

Visualization of Modern Warfare with Chinese Chess

Zixuan, Wang

¹ Author's school: Cape Henry Collegiate Virginia Beach, Virginia

*Corresponding author. Email: Zwang23@student.capehenry.org

ABSTRACT

Some models visualize different warfare, such as dynamic images online, and real combat models. Although there are people comparing warfare and international relation with a game of chess, rarely have models appear. International relations are just like chess, where nations compete on a huge platform by moving forces and troops, says Trump, the former President of the United States of America. This paper will try to demonstrate and analyze events in the past and prove the hypothesis that Chinese Chess can be used as a model of international affairs and combats. First of all, the pieces in Chinese Chess are going to be defined as a part of modern warfare, then, how each part of a Chessboard is going to be introduced. Secondly, the rules of a chess game and the metaphors of each piece are explained. Lastly, the process that takes to the consequence is shown with pieces on a Chinese Chessboard, and the conclusion is made. Case studies about the Cuban Missile Crisis and the results of the calculation of the model may give some possible references and explanations that help with speculations and decisions later on.

Keywords: Chinese chess, visualized model, international affairs and combats, Cuba Missile Crisis

1. INTRODUCTION

Chinese Chess was invented a long time ago around 200 B.C. by a military commander named Han Xin (Murray). However, it appears to be rarely used to represent and visualize a real battle between two different power, but used as an entertainment and game. Within the game, pieces were created to represent a certain part of the army and to (present a situation or multiple situations of warfare. If Chinese Chess can visualize ancient events and warfare, it could very well likely be used to visualize modern warfare as well. In this paper, the possible way of using a Chinese chess game to present modern warfare will be explained and visualized. This way of representation may help students across grade levels to easily understand warfare and their results, also learning while enjoying a Chinese Chess game.

2. LITERATURE REVIEW

Scholars have had quantitative analysis on Chinese Chess. According to John von Neumann, a professor of Eötvös Loránd University, the Game theory was to predict different outcomes by looking at all the possibilities of the process. This requires amounts of constant factors, and in reality, however, everything is

changing with time. Research conducted by Qingyun Wu et al at Stanford University considers the endgame of chess as a math series and solves the endgame mathematically by predicting all the possibilities each step could result. By knowing the distances of each piece, the closeness of King pieces and pawns, and also the position of other pieces, the calculation of endgames could be done accurately. Her method of solving chess endgame is about Game Theory, in which it assumes different processes and predicts the outcomes. However, the best chess engines can only predict about 20-30 moves, while each player makes an average of 35 moves a game. Therefore, it can only be used to predict and calculate end games; in this case, a lot of statistics and numbers will be needed. Thus, Quantitative analysis is infeasible, and this paper will mainly focus on qualitative analysis.

Another paper written by Benjamin Gray suggests that abstract strategies of chess are a method “for intellect, critical thought, and even tactics used in wars.” In his paper, he mentions that chess can be very well used to mirror military strategy and mindset, such as giving pressure in different areas to the opponent. Even though Gray assumes to associate military tactics with chess, he does not predict all the consequences and dissolution each step could lead to. According to this paper, Chinese Chess can be used to present deductive

analysis and wars that have happened in the past. The visualization of endgame in Chinese Chess can lead to better illustration and final decisions.

Graham T. Allison from Harvard University, also published a paper in 1969, addressing that foreign policies have often been compared to chess. In both cases, a single move may most likely lead to a sequence of action in the future. Allison suggests a series of questions could be asked to a policy decision: “What happened? Why did this happen? What will happen?” Such questions could also be asked in each individual Chinese chess move, and thereby give out the prediction by analyzing earlier steps. Allison also proposed the Thucydides Trap, which indicates that a potential war is very likely to take place when an emerging power is threatening to take over an existed nation. Allison never use chess to compare these two theories with factual matters, and this paper will focus on representing an event or a war with a Chess model. It will be an analysis of past events without future predictions or prophecy. I

agree that past war can be tracked with Allison’s opinion, but a future prediction cannot be made with Chinese Chess because there is too much intertwinement between two powers economically and in another area, especially in modern warfare and in the future.

3. PROPOSAL

Modern conflicts can be analyzed by looking at visualization from Chinese Chess, but the two main power have to be mutually exclusive. This model will also only be used on past wars for deductive analysis and visualization, but not for future predictions.

4. METHOD

The goal is to create a demonstration for a better understanding of the Cuban Missile Crisis, both from its quality.

