, in 1987, the Golden Ax allowed enemies to chase the player in order to kill him/her which was astonishing during that time [8]. In early 2000s, AI started to hold ground with Unreal by having a commercial level game…moving on, Monte Carlo Tree Search and Travelling Problem salesman problem were integrated for games. And so on, AI was used for almost each game developed such as Far Cry 2, Alien: Isolation, etc. [8]

Moreover in 2007, the game Jeopardy was mastered by Watson (IBM's supercomputer) that had NLP capabilities. In 2017, world's biggest Dota 2 tournament was completed by "OpenAI" which was against the professional players[8]. In 2019, Pluribus, an AI, defeated the professionals at Texas Hold'em which was able to calculate a couple moves ahead and used strategies unknown to human mind.

Moving on to General Game AI [recent research], GGAI, which refers to designing AI programs in a way that it enables to play more than one game successfully wherein computers are programmed using AI algorithms to play. With these advancements in AI, it makes one thing sure; that is the future of AI is vast than we can even imagine because it kept excelling not only in board games but also strategy games as mentioned before[6].

C. Applications

Use of AI has widely opened scope for much more realistic experience of video games and hence the applications have been limitless. There have been various Game AI algorithms which are used in a variety of games such as:

(1) GOMOKU which is called five in a row which is a strategy game was implemented using Minimax search tree with alpha-beta pruning which basically reduces the search time as compared to Minimax search tree [7].

(2) Othello also known as Reversi, is a board game where Alpha Beta Search algorithm is used for searching

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which speeds up the time taken by Minimax by pruning off cases which won't be used [6].

(3) Settlers of Catan also called Smart Settlers is a multi-player game in which the agent can play against a computer or another human wehre MCTS (Monte Carlo Tree Search) algorithm is used which takes the following into consideration : Effect of seating position, Domain Knowledge in simulation strategy, Domain Knowledge in tree search .

(4) Motor Cross is a simulated game in AI which uses the following algorithms: Evolutionary and Back Propagation wherein it can be improved by fine tuning the training given to the AI. Begging and Boosting are two optimization techniques for training Back propagation algorithm [7].

(5) FIFA EA Sports Game is a football simulator which can be played both against a computer whereas between 2 humans. The algorithms used are A-Star search (to help player get appropriate position and passing). In a few cases, Dijkstra's algorithm can outperform A-Star by a margin [7].A graph within a graph is an "inset", not an "insert". The word alternatively is preferred to the word "alternately" (unless you really mean something that alternates).

III. NON PLAYABLE CHARACTERS

A Non-Playable Character (NPC) is an important component of the game, as it makes the game more interesting and increases player immersion [11]. Video games are supposed to be highly interactive so that the players (users) can have fun [13]. What sets video games apart from traditional form of entertainment (movies, music, etc.) is the interaction a player has with the video game [14]. Sir Henrik Waperfelt also mentioned in his 2016 PhD thesis that video game industry has seen a drastic change in terms of advancement in technology and use of newer technology like Artificial Intelligence. But one area in game development that went unseen and could not keep up with the trend was NPC development. NPC's not only have their applications in games but also in different simulations where a character needs to be placed in a virtual environment and it is not controlled by any user [13]. The behaviour of such NPCs in a simulation helps us better understand the situation and the environment.

The algorithm that is going to be used for deployment of the NPC depends on what is the role of the NPC in a certain environment. In first person shooter games, NPCs having stealth characteristics and can hide in their environment is a must [14]. Depending on the action and role of the NPC, we select an AI algorithm that will better suit that NPC. Few common options for making such dynamic NPCs are Finite State Machine (FSM), Behavior Tree, and Goal – Oriented Action Planning (G.O.A.P) [14].

