Professionalism Assessment

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Introduction

Any project requires professional aspects to be considered before and while development in order to ensure the end product to be of highest standard possible (Project Management Institute INC., 2022). Similarly, the level of professionalism is directly related to success or failure of any project. For an example, the famous Sydney Opera House and the acoustics problem (Konstantinou, 2015). According to a report by "The National Audit Office" in the United Kingdom in May 2012, approximately one out of five projects are vulnerable to some risks and require actions to divert those risks (Konstantinou, 2015). This proves that the project management and professionalism plays a vital role in identifying the risks, impacts and shortcoming of any project if studied in detail. Any project comprises of various sub-projects and if any one of them fails, the whole project could be in jeopardy resulting in huge losses and even project could collapse in many cases.

Hence, to identify the risks, ethical challenges, socio-economic impacts or any security concerns the project poses, to mitigate or be prepared for those scenarios and to make sure that the project meets a certain standard in the end, the professionalism aspects of any project should be kept in mind.

In case of our project, the major issues and challenges will be explained below.

Social Impact

Any project that involves the interaction with human beings have direct or indirect social impacts. Since our project requires that the gameplay between a human and the robotic system, the effect that the interaction could have on the user must be explored fully before rolling the product. Some of the social impacts are discussed below.

Exploration of computing capabilities

Since the development of the mechanical turk, a chess playing robot in 1770, computing and mathematics have always been used to further explore the extent to which the computers can perform acts such as playing chess. One can have a look at the effects that the implementation of neural networks and reinforcement learning in chess by systems like alpha zero have also completely redefined the way competitive chess is played. For example, h-pawn advance in which black side pushes h4-h5-h6 or black with h5-h4-h3 to have a tactical advantage by occupying key squares kingside of the opponent (Chess.com, 2022). This technique with many others have been used by many players in tournaments since the advent of stronger chess engines. This proves that the chess industry is always evolving with the introduction of any new technology and concept. Since our end product can also aid in training for competitive environments, this can also bring sufficient change that the others with the fear of missing out, join the trend and the whole chess scenario could change with time and the piece of equipment be absolute necessity when it comes to playing or learning chess.

On the other hand, this excessive use of computation to explore this single game could have an adverse effect on its mere existence. For an instance, due to increasing chess theories, maximum probabilities of draws in championships while the number of games that end by one player winning being absolutely low, the people from deepmind (A group of researchers working on AI) along

with Vladimir Kramnik (World Chess Champion 2000-2007) set out to discover the new variants of chess game. Their main motive was to tweak the pre-existing chess rules so that the newer tactics emerge while maintaining the complexity of the game. They emulated the games between the human and the system for the newly developed game. Similarly, one of the newer chess variants called No-castling chess has already been tested on real life in a blitz-experimental tournament in Chennai (Tomašev, et al., 2020). Such behaviours raise serious concerns that undermine the existence of the game. In our case, such changes might impact our project in a way that the adoption could fade out and the whole chess engine might have to be changed to adhere to newly developed rules of the game.

Easiness for Newcomers/Hobbyists

Since being able to play chess competitively requires high level of training and study, for newcomers to fully gain confidence relies in finding peers or going to public places to play with opponents or play online with unknown people, the proposed robotic system could aid them play against a worthy opponent in the comfort of their place and according to their difficulty requirements. This means that they could easily buy a product and begin learning chess, understand moves, tactics and excel in playing chess with time. Similarly, experimentation of tactics and openings learned by them could easily be done with the robot. Through a visual way of learning, one can easily grasp and practice the important concepts with the help of the robot.

Cheating and scamming

As stated by the report from chess.com, the number of cheating in online tournaments in chess.com rose from 6000 per month in 2019 to 17000 per month in 2020. Similarly, a scandal happened in 2020 where the FIDE online university tournament winner along with 19 others were disqualified for cheating (The Indian Express, 2022). Our device being a physical one, could be used in such a way that any software solutions monitoring the online games on the computer will not be able to detect the cheating being done. This in turn can aid the cheating person increase their ratings by winning big matches. It is said that a player with years of experience can easily detect those moves made by the chess engines by the way defense moves are made but for an ordinary person, it is not a possible task. The cheating could happen at a smaller scale where a person can quickly raise their ratings to play games with better players and effecting the opponent player's ratings (The Indian Express, 2022).