Table 1: Translation of Chinese Chess Pieces and Representation In Modern Warfare

Chess Piece (Chinse)	English translation	Representation
	Commander	The target of the game
	Guard	The defensive piece that is close to the commander
	Elephant	The defensive piece that is relatively far from the commander
	Horse	Flexible to use on both offensive and defensive
	Chariot	Most threatening piece to the opponent
	Cannon	The piece that can quickly attack but is hard to set up
	Pawn	It can be helpful to both sides sometimes

Note: This table translates pieces in Chinese names into English names, and these English names somewhat relate to different fractions that occur in modern warfare.

Table 2.1: Terminology for Chessboard Structures

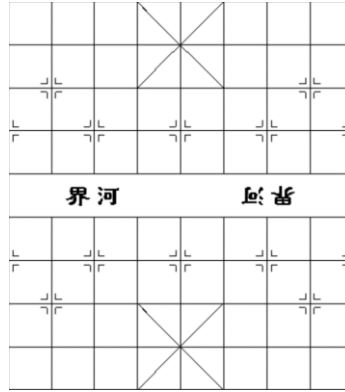
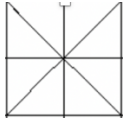

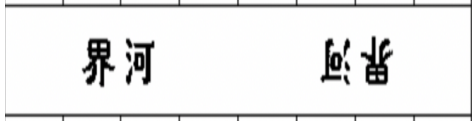


Table2.2: Explanation of Different Sectors of the Chinese Chessboard

	Palace	Palace is a square on the bottom center of the Chinese Chessboard, there is a square containing 3 "points" x 3 "points" with diagonal lines within it. It is the palace for the commander and its guards, who can only stay within the palace during the entire game.
	Point	Each player moves and takes turns, pieces stay on the intersections of lines, which are named points.
	River	Two sides of the chessboard are separated by a river, lying in the middle of the chess board. Pieces such as elephants and guards cannot cross the river, which limited them to only defensive purposes.

Note: This table helps demonstrate what different parts of a Chinese Chess part represent, and in addition, this table gives specific names of parts that will later be used in the paper.

Table 3: Other Terminology

Terminology List	Explanation
Check	When a piece is attacking an opponent's commander
Check-mate	When a piece is attacking an opponent's commander, and it cannot move, the game end.

How each piece in a Chinese Chess game will be used to represent fractions in a real battle is defined, and reasons are given.

Commander may move one point vertically or horizontally within the palace, and it is the target of the entire game. The Commander illustrates as the headquarters of each nation in real wars. It is because the Commander is the target of the game, representing the headquarters of a nation. Also, it is a direct determining factor of win or lose in a whole game. In a Chinese Chess game, the commander can only move one point per step, which makes it slow and hard to dodge attacks by other opponents. In reality, headquarters usually contains too many files, objects, and even people to be evacuated, and therefore move slow as well, and can be easily targeted and destroyed.

Guards are inside the palace with the commander, and they can only move one point diagonally each step within the palace. In reality, it represents the missile defensive system for a nation because it may be the best tool to defend against missiles or airforces since they

are closest to the commander. Since they are in the same 3x3 palace as the commander, they can always reach the commander within two steps. Thus, it is the best piece to represent a bodyguard for a nation, in modern warfare, missile defensive systems.

The elephant moves exactly two points in any diagonal direction, but it may not jump over intervening pieces or cross the river. It will be used as a marching army in this model because it moves relatively slow, and it cannot approach the headquarter at a close distance but may be powerful and supportive during a battle.

The horse moves one point horizontally or vertically, and then one point diagonally, but it cannot move in a direction where there is a piece blocking its way. It metaphors the airforce(bomber) during a real battle, because it moves slower than a missile, but sometimes could be more flexible and easily used for both offensive and defensive.

Chariots are the most powerful piece, and they move as many points as it wishes horizontally or vertically, but they cannot jump over pieces in their path. In this model, it represents the craft-carrier, because chariots are considered the most threatening piece in a Chinese Chess game, and in real battles, craft-carrier can give enemies lots of pressure when placed around the headquarters of a nation.

Cannons move exactly as a chariot, but when they are capturing pieces, they have to jump over one piece, either friend or foe, along its line of movement. It is the nuclear weapon/missiles in this model, because they are long-ranged weapons that are able to jump over an allied piece or an enemy piece, and it can quickly attack the enemy's headquarters, but it is easy to be detected, and inconvenience to set up sometimes.

Pawns move and capture by advancing one point forward, once it crossed the river, it may also move and capture one point horizontally. They are allied nations around the main power in this model. In the war, weapons and missiles are able to be set up in a foreign allied nation, but sometimes an allied force could also be given up in exchange for a high-value result, as Trump suggested.

5. RESULT

The distance from Cuba to DC is 1831km, and the distance from Turkey to Moscow is about 2426 km. Each point represents approximately 600 km on the Chinese Chessboard. Based on the data and information defined above, the simplest model of the position taken by two main nations could be visualized like the table below.