A. Different methodologies

Creation of NPCs that are lifelike and interesting has been the main purpose of implementing AI in the gaming industry. It has been difficult to do so in past because as the name implies NPCs are not controlled by humans. In the past, games having NPCs relied on a script. The NPCs were not dynamic in nature and couldn't react to unpredictable player behavior, resulting in reduced player engagement and immersion in gameplay. To achieve the desired lifelike player agents, NPCs rely on predetermined algorithms or a complex AI technique [11]. One of the ways we can make NPCs more interesting would be by making them interact with each other. This sort of interaction adds an extra layer of unpredictability, which increases player immersion as the player is not able to predict the NPCs actions. This can also be achieved by deceiving players into thinking that NPCs can interact with each other and are coordinating amongst themselves [12]. These sorts of illusions are also effective because in the end what matters is what a player perceives.

Behavioral Trees (BTs) are the most common method of implementing NPCs. Behavior Trees have an edge over Fine State Machine (FSM) when it comes to NPCs behavior creation. This is due to factors like reusability, easy to design, scalability and modularity [12]. Every action of a NPCs while using behavior tree is based on a hierarchy [14]. BTs are also tried and tested as they have already been used in modern day popular games like Halo, Far Cry: Primal and Tom Clancy's The Division. This method of implementation is good for games where NPCs need to interact with each other and coordinate with each other.

Goal Oriented Action Planning (G.O.A.P) is another proposed method of implementing NPCs. In this method of implementation, the NPCs have the flexibility of arranging their actions on their own to achieve or to complete a certain goal. This method of implementation can be used in games like Counter Strike, where there are two teams, and each team has a few goals to complete. G.O.A.P. is an algorithm proposed by Jeff Orkin [14]. Using this method of implementation, the NPCs are found to be more dynamic compared to FSM. This algorithm has its applications where a NPCs needs to hide and seek an objective.

B. Evolution

The In his PhD thesis in 2016, Warpefelt, Henrik talks about how the term "NPC" pre-dates digital games itself. NPCs are commonly found in, for example, tabletop Role-Playing Games (RPGs), where they are characters controlled by the Dungeon Master. He further lists down the following factors which were traditionally deemed to identify and elaborate on the role an NPC has in game:

a) Surrounding area and location of the NPC
b) Actions taken by the NPC
c) The NPC's attributes and visual presentation

He further discusses how certain parts of these are still relevant today and act as a base for designing NPCs. Over time, the methods and approaches to design and develop these NPCs have also evolved.

In 2013, Justin Perrie and Ling Li suggested creating a gossip virtual network for NPCs in RPGs. The network allows simple individual NPCs to communicate their knowledge amongst themselves. The communication within this social network is governed by social-psychological rules.

In 2016, Shu Feng and company proposed a hybrid learning strategy that provides an efficient method to building intelligent NPC agents in game. In their paper they talk about how, although reinforcement learning (RL) has

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been a promising approach to creating behavior models of NPCs, an initial stage of exploration and low performance is typically required. They also cover the pros and cons of imitation learning for the same. With this they propose their novel hybrid approach towards autonomous behavior learning

C. Character Believability

"When knowledge and belief coincide, that is true immersion" [15].

As described by Bartle in 2004, the secret ingredient to immersion in persuasion. The more persuasive and familiar an environment makes itself to be, the easier it is to be completely infatuated and immersed with it. For the player to perceive some form of immersion or attachment to the virtual world, the game must persuade the player that some aspects of it are believable [16]. Additionally, the narrative or the lore must further contextualize the player experience, providing an approach in which users can construct and formulate their alter biography [17]. As suggested by Warpefelt, believability and immersion essentially co-exist and feed of each other, where enhancing one could very well have a positive impact on the other. Transitioning to AI, we have a prominent subfield concerned with the developments of agents, which basically are blocks of software acting on their own in order to achieve a goal or execute a designated task. A part of this subfield might directly translate to NPCs, especially accounting for the instances where these research agents focus on believability or varying degrees of social capabilities. These are predominantly categorized under believable agents (BAs) [16].

