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Wireless Powered Chess: - A Review

Prof.R.D.Sushir[1], Manish A.Chhangani[2]

[1] Prof. Dept. of Electronics and telecommunication, P.R. Patil College of engineering, Amravati, India
[2]Student of M.E Department of Electronics and telecommunication, P.R Patil College of engineering, Amravati, India
[2] mchhangani9@gmail.com

Abstract— When we play an ancient and noble game of Chess, we grapple with ideas about honesty, deceitfulness, bravery, fear, aggression, beauty and creativity which echo the attitude we take up in daily lives. Chess is an activity in which we deploy almost all our available cognitive resources; therefore it makes an ideal laboratory for investigation into the working of human mind.
This study will focus on automatically operated chess board with the help of Bluetooth and Adruino Processesor. In this process two chess boards are connected with the help of Bluetooth and by using Adruino processors the interfacing between the two boards is done. The idea to carry on this project is taken up from "Computer Controlled Chinese Chess" in which the program is written in visual basis (VB) language and the commands are given with the help of computer to microcontroller which manages the different RF receiver robots at RF frequency and moves the different major and minor pieces and performs the operation of castling .The Complete operation is done at RF frequency and the moves done on computer is perform on the board as well.
In the proposed wireless powered chess project, since both the chess boards are connected with Adruino Microprocessor, the move performed on manually attended boards is also seen on other board without operating by the player. This study of Wireless powered chess will facilitate playing chess sitting at different location in a limited surrounding.

Keywords — Adruino mux shield, Adruino Uno, Bluetooth, Dc motor, powered Chess, Reed switches, Stepper motor.

INTRODUCTION

Chess is a game which was discovered before 800 years. It has been a favorite game in people of all ages. Though the game is a complex one, it is based on approaching, threatening and capturing pieces until destination is reached. John Artise in **Chess and Education** states: "Visual stimuli tend to improve memory more than any other stimuli; chess is definitely an excellent memory exerciser the effects of which are transferable to other subjects where memory is necessary." Chess utilizes all abilities of human being. It enhances spatial aptitude, perceptive speed, reasoning, creativity as well as general intelligence of a person. It was claimed that chess playing makes kids smarter and hence in many schools chess is made a compulsory indoor sports. But for playing chess two players need to be in front of each other. What if someday you are alone at home and want to play chess with a friend who is few kilometers away from you. What if there is a competition but a player could not reach at the desired place due to some unavoidable conditions. Wireless powered chess proves to be an excellent solution over these problems. The wireless powered chess is similar to the conventional chess that we play in day-to-day life. It has two players playing with two colored pieces. The way it differs from the conventional chess is that the players need not to be in front of each other for playing. The main elements of the system are Adruino mux shield, DC motors, reed switches and Bluetooth. The range of distant play is about 10-15 km. The key types used to represent chess positions are:
Side - White j Black;
Piece - King j Queen j Rook j Bishop j Knight
Square - N * N
Position - side * (square → (side * piece) option)

Fig.1 Chess board

Fig. 2 Player playing chess

LITERATURE REVIEW

The game of chess with the modern rules came into existence in Italy towards the end of the 15th century. [1] The concept of wireless chess is un-introduced to the world. Many researches have been done on remote chess but the hardware of the concept was not developed yet. A survey paper by Heinz [2] gives an algorithmic construction of end game database and now it exists for every position.

Shi-Jim Yen, Jr-Chang Chen, Tai-Ning Yang, Shun-Chin Hsu in March 2004 proposed a concept of computer Chinese chess.[3] It is very important in the field of artificial intelligence as it is most popular and oldest game. The Chinese chess consists of a board and 32 pieces for two players. The board has eight horizontal and vertical lines in which the squares are arranged up in two alternating colors i.e. Light and Dark. The board is divided into two parts by horizontal central lines. The goal of the game is same as to checkmate the opponent.

Bo-Nian Chen, Bing-Jie Chen and Tsan sheng Hsu in January 2009 proposed an idea of Chinese dark chess [4]. It is different from Chinese chess that it uses only half of the board also called dark chess, blind chess or half chess. Most people playing Chinese chess play Chinese dark chess. A lot more people can play Chinese dark chess while not able to play Chinese chess.

Drawen and Yao proposed an algorithm to solve the problems where the object measure to guide searching process is very difficult [5]. The alpha-beta search algorithm, quiescence algorithm were implemented in Chinese chess [6]. An adaptive genetic algorithm was proposed by Wang [7] for Chinese chess strategies.

