The Art of Forfeiting: Culture and Computation of Igo/Baduk/Weiqi

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Thesis: The Art of Resignation (forfeiting) in Go can probably be used during Machine Learning training for Go and other games to speed up the training process with itself and it would also make the AI a more respectful junzi (Confucian gentleman) that would attract more pro players to play against the AI for practice.

Outline:

Introduction of thesis

Introduction of the game of Go

History of Go

Four noble arts

Culture of Go

Language of Go

Go and health

Art of Forfeit within Go

Findings from simulating Go

Conclude and explain if findings contradicted thesis

**Intro**

I am using disparate sources ranging from online games, my own small modifications to code, and ancient texts to explore the game of go. Now to introduce Go in the context of the virus, suppose there is a 2x2 board:

(White blood cell)-–-(Infected cell)

| |

(empty)-------------(empty)

If it is the white blood cells’ (白血球, white blood ball, according to anime *Cells at Work*) turn to place a cell, called sente, where could a white blood cell be placed so as to capture, engulf, and eat the infected cell, which is in *atari*/check? The answer is:

(White blood cell)-–-(Infected cell)

| |

(empty)-------(White blood cell)

And the infected cell gets removed as the white blood cells’ prisoner. However, in a real-life Go board or pandemic, the infected cells would get the first move, at least at the start of the game. I say the word move as in chess, but as Moskowitz’s *Why the West Plays Chess and The East Plays Go* says, in Go it is a turn to place a stone, like a ninja appearing out of hiding, or a transient neutrophil white blood cell capable of moving through blood vessel walls, or a latent infected cell or cancer cell (Source: Cells at Work).

**Computation**

For this project, an offline web Go game with explanatory comments in Chinese was modified to have a weak Artificial Intelligence that takes capture of atari (when a piece is in Check) when the opportunity arises and can play continuously with itself to have a nice screensaver: [zoeweinberg.github.io/nixBoard](http://zoeweinberg.github.io/nixBoard) . So far, it does not implement exact territory scoring, which according to the rules of Go, would involve counting territory, which might be a little difficult, even for an insei/prodigy of Go (Source: Hikaru no Go, episode "No winning allowed"). A simple way to gauge scoring initially for this test program was created to merely count up how many stones of each color are on the board, which is part of scoring in some rule-sets anyways (Source: Wikihow, Go scoring, New York Go Institute’s scoring video by Stephanie Yin). This way of scoring based on population would be similar to evolution simulations. In the end though, a strong AI would still leave eyes (holes) in their groups/chains of stones to prevent them from being captured/eaten/wiped out. Therefore, a strong A.I. in Population Go would not play entirely differently from a normal traditional game of Go because it would still have a few eye spaces though not huge swathes of territory. Even both colors of the weak AI created for this project on NixBoard chose not to fill in all their eyes after 562 generations of evolution, despite the small increase of population reward they would get from it. Go is similar to reality, because even though having dents in the population seems counter-intuitive, according to Veritasium's video "This equation will change your perception on life", populations of living organisms swing from being overpopulated to underpopulated. Lacking social distancing during an epidemic loses the siege; for example, Genghis Khan won a siege because the besieged city fell to an epidemic, and later when Genghis Khan besieged another city, his troop camps on the outside fell to another epidemic, and they had to call a truce (Source: Youtube documentary on Genghis Khan, though not the one from the channel Extra Credits). Having space for agriculture is also important, especially during a pandemic when travel is limited.

This simple scoring technique would allow one to further modify the program and involve a simple Machine Learning algorithm like a genetic algorithm (evolution) that could not see what the opponent is doing but at least prioritize which moves it would want to make first, like a TASbot (Tool Assisted Speedrun). The first moves it would end up making after training would be the four square points, roughly. According to Hikaru no Go's ending Go lessons, playing close to the edge of the board helps because less stones are required to form territory; this is similar to the Art of War, which uses the least resources possible to win. It is also similar to the money-saving aspect of Mohism.