As discussed by Mateas, the success of such BAs is determined by audience perception, where if the players, in whatever context it might be, find some sense of familiarity and believability towards the agents, then they could very well be considered as a success [18]. This approach towards believable agents translates over to the NPCs. Today NPCs in games are most prominently judged by how believable they appear to the player base in accordance with the virtual world. However, depending on the type of NPC in conversation, there may be varying degrees of challenges and difficulties to instilling this believability in them. For instance, Warpefelt rightly suggests that for NPCs in shooting games maintaining a level of believability would be far more achievable than an NPC who must constantly engage in social interactions [16]

In accordance with the aforementioned, the co-relation between character believability and player immersion into the game world is even more prevalent in the huge triple A titles out today. Open world games that house a cast of believable NPCs are the ones that usually see their player base sticking to their game even after the main quest/storyline might be completed. NPCs are well known to be a key component to further storylines and especially initiate side quests that might stray away from the main storyline in some respects. Be it a one sentence dialogue exchange, but NPC interactions with the player are usually the triggering component that initiates a side quest, meaning have less believable NPC interactions would directly influence the players interest in even starting a side mission, which in turn, would have a drastic effect on the overall immersion. On the contrary, a captivating dialogue from an NPC which gives a proper introduction to the quest being offered would make the whole experience of a side quest feel more familiar and believable.

IV. Conversational AI

Conversational AI is an extended branch of Artificial Intelligence that essentially focuses on applying ML to develop applications that enable human-like conversations with machines. It uses speech and text-based agents to simulate and automate verbal interactions, which in turn focus on delivering a realistic conversing experience [19]. With the surge in advancements in concepts like Machine learning and deep learning, a considerable evolution is also encountered for applications like chat bots. On some grounds, it can be said that conversational AI is the enhanced successor of a chat-bot, refining a multitude of different aspects. The technology can be used to increase accessibility in Question-Answering, enabling input and output methods as well as enable interaction without requiring reading/writing skills [21]. Industry titans such as Apple, Microsoft and Google have developed Intelligent Voice AI assistants by harnessing the powers of conversational AI. [20]. Using this technology can help bots grasp the context and intention behind the user's incoherent and uncertain requirement expressions. Modern day question-answering systems use conversational AI to generate natural language answers based on the user's question [22]. Conversational AI has redefined the way bots select various functional and non-functional services in accordance with the user's expectation [20]. Because of the said characteristics and functionalities, conversational AI has seen a wide-spread adoption across numerous fields ranging from retail, healthcare to even finance. The sheer range of possibilities brought forward because of advancements in this recent avenue have propelled the rate at which novel individual core components of conversational AI are being developed [19]. As for practical integration, there are a number of language models freely available that have been pre-trained to a certain extent. As the surrounding domains for this technology have advanced, so have the size of these models and the number of parameters. For instance, BERT, one of the more popular models used today, has over 340 million parameters to achieve the quality of pre-processed output it has. Models trained on generic public datasets that are readily available result in lacklustre quality, mainly because they lack context for the specific application they're being trained for. Because of this, today, models like BERT are being fine-tuned to further cater to the application they're being used in.

A. Architecture

Considering the detailed nature of different models that are used for different aspects that conversational AI is composed of, there are several ways to describe the overall architecture. In accordance with P. Kulkarni's survey paper, a typical conversational AI architecture consists of three primary components namely Natural Language Understanding, Natural Language Generation, and a Dialogue Management System. The Natural Language Understanding component is a combination of two major processes viz. Intent Classification (identify intent behind

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user input) and Entity Extraction (identify key information from input). These two components compute and identify the What and Why of the input which when combined help the agent completely understand the user's input. In cases where the agent has insufficient information to decide its further actions, it traverses through various states and depending upon the state that the agent finds itself in, it decides the next action. This is process is controlled by the Dialogue Management System. The system consists of processes such as grounding, slot filling, and context switching. Finally, Natural language Generation is used to generate an answer in human readable language using the structured data gathered by the agent. Processes in Natural Language Generation include content determination, document structuring, aggregation, lexical choice, referring expression generation and realization [19]. On the other hand the same architecture is usually described in the context of a pipeline consisting of three stages namely, Automatic Speech Recognition (ASR), Natural Language Processing (NLP) and Natural Language Understanding (NLU) and lastly Text To Speech (TTS). Each of these aspects that make the pipeline are said to have their own set of detailed processes and approaches that contribute to the final outcome. Further, we have briefly explored some of the components of said pipeline and how they contribute towards refined conversing.