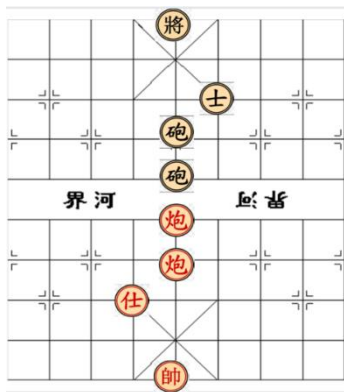


Figure 1: Stalemate Position at the Beginning

On both sides, there are missiles (cannon) set up, along with the missile defense system (guard). Furthermore, either side that moves first will always end up with a tragic aftermath/worse consequence, and therefore a stalemate occurs, where both nations are struggling to make decisions. In this case, a crisis is not likely to appear because both sides are not likely to take any actions. However, there are way more factors in

reality that will change the situation of this model. Traceback to the cold war and the Cuban Missile Crisis, if the red side were the United States and the black side were the USSR. The United States had approximately 31,255 nuclear warheads at its peak in 1967. Even though USSR only had about 5,000 nuclear warheads at the same time, a stalemate is still achieved in between because nuclear weapons are devastating. In this case, either side would not take any further steps regardless of the number of nuclear weapons each of them has. Thus, the forces from each side are in a balanced position, and peace is the outcome for civilians.



Figure 2: Position of Each Side Before the Cuba Missile Crisis

If the pawn on the bottom right corner were to represent Cuba, it is black because Cuba was on the same side as the USSR in the last century. An only pawn will not make a big difference within the model and in the real world, but forces from Russia are able to be deployed, even nuclear weapon.



Figure 3: Position of Each Side at the Beginning of the Cuba Missile Crisis

In this situation, however, missiles have been transported to another place where it is nearly impossible to defend because an intermediate-range ballistic missile can attack anywhere within 5,000 miles in 20 minutes. On October 14, 1962, the United States took photos of the Cuban island from the air, and they indicate that the Soviet Union are constructing

intermediate-range (IRBM) and medium-range ballistic missile (MRBM) sites on the island.

If cases like this occur, the only way to help both sides remain in a stalemate position is to reestablish a scenario where both sides could not move. In another word, one nation must make the other side scared to move forward and take military operations.

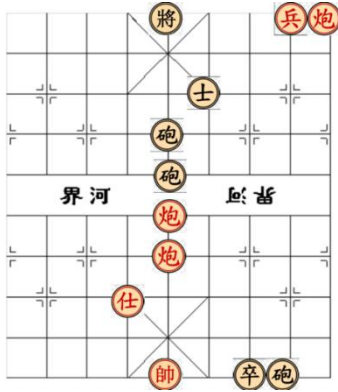


Figure 4: Reestablishment of Stalemate During the Cuba Missile Crisis

Therefore, this situation may very well be likely to occur, where the other side also transports missiles to a place that is hard to defend against. Even though there are no immediate threats occur, both sides are all in an uncomfortable situation, and a stalemate is reestablished. In reality, the United States decided to deploy nuclear weapons in European nations such as Turkey in 1962 after the failed attempt to overthrow the Castro regime in Cuba with the Pay of Pigs invasion planned by former U.S president Kennedy. After the nuclear weapon “U.S. Jupiter” missiles were placed, both sides are in a balanced position again, but both the United States and the USSR are in a seriously dangerous position, instead of a peaceful period. Particularly, both sides “lose” if one were going to take military operation.

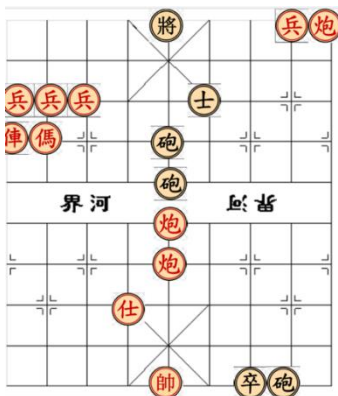


Figure 5: Reality in European Battleground

In reality, however, the United States has other forces in Europe and in NATO (North Atlantic Treaty Organization) who are able to help them, and therefore aircraft, airforces, and allied nations are placed around the Soviet Union, making the “game” for Slavic people

even harder. Eventually, USSR former president Khrushchev decided to withdraw nuclear heads and missiles from Cuba, preventing a dangerous nuclear war from happening. In this model, it is clearly shown that the USSR had disadvantages on the battlefield. If the nuclear war started, USSR will nearly disappear from the earth since thousands of troops from Europe are able to invade and attack the whole nation. On the other hand, the United States will still survive, not only the missile cannot reach the west coast of the United States, but also because the Soviet Union rarely had other forces deployed in the west besides nuclear missiles.