Extensibility to other board games

Once the arm along with the algorithm for movement has been made, it can easily be modified in a way that any kind of board game can be played if it can be played by a computer. For example: go, bagh chal (Popular game in Nepal) and so on. Future versions of the product could be rolled out with all of the gameplay modes so that one equipment can play multiple games. Similarly, the peak achievement that this project could have is to be able to efficiently play "Go", one of the hardest board games.

Loss in excitement of the game

One of the major drawbacks of using computation in a game is that any game could be calculated in terms of wins. Player with proper planning, training and good experience paired with great intuition could easily be defeated in a game by a person equipped with memorization who rather than understanding the reason behind the move, memorizes all the steps. In a sense, the whole excitement, unpredictability and the fun part of the game gets entangled and lost behind the rote learning just for the number of wins.

Business Impact

When seen on a bigger scale, people are moving towards an algorithmic approach towards chess. One can either learn chess from a vast amounts of chess or through online platforms that play with calculation rather than intuition. It can impact the chess books and reading materials industry as a whole. Similarly, moving from playing game on a physical board to a digital one in a big scale can render the chess board and accessories industry obsolete. If our product gains significant amount of attention in the market with future versions equipped for training rolling, it could directly compete with online chess platforms as well as the reading materials.

Ethical Issues

Autonomy

The major shortcoming of an AI and robotic system is that it is like a black box and nobody can know what is happening inside except itself. This could have an adverse effect on the learner as he/she could be unknown about the wrong move that the bot is making and the learner picks up that move during training. Similarly, the problems are harder to troubleshoot and get rid of since the chess gameplay is dependent on the stockfish engine and exploring it in detail is a challenging task for now. If the engine consists of bugs/errors during the time of implementation, there is no any mechanism of knowing it and solving it.

Chess becomes synonymous with winning at any cost

The major issue with using algorithms/bots for enhancing chess gameplay is that with time, people start to use it to make sure they wine at any cost. This involves practicing a certain style of game to even memorizing every steps of it. The fun part of the game fades away with such acts and in the end, the game of chess could become a way only to prove the intellectual superiority.

Replacement of Jobs

One thing that could happen is that the jobs of training chess players could be replaced by the robots/AI machines.

Legal Issues

Copyright

The name “Chessmate” is being used throughout the project but, it might have been preoccupied by another registered company or have been mentioned in any of the literatures or softwares. According to the section 25 of the copyright act 2002 of Nepal, if anyone is found guilty of copyright infringement, a punishment with a fine ranging from 10000 to 100000 with imprisonment of upto 6 months is applicable (Onlinekhabar.com, 2020). Similarly, conviction for second time could result in fines could double along with jail time (Onlinekhabar.com, 2020). It specifies the contents like thesis, articles and computer programs as copyrightable items and to reproduce or distribute any copyrighted products or works results in violation of the aforementioned law. If any of the products or published literatures publicized before the submission of the proposal, our project could be running in violation of copyright act and it could land the project in halt due to legal issues.

Copyleft

Copyleft defines that any work derived from an open-source project must be distributed under the open-source domain. The use of stockfish (which is distributed under GNU GPL license) bounds us in such a way that if the software is to be modified in future and be distributed, it must be under the same license. Both the original and the modified version must be open source.

Issues with liability

In case of a person trying to misuse the product and cause substantial harm to the people, our product being an open-source one due to the use of GPL licensed product as part of our system, holding anyone accountable is not possible which might cause many severe problems.

Security Issues

Stockfish

The major issues with using open-source softwares for commercial application are that the bugs are already known to the general public, they can perform attacks on the software within their own environment, there is no legal requirement for ensuring security and so on (Infocyte, 2022). It means that anyone with sufficient knowledge of programming can easily manipulate our system for their own purposes.

Hardware Hacking

The modification of our hardware arm for any purposes except than it was designed for could pose a serious security threat for our system. Since hardware is the most import part of the robot, it renders the whole system unusable and on the other hand, it might open new areas for people with ill intent to get inside the system and misuse it.

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