B. Natural Language Understanding (NLU)

Being one of the more critical junctures in the conversational AI pipeline and essentially the centrepiece behind generating viable context-based answers and replies, we elaborately explore Natural Language Understanding and its core composing fundamentals. Natural Language Understanding (NLU) is a branch of AI and a subset of Natural Language Processing (NLP) that uses computer processing to understand unstructured data i.e., the user's input. Essentially, NLU models take text as input to understand and determine the context behind it, and finally formulating an intelligent context-based response. An ideal NLU engine should understand the intent behind the user's input even in case of grammatical errors and mispronunciations (for voice input) [19]. The NLU engine is responsible to extract the intent behind the user's input regardless of the way it has been presented to the system [24].Deep learning models are generally applied for NLU considering their ability to accurately generalize over a wide range of complex contexts and languages. Any NLU engine is composed of three major modules viz. Name Entity Recognition, the Intent classifier, and Entity Extractor [19][25].

a) Named Entity Recognition (NER)

The process deals with identifying unique information and classifying them into various classes. These classes can represent people, objects, place, or any real-world entities. Earlier, these systems used regular expression for this process. However, it was found out that this approach won't work for real-life dynamic conversations. Over the years researchers found out that usage of Convolutional Neural Networks (CNN) provided better results since they use a two-phase process where word embedding is performed first to convert words into vectors and then passing these vectors to the CNN for labelling and training [19].

b) Intent Classifier

The module is responsible to identifies the intent behind the user's input, thus helping the dialogue management system in generating an appropriate answer [25].

c) Entity Extraction

The module highlights tags from the user's input. This is performed by assigning a label to each word in the input sentence and then identifying their role [25]. These roles are then combined with the classified intent to completely understand the user's expectation [19].

C. Dialouge Management System (DMS)

The DMS is responsible for mapping inputs to appropriate outputs in a way that directs the agent in determining its own actions. State-of-the-art DMS use methods such as switch statement, finite state Machines (FSM) and Machine learning/Deep learning-based approaches to guide the agent into taking appropriate answers. Switch statements is control structure that contains predefined execution steps for each possible input. However, these systems are restricted with limited scope and can only react to the user's input thus making the conversation robotic and unengaging. Finite state machines are also considered as a viable option for a DMS but fail to provide flexibility and availability as each conversational cycle having similar end goal will go through the same states over and over thus making the conversation seem redundant. Traditional Machine learning techniques are not considered viable for such system since they require substantial data pre-processing. Deep learning can overcome this limitation but falls flat due to its inability to improve based on the result of the conversation. Through reinforcement learning, these limitations can be addressed by implementing a conversation success reward and failure penalty mechanism which will drive the conversational AI agent to reach meaningful conclusions in conversations [19].

D. Natural Language Generation(NLG)

The Dialogue management system arranges the data in a structured format and forwards it to the NLG module where it identifies takes the identified context and dialogue history and formulates a natural language sentence. This generated sentence is the final output of the Conversational AI framework and is presented to the user [19]. Some of the popular NLG engines are T5 Google, DLG Net, and Persona [23].

E. Use cases

Conversational AI finds significant use in the fields of marketing, psychology, communication, and computer science [26]. One of the more glaring and widespread applications is said to be in the telecom business. When the generic framework is simplified and broken down, it becomes increasing evident how well conversational AI would automate and further simplify a number of different aspects in the industry. Enabling conversational AI agents at all the call centers would result in substantial growth in savings, both in money and time. Real-time assistance and recommendations could become viable when this technology in brought into the picture. Calls can be analyzed and routed accordingly, considerably speeding up lengthy processes. Aside from the telecom sector, conversational AI