Whichever color lost the match would mutate its algorithm. So instead of playing tengen (center, source: Dwyrin's video "Dosaku vs. Tengen" about the 1600s match), the algorithm would prioritize one of the four points (or nearby points such as 2,3) first, and if that space was taken it might go to its next favorite spot, another of the four outside spots, such as 16,16. This queue of choices would be relatively easy to program and could help focus on the machine learning aspect, which would then enable testing of the Art of Forfeit. After testing simple adversarial machine learning between two agents, the program should then be further edited to include four agents. To make things simple, agents would not switch color even though the game isn't perfectly fair without a perfect komi score to compensate white going 2nd. This is because white and black have to play differently (though komi changes the styles). White has to be passive, which is actually the opposite of its aggressive Yang symbol, according to Weiqi Wonders.

The two groups of agents would have the same amount of playing time to train, though they would be able to play as many matches as they want given the time they have. So far, the program cannot yet resign, though that would be somewhat easy to implement, probably only an hour of coding at most for a Computer Science minor. The program can, however, pass. Passing a move means to refuse to make a move, though the word refuse sounds more impolite than it is in this game. Passing usually happens at the endgame when not much can be done to change the outcome. When both players pass consecutively, the game is over and the board is scored. Passing usually occurs when the scores are close to a tie, but an easy way to implement resignation would be to either pass or to forfeit after the number of prisoners is very unequal. In a match with a human, though, passing when about to lose by a lot would probably be impolite unless the player was a novice who could not yet count territory well.

One set of agents would play only until the endgame and not make unnecessary moves. The other set would play until the board is completely filled with stones and one-space true eyes that cannot be played on because of the rule against suicide. The Javascript program would switch between the two games like an expert sensei playing multiple games against many opponents at once but in this case only observing and proctoring multiple games at once. Actually, using time to limit the training time might not even be necessary in the preliminary stages of the program editing; one could just count the total number of moves made in each game and add them up, for example, a 200 move game where the scores were close plus a 100 move game where the scores were more unequal, would add up to 300 moves played by the polite agents. The impolite agents would be allowed to play 300 moves as well, and would probably only complete one game. The impolite agents might succeed to train themselves to be annoying xiaoren and be able to take advantage of the polite agents in the end but probably if the polite agents played with the impolite agents after training, the polite agents would win because they would reach the endgame with a lot more points impossible to come back from.

After reading the lyrics to Jay Chou’s song Hero and from watching The King’s Avatar, the idea solidified that “real life is not a single player game.” Although this project’s genetic algorithms have trained for 150 generations in Go, they are currently lacking skill and still playing stones isolated in the very corners (1, 1) of the board, probably because they lack adequate competition. Instead of creating a new Javascript Canvas (a square where you can paint the pixels with images and shapes), which might be complicated, adding a new color stone to the already existing board might help create competition. Two color Go is very traditional in Asia, and furthermore if there is a multi-color Go game the extra stones are usually red and gold (Sources: The Surrounding Game, and Everlasting Firmament). However, Internet Go tended to have a red square marking the last stone placed in Hikaru no Go from the 2000s. Likewise, the Go emulator being modified, NixBoard, came with the red square marking the last stone placed. It is useful for debugging purposes, but red stones would not make it easy to see the red square. Gold stones would not stand out very well against the brown pixels of the woody board. Blue would be a good color, at least for debugging. Blue would take some strain off of the human eyes looking at the board. Later, when the program is glitch-free, the color can be changed from blue to gold, or instead of having a 3-way war to simulate evolution, the colors could be separated into two different boards playing games simultaneously, which would be more traditional. It would also be necessary anyways to separate the boards into two, to pit the junzi (polite) against each other and to pit the xiaoren (impolite) against each other, and then after giving them a set amount of time to play multiple games as drawn out as they want, then testing the junzi against the xiaoren. Although Go is traditionally a single-player game, “it takes two to play a game of Go [and perfect the Divine Move]”, meaning, even a child cannot become a good Go player without a good rival; in this way, the rivals must co-develop (Source: Hikaru no Go). Like Mozi said, two officers that support each other when needed will do better than two officers that do not help each other (Source: The Black Ponderer). Likewise, in Go, sacrificing a small chance of winning against a rival will help both players have more time to practice uncharted territory.

