Contribution of computational intelligence tools in the improvement of strategy games

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***Abstract*—The abstract goes here.**

I. Introduction

the large entertainment industry sector is the video games. the commercial Video games budget is rising every year, it reach 25.1 billion dollar in 2010. Many designers and developers are interesting on the community of video games around the world. the main objective of these video games community is to provide amusement to their players.The question is how to the this;there has been no detailed investigation of the fully mechanism to put the work in the correct way.

In the past, a number of researchers have sought to determine a more realistic games.the developers overlooked their games artificiel intelligence and focusing their works to high quality graphics games.In the last year, these features are not sufficient to guaranteed a good profit to the games companies. Moreover, the humain players are able to defeat these games without much effort and lose the interest. In the recent years, there has been an increasing interest about more features in video games community such as art,psychology narrative to name but a few.

In light of recent events in video games it is becoming extremely difficult to ignore the existence of one paradigm that is fast becoming a key instrument in most video games is the Artificiel Intelligence. The AI is an important aspect on the conception of these kind of games.Moreover, it has seen the rapid of development in many fields such as humain player imitation, procedural content generation(PCG), automating game testing, opponent modeling and computational narrative, among others. Recent development in the AI such as computational intelligence and their applications heightened the need for new challenges to the video games community. Whilst, the debate continuous about the best strategies for the management of all these features and technics. Nonetheless, in the past, developers focusing their works on non-players-characters (NPCs) games to control and design the behavior of the players by the integration of the AI for the opponent modeling to design an intelligent player behavior, in order to increase the player interest on these games.

The NPCs developers are conscious that a stupid behaviors of a virtuel player will make these kind of games less interesting and easy to beat. As a solution the video games designers new playing rules such as play around levels.In addition, the difficulties are increase from the bottom levels to the high levels.However, players lose their interesting about these games when they be able to win and defeat all the opponents in the end of the game. Whilst, to make an opponent's behavior evolve with player's abilities is an interesting challenge for developers to make these kind of games more attractive. A considerable amount propositions of literature has been published about behavior's self-adapt to players abilities.

Recently, researchers have shown an increased interest in developing of AI for RTS games. RTS games are a sub-genre of strategy video games,which all the actions made in real-time. The contenders have the capability to control (make a decision) a set of distributed units and structures during the game with the aim of: (a) destroy the opponent assets (b)create additional structures to reached some goals in the game or to secure area. The RTS games can be considered as a ressource gathering games. Typically,the participants have the possibility to create more units but this depend by the number of ressource gathering with a specific units in a specific zone on the map, in order to achieve multiple objectives during the game. At the most of RTS games they employs two levels of AI,while can classify these two levels by (a)strategic when it will make a decision over the whole set of units (b) tactical when they decide the behavior of each these small units.In addition, by the real time aspect challenge these difficulties are increased.One of the greatest challenges inherently bounded to the RTS games is the real-time aspect. It associated to make decision without waiting the others to move. Moreover, the actions are made simultaneously during the course of the game. Some researches has been carried out on these challenges on the computational intelligence in game conference (IEEE CIG 2010) while less than 10% of them deal with its. One of the international AI challenges is Google AI challenge. Which, the participants with the aim to design an AI programs(bots) in a real-time strategy game.

One of the most hardest tasks in RTS games is the bots conception. For simulate the other contenders, designers use the bot concept.Bots are an intelligent agents interact with humain players in order to compete them within any computer-based framework.This challenge is made by an experts humain to design bots behavior from their life experiences and experimentation in order to increase the games challenges.The games designers make the intelligence bots one of the important parameters in the conception of an RTS games.In addition, a set of parameters are required previous the running of the bot, moreover a good parameters values are make a better behavior from the bot. So, for tuning the parameters previously is a wide research area like an optimization problem it self. These parameters are used to determine which ones are more important for the bot to tune. In a typical RTS games, the contenders(two players or more) have to make a decision under the uncertainty(the map is covering by a fog of war, the player will just known their units and structure in the game).There are more difficulties need to understand such as spatial reasoning, strategy planing and opponent's strategy prediction.Therefor, there are hundred of units simultaneously acting, many possible position in the map, units control, among others make the conception of the game more challenging and open a wide space of researches. However, current methods of computational intelligence have proven many researches proposed potential solutions to solve different tasks such as player experience modeling (PEM), procedural content generation (PCG) and data mining.

RTS games is essentiel for wide range of technologies in order to design AI, e.g., planning in the uncertainty(lack of the informations), opponent modeling, temporal reasoning, just to name a few.Like a classic problem, is to provide a non-cheating and humain-like as an important features in the conception of the virtuel players(bots).