could also enhance the financial sector, allowing users to autonomously manage simple tasks like tracking transactions or making their payments. As for the insurance sector, virtual conversing assistants can aid in accelerating claims related procedures by engaging the clients with dynamic and reliable conversations. Additionally, the research proposed by Ashay Argal et. Al and Clarizia F. et al. showed how conversational agents could be used in chatbots to enrich tourism experience through smart question answering and automated location-based storytelling [31]. In related work, Clarizia F. et al. showed how these question answering systems could also be used in the education sector to identify the context of the questions posed by students and generate natural language answers in accordance with that [30]. Kyungyong Chun et al. and Chin-Yuan Huang et al. proposed the usage of conversational agents in wireless healthcare systems for smart heath diagnostics [27][28]. It is said to make the healthcare industry more accessible while also enhancing the patient care experience. ASR models have already been deployed at several locations to take the doctors' prescribed and dictated notes, automatically converting speech to text for clinical documentation. Additionally, TTS (Text-To-Speech) models can be of great help to people unable to clearly read medical information and instructions given on websites. use cases also include the development of a counselling system having the ability to gauge the emotion of the user and conversate accordingly [29].

V. Answering The Research Question

The entire purpose of our research exploring different aspects of NPC conversing capabilities and conversational AI is focused on exploring the viability of integrating conversational AI in games to enhance NPC interactions. Our survey gives a brief insight into the state of NPCs today, looking at their evolution and glaring areas for improvement. As seen while surveying some of the most popular triple A titles today, the norm set for NPC conversations doesn't allow players to explore the plot in the way they see fit and instead offers a set of pre-defined dialogue choices that drive the conversation. This is where we can see conversational AI being extremely viable. With the functionalities that it brings to the table, a proper integration could refine and essentially re-define the three-choice conversing dialogue meta that is the standard for most games right now. Natural Language Processing (NLP) and Natural Language Understanding (NLU) could help the computer controlled NPCs come up with intelligent, context-oriented responses. This would allow players to explore side-plots and the storyline in the way they see fit, in-turn greatly increasing player immersion. The possibilities with such a framework are practically endless. A multitude of functionalities could be built on the core model allowing players to approach certain aspects of the game in ways never seen before. With the sheer compute power at the industries disposal today, processing time should be a concern of the past. With that being said, we can confidently conclude that yes, conversational AI indeed would be a viable technology to enhance NPC interactions and propel player immersion to new heights.

VI. Conclusion And Future Work

The entire gaming industry has taken unprecedented strides in terms of gameplay enhancements and player immersion ever since the introduction of Artificial Intelligence in the sphere. Several development processes have been further refined and evolved as a result of introduction of some form of different methodologies involving AI. NPCs are just another instance where AI could propel the fundamentals of immersion to another dimension, but hasn't yet been explored to the fullest. NPCs have grown to become a key component in most games as we discussed earlier, making research in their surrounding aspects that much more warranted. In this paper we explored the different ways AI has impacted the gaming domain and looked at the evolutionary timeline of NPCs, understanding what they have become. The survey highlights how NPCs have become an integral component for games today, yet somehow lack immersive conversing capabilities. By dissecting the norm set for the NPC conversing framework by the industry juggernauts, we point out some of the more obvious aspects that can be developed and further enhanced. This led us to explore conversational AI from an gaming oriented point of view. In doing so we concluded that with proper integration of different conversational AI models for NPCs, the conventional and robotic dialogues could be transformed into smart, context reliant conversations that would greatly improve player immersion.

Moving forward, we plan to practically integrate conversational AI in a game to see to what scale we can enhance simple choice based NPC interactions. Taking this research survey as a foundation, we look to address several aspects discussed in the paper and offer a fully functional, conversational AI based framework to re-define conversing with NPCs. Conceptually, this game would solely be made to highlight the functionalities and possibilities conversational AI would have to offer. We would be prioritizing the fine tuning and implementation of a couple of NLU models that would essentially serve as our base, upon which we would be layering different functionalities and features that compliment or refine the player experience in some way.

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