**Culture**

However, forfeiting is not always considered polite or useful in all games at all times. Action single-player games can be reversed at the last moment, and even battling to the death in those games still gives valuable playing experience for those games specifically, as long as the players don’t “zero-out”, meaning losing all their equipment like they would in a real-life battle. Team games might also be tricky for surrendering because not all team members might want to give up, but on the other hand, if one team member has already died in the game, he will not get a chance to play until the game is over. Surrendering could help give up a definite loss and skip the waiting time to give the newbie more experience playing. Additionally, resignation is not just an art because of the respect and rituals it entails, but also because knowing when to resign (too early or too late) is a difficult art to master. In the Art of Resignation chapter of The Treasure Chest Enigma book, Kita Fumiko as a girl (who later became a pro) was scolded by her mother for not resigning to a pro player in a hopeless match even though she somehow managed to win. Her mother also cut off her hair (though just to shoulder length) so that she could compete with the boys unhindered by having to spend time managing long hair. The girl kept her short hair until she became a title-holder and got married. It is a true story, though things might have changed since A.I. But the time management strategy of cutting hair also relates to resignation as a time saver. Actually, even though there is a gender divide in the Video Games (specifically) branch of the ACV club at USF, it is not so much that all players are male but that almost all players have short hair, including the girls, and it just so happens that only a few girls at USF have short hair. So really, the main factor of being a pro gamer is perhaps not gender, but hair length. But really, long unkept hair is the most convenient, and could explain pros Cho Chikun’s and Lee Sedol’s (in the past) long hair (Sources: Cho Chikun in both Nick Sibicky’s Lecture <https://youtu.be/7KYcDPUMmG4> thumbnail and NHK Tournaments, images of Sedol). Having unkept hair that sticks up like antennas would help detect imminent collisions to the head and prevent brain damage, increasing the chance of human comeback. Of course, the main factor in skill for a specific game would be how long someone spends playing it (which would relate to the backpropagation Machine Learning algorithm), or if somebody’s parent or grandparent played the game, that player could expect to have natural skill at it. It is a controversial idea but it is echoed by Confucianism, and also with Akira Toya’s grandfather in Hikaru no Go, and even by top Starcraft player Serral whose father gave him advice on playing the computer game with etiquette by resigning. It is also a natural component of the ML algorithm Neuroevolution, which is one part of how humans and animals have developed instincts and reflexes over the millennia. A human brain is both a product of neuroevolution from many generations and also reinforcement-learning backpropagation (probably from dreams) that helps it deal with personal experiences. Of course, having a parent as a full-time teacher is also a huge advantage in learning to play a game or acquire any skill.

In the end, another undeniable way to teach A.I. to train faster is to simply increase the frame-rate (limit the time spent between turns) which could also help with debugging the evolution process instead of waiting an hour for two agents to finish playing a game only to find that the mutation algorithm had a bug (glitch). Reducing the frame-rate can also help debugging by spotting odd behavior in the A.I.s capturing or lack of captures. Changing the framerate and also the amount of thinking time (propagation time) for the A.I. is also perhaps necessary to have it adapt to different game milieus. An Internet Go game is much shorter and faster than a Meijin title game (Source: Hikaru no Go). Even in Nintendo’s Super Smash Bros., one official version of the game, Brawl, is slower than an older version of the game, Melee. Using too much or too little thinking time could cost the A.I. the outcome of the game. A.I. is not perfect as AlphaGo did lose one out of five matches with Lee Se-dol.