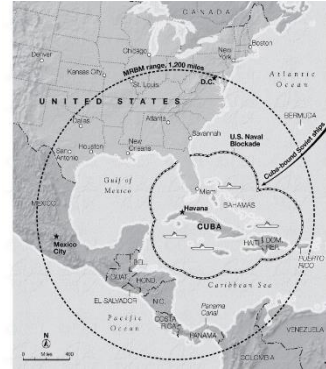


Figure 6: Map and Illustration of Cuba Missile Crisis in North America

Source:

<https://www.pinterest.com/pin/647392515165388305/>

6. DISCUSSION

However, the visualization of the Cuba Crisis presented by Chinese Chess may differ from reality. For example, pieces each side has in a chess game are set to a specific amount, and both players are in a situation of absolute equality during the game. On the other hand, one will never know what both sides have in reality, these may specify into weapons, missiles, or even alliances. In reality, the real threats are usually hidden, and therefore nobody knows what both sides really have during the game. Secondly, nearly every single Chinese chess game is decided by a winner, who wins the game. In reality, even though one side may benefit more than the other one does, there may hardly be a winner, who wins the "game". Especially in a nuclear war, where a few nuclear weapons may put the entire world into a threatening situation. In addition to that, players in a chess game must follow specific procedures and rules, and both players move their pieces in their own round. In a real war though, both sides are moving simultaneously, and one side may very likely move faster than the other side does, where war will never be "fair".

The Source of this war and the data found are all from the United States website, and bias could very well likely exist because Russia and different other

countries can have another perspective and even different data collected and recorded.

7. CONCLUSION

In conclusion from this model, the Cuban crisis started from many accidents, but the solution to the crisis in Cuba is not accidental, but rational. And the end of a war is always

the lesser of two evils. From the model created above, the reason why Khrushchev, former leader of the USSR, withdraw troops and weapons from Cuba is clearly shown. This reinforced the hypothesis that Chinese Chess can be used to visualize the outcome of a conflict or warfare.

This model could be adapted to conflicts and wars between two great power where there are not much intervention and cooperation going on economically or in another area. In this case, more chaotic will become obstacles to solving a problem, and Chinese Chess cannot present too much information on a single board. However, another type of chess "Go" may be used to represent how different areas are expanded and when big powers fight for power and land.

Future studies may include the discussion of the Peloponnesian war and the study of other cases. Other case studies may help with the accuracy of the deductive analysis and results.

REFERENCES

- [1] Allison, Graham T. "The American Political Science Review - JSTOR." *JSTOR*, <https://www.jstor.org/stable/1954423>.
- [2] Gray, Benjamin. "Chess and the Modern Commander." *Chess and the Modern Commander / The Cove*, The Cove, 30 July 2017, <https://cove.army.gov.au/article/chess-and-the-modern-commander>.
- [3] Korybko, Andrew. "Trump Says Intl. Relations Is like Chess, so Who Are His Pawns?" *404*, 19 Aug. 2020, <https://news.cgtn.com/news/2020-08-19/Trump-says-intl-relations-is-like-chess-so-who-are-his-pawns--T3YIABsdbO/index.html>.
- [4] "Networks." *Game Theory in Chess Endgames – and Possibly More: Networks Course Blog for INFO 2040/CS 2850/Econ 2040/SOC 2090*, <https://blogs.cornell.edu/info2040/2017/10/25/game-theory-in-chess-endgames-and-possibly-more/>.
- [5] "Nuclear Pieces on the Asia Chessboard: U.S., China, and Extended Deterrence." *Nuclear Pieces on the Asia Chessboard: U.S., China, and Extended Deterrence | Center for Strategic and International Studies*, <https://www.csis.org/analysis/nuclear-pieces-asia-chessboard-us-china-and-extended-deterrence>.
- [6] *Operations - U.S. Department of Defense*. <https://media.defense.gov/2012/Aug/23/2001330104/-1/-1/0/Cubanmissile.pdf>.
- [7] Rhp. "The Cuban Missile Crisis in Pictures, 1962." *Rare Historical Photos*, 20 Nov. 2021, <https://rarehistoricalphotos.com/cuban-missile-crisis-in-pictures-1962/>.
- [8] R., Murray H J, et al. *A History of Chess: Corrections and Additions Mostly by the Author H.J.R. Murray*. K. Whyld, 1994.
- [9] *U.S. Department of State*, U.S. Department of State, <https://history.state.gov/milestones/1961-1968/cuban-missile-crisis>.
- [10] *Xiangqi Terms in English - WXF.CA*. http://wxf.ca/xq/computer/XIANGQI_TERMS_IN_ENGLISH.pdf.