Lee and Liu proposed an approach in IEEE international conference in 2006 to develop software framework for rapidly online chess game [8].

PROPOSED CONTENT

Chess is a oldest game started back in 1500 years originated in Northern India in 6^{Th} century and got spread worldwide to many countries .In the conventional game of Chess the pieces was abbreviated as King, Adviser ,Elephant, Horse and Foot soldier but now in the modular format the names got changed to King, Queen, Bishop, Knight ,Rook and Pawn. The king and Bishop were week until the 1500AD and as the rules changes and modern era originates they got power more than other pieces on board.

In Path searching Algorithm of multiple robot system applying in Chinese chess game, the system contains multiple computers, Image system, RF module and thirty two mobile robots. Mobile robots are divided to be in the two sides i.e. black and white. Thus 16 mobile robots are for every opponent. The computer is used as a brain and the computer sends the commands to the robots and accordingly robot move the pieces on board and the present state of each robot is send back to the computer to judge whether the move made by the piece is right or is it at wrong destination. Each robot is having its own Identification code and a unique orientation. The identification code and orientation helps the computer to decide and search the new path for moving the next pieces accordingly to the move performed by user in computer. The player plays its move inside the computer with the help of mouse and accordingly the same move is done on board through the help of computer.

The drawback of this system is that the user need to be computer friendly and user should have the knowledge of computer. Another drawback is that the user should be able to synchronies the board and the computer so that the move played inside should be similar and if the board is synchronized but the moves are different than what is inside the computer then user must be able to troubleshoot the Architecture to enjoy the game without any problem.

In the proposed method of playing chess, the game is played in its true form without using computer. The presented system is having two different boards which is at a suitable distance to play the game, so that the opponent is at his place and enjoying game while being at his bed or watching TV as well.

It is having two wooden 36”× 36” size board which is used to play the game. The architecture contains DC motor, Stepper motor, Reed switches, permanent magnet and X-Y axis setup shown in figure 3.

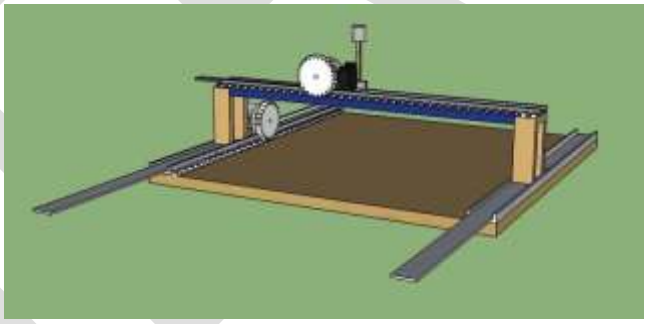

Fig. 3 X-Y Axis Set Up

The X-Y axis set up is used to move the motors to the all 64 blocks and helps the magnet to pick and drag the pieces to the proper position with respect to the move made on next board. The pick and drag is done by the magnet which is attached to the stepper motor and the stepper motor is mounted on the X-Y axis. The movement to the Y and X direction is done by the DC motor which is used to reach the particular position. In between the Permanent magnet and the pieces the reed switches are connected for each block to decide where the connection is terminated and a new connection is established. The Reed switch shown in figure 4 are the magnetic coupling switch in which is the magnet is placed the connection is active and after removal of the magnet the switch turns in its original position. If the particular piece is picked from user on board then the connection is terminated and when the user puts the piece into the new position then the connection is established. All the reed switches are connected to the Adruino Mux shield having 64 input and output ports corresponding to the each block on chess board.

Fig:- 4 Reed Switch

Fig:- 5 Adruino mux Shield

The Adruino board is acting in master and slave configuration. Adruino mux shield and Uno board is shown in figure 5.If the on board shield is sending the information then it is acting in master mode and the shield receiving information is acting in slave mode. The shield is basically used to send or to receive the move played by the user. The boards are connected via wireless link such as Bluetooth or RF module and depending upon the range of technique the distance between the two boards is decided for proper working condition.

The method is effective in terms of enjoying game at distance where the move made on board 1 is reflected on board 2 and the move made on board 2 is reflected on board 1.

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CONCLUSION

Proposed system is a very new and introductory project and has wide scope for development. Though if used it can prove to be the most efficient system for playing chess. The proposed method is used for range of few kilo meters. It uses Adruino processor and dc motor as main component. Research is going on for the betterment of device.

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