Forcing one set of agents to resign when needed would be a fast way to test the Art of Forfeit quickly but if the agents were allowed to forfeit or not, eventually they might actually choose to forfeit, because of the pressure of losing to other agents going through training and that having to mutate to prevent those losses. To win against other machine learning bots, the bots must learn to find a faster way to learn. As the Surrounding Game says, "Go is fascinating because it helps us understand what is understanding." Mencius also talked about Yi Qiu, the first Yi (ancient term for Weiqi) master ever recorded, and Yi Qiu's disciples, one of which who focused on Weiqi and thus improved, and the other who was distracted by archery and thus stagnated. However, merely spending a lot of time playing is not enough. The main difference between pros and amateurs, according to the Art of Resignation chapter in The Treasure Chest Enigma, is how likely they are to resign, even if there is a small chance of winning. This is because at some point of inequality, the rich only get richer and the poor only get poorer. Additionally, stones on the board cannot be removed unless captured. All the space gets filled up eventually, and when the board is nearly full the outcome is clear enough not to waste time playing it out. Computing time also takes time. For instance, AlphaStar, moving on from Go to Starcraft (which happens to also be dominated by Korea now), actually has a slower reaction time than most pros. Similarly, AlphaGo spent a lot of time deliberating its first move vs. Lee Sedol. Normally, humans think over their first move before the match starts. AlphaGo probably spent a lot of thinking time on the first move because it thought it was still in training mode, like the nuclear AI in the movie War Games. However, besides its first move in the first match, AlphaGo did spend an almost equal amount of time thinking as Lee Sedol.

Thinking time can be used however the player wants in high level matches, for example, a smoke break (like in AlphaGo movie), or a spin on one's motorcycle (like the man Tsubaki in Hikaru no Go during examinations to become pro), or to get up to stretch one's legs from the kneeling seiza position (like Hikaru wished he knew about in the test to become insei/prodigy), or having tea or lunch like in Hikaru no Go. The Hon'inbo title match in Japan is spread out over two days. However, with the advancement of AI and even the decade old Internet Go games, perhaps people's patience will decline in the future. People are usually more impatient playing board games like Go and Othello online than in playing board games in real life. However, there are some Go applications that let you play a game with a friend over a long period of time, playing a move whenever you have 5 minutes of freetime (Source: Haylee's World of Go/Baduk vs. Dwyrin).

As a side note more about the culture, one worry that vegans might have about Go stones is that expensive white stones are made from clamshells (Sources: The Surrounding Game documentary, and also "The Clamshells are Heavy" chapter in the Treasure Chest Enigma, and also from the web). However, even though "a clam has to die and rot in the soil for ten years" (Source: Surrounding Game), it is not like the process of producing silk, where silkworms are boiled alive. In a series of videos as part of a Chinese-only CCTV documentary on Youtube about Weiqi, a stone maker finds a large white seashell in the ocean and then grinds it down to make a Go stone. This might not be the case for all expensive stones, as there are even giant clams in a grocery store in the Sunset district of San Francisco, but the amount of time it takes for the gray shell color to turn white might make starting a Go stone company inconvenient. Additionally, given the title of The Glass Bead Game, a one page essay about the creative aspect of Go by Ernest Brown, stones are usually made nowadays with glass. Glass has a more creative aspect than grinding down shells because glass is made larger than the small particles of sand individually fused together, rather than the deconstructive aspect of grinding down shells or black slate. However, given the oysters and one possible origin of Go from star constellation mapping (Source: Hikaru no Go's Go Go Igo lessons), one Asian song that could relate to Go could be "Exploit Oysters and Looked at the Starry Sky" (using that exact grammar) by Kobaryo, a Japanese DJ. "Exploit Oysters" is also in a minor key, so it would not sound like the Se predecessor of the guzheng instrument, which Confucius called evil, according to USF professor Kumiko Uyeda. However, according to Weiqi Wonders, the Four Noble Things has been generalized to include not just the guqin instrument but any instrument, even Western instruments, and also even chess instead of Weiqi. Funny enough, one of the ending songs in the Hikaru no Go anime is titled (and also has the lyrics) "Music Is My Thing". Hikaru no Go touched on the culture and history of Go, because of the ghost Sai, but didn't mention the Four Noble Things explicitly, though the first opening song of the series shows Sai playing a transverse (horizontal) flute. Actually, many of the instruments in the Philippine Barrio Fiesta performance at USF are similar to the guqin in the sense that they can easily play a chromatic scale of 12 notes, such as the stringed (but high-pitched so different from the low-pitched guqin) bandurria, and the Mountain Dances' metal hand-drums that can even play a 24 note scale, like a guqin could theoretically play. DJ'ing software was also modified to play a 24 note scale, such as the eerie song Dark Matter by Kobaryo.

However, weiqi was not always accepted and included in the Four Noble Things. Another CCTV documentary about weiqi explained that nobles initially viewed weiqi as a waste of time. Mencius (a Confucian scholar) also said later that weiqi (then called Yi) addiction is one of the forms of unfilial behavior, including laziness of limbs, and shunned marriage bringing shame to one's parents. The Analects of Confucius supposedly mention weiqi as something to relieve boredom for people with nothing better to do.

Perhaps people in the Tale of Genji understood lessons of social distancing to stay alive from the eyes in Go. When characters die in the Tale of Genji, the other people who came in contact with the victim around the time of their death had to go into seclusion. Although it was probably motivated by religion such as Buddhism or Shinto or both, the seclusion could be thought of as a way of quarantine.

Go is often played in the Japanese kneeling position, seiza. Seiza is more comfortable to sit in if one turns their toes inwards (Source: Youtube). In Hikaru no Go, seiza is called "sitting in formal position." It can be difficult to sit in for long periods of time because of the strain on the knees and feet, but is easier on the back muscles than leaning forward in a chair or cross-legged. Another way of taking off the strain from the back muscles is probably the proper way of holding a Go stone, between the index finger and middle finger, with the index finger on top, and the hand outstretched. This way of holding the stones probably enables players to reach further forward without having to lean forward too much. According to Weiqi Wonders, weiqi used to be played in comfortable teahouses, however today there is not so much space and even old men squat on stoops leaning down to play on a weiqi board just barely resting completely on the concrete erosion-wall (Source: Weiqi Wonders: Conversations About the Game of Go). Before the reapplication of the '80s concept of artificial neural networks to modern computing power (Source: article on neuroevolution and parellel computing), Go had a divine essence to it that robots were predicted a decade away from reaching. In Hikaru no Go, Sai's ghost remains through Hon'inbo Shuusaku Torajiro and then later Shindo Hikaru because of his desire to play the Divine Move. As of 2019, however, even the world champion Starcraft (a computer game mostly taken over by Korea) was beaten by a group of Alphabet AI's. Starcraft was considered the hardest game, like how Go was (and still is and probably will be) the hardest board game. The rare Finnish Starcraft champion Serral had explained that his father taught him to always GG (Good Game, meaning forfeit in the context of Starcraft) after beating the Korean champion. In the future, retired men will probably also play Starcraft on laptops squatting or kneeling in parks. Not everyone is as skilled as Go Seigen (a Chinese Go master who moved to Japan) was to be privileged to play indoors (Sources: Weiqi Wonders, The Surrounding Game).

To entice new female Go players, perhaps replacing the stones with black and white candies such as blackcurrant and mints (some flavors of the Chinese candy KisKis) would have a more appealing aspect to it of Candy Crush than gambling or warfare mapping (a possible origin of Go). When stones are captured, they could also be eaten. As the sensei in Go Go Igo (Hikaru No Go's episode ending lessons) said, "thanks for the meal!" In the best quality Go Javascript emulator on Github, nixBoard, the method for checking atari (possibility of capture) is named can\_eat. NixBoard is commented in Chinese, so it took some translating to be able to understand it and flesh it out further.

Another way Go organizations are trying to address the gender gap is to implement Go Pair tournaments. Two players, one male and female, must take turns moving their same color to defeat the opposing team. It is based on the Go Doubles game, where teammates can be the same gender (Sources: Hikaru no Go's Go Go Igo Let's Play Go, Weiqi Wonders, Wikipedia).

Although A.I. initially brought new interest to the game of Go, it can also ruin it. For example, there is an A.I. app called Leela that anyone can use for Go. Around March 2020, there was a top player on FlyOrDie.com that was both 2nd place in Go and also Othello. Although Go and Othello look similar, the game-play strategies and rules are completely opposite, as in Othello the goal is to force one’s color into a corner and then change your opponent’s pieces’ loyalty to your side. Given the very controversial and perhaps offensive name of the player, “VirusAntrax”, which appeared suddenly during the corona-virus spread in the USA, he is probably using a bot.

One eye-opening idea that was shown in a video during the Japanese Robotic Innovations talk at USF was to have robot cafe workers that were intentionally not controlled by A.I. but by disabled people at home, with the founder (himself in a wheelchair) saying, “If people can feel the enjoyment of working in a cafe, it would be wrong to give that up to A.I.” This would reduce the headache for A.I. programmers and also give people a social outlet, especially in the context of the virus when people cannot meet in person.

Mencius (in pinyin Mingzi, according to Moskowitz’s Why The West Plays Chess and Why the East Plays Go) commented on the noble behavior of socially distant fish-hawks, saying that a married couple should not live together. Likewise, a noble Go player does not place their stones too close together, because once they are placed they cannot move apart, and may run out of liberties and fresh air to breath. Go stones cannot move until they are captured. In a sense, it is “until death do we part.” Fish-hawks also mate for life, but do not live together, as Professor Menkus said in Chinese Literature. So instead of always of always connecting one’s color stones (Extension), they might play the *hane*: putting one’s color next to the opponent’s color. This would reduce internal strife because even though the same color stones are on the same team, placing one’s color in a seki (mutual life or death) position would put the entire group of stones in jeopardy. Alternatively, one could play the Knight’s Move spacing, or the Diagonal, so that the stones are not too far apart to be cut off from each other in case they end up needing to share a liberty but not too close to the point that they bring each other down.

In Ancient China, supposedly the world was considered square and the sky round, with the board representing the square earth and the stones representing the round sky, day and night (Source: possibly Go Go Igo). On the other hand, according to Lane Wilcken, an artist of Philippine indigenous tattoos, euphemisms from ancient times could have been merely misinterpreted too literally by future anthropologists as round world mythology. But some people still believe the world is dome shaped even today, so if an emperor in the future (like Emperor Yao of ancient times) explicitly wants to teach his unruly son that the world is round, he could teach his son a modified game of Go where groups of enchained stones and liberties “wrap” (a programming term) from one edge of the board to the opposite edge, vertically and horizontally. The game could be emulated on a computer using the modulus function, written as the % sign in programming, which would divide the overflowed or underflowed position of interest on the board by 19 and take the remainder as the new position. In a round world game, black’s starting point would not make a difference, because there would be no world boundaries, only limited spherical space.

The Encirclement Game of Go is similar to the arcade arena-racing game Tron, where players try to cut off their opponents’ escape by leaving behind a trail of hazardous walls of colored light, particularly in a team multi-player Tron game where multiple walls of each color are created. An AI capable of playing the video game Asteroids may not be suitable for learning how to play Go, but an AI capable of Tron may be capable of learning the maze-building formation of Go.

A Sunzi's Art of War documentary explicitly references the game of Go. Additionally, Go’s gameplay of placing stones seemingly out of nowhere is similar to Sunzi’s guerilla tactic of sneaking into Chu behind enemy lines.

Brandon Hill’s Agent57 article mentioned at the bottom that although AlphaZero mastered Go, Shogi, chess, and Othello, it had to retrain itself each time before mastering the next game. AI is still not capable of playing one game decently and a minute later play a totally different game decently with the same brain. This article said that kind of learning and memory retention skill "comes naturally to a human infant." Likewise, in Hikaru no Go, there was a red-haired character named Kaga who was captain of the Shogi (Japanese chess with side-switching pieces) club but also had the most skill at Go out of the Go club members besides Hikaru, and Hikaru was already skilled enough at Go to become an Insei/prodigy.

As for non-generalized AI, however, Ke Jie 9p (9 Pro Dan) said in an interview about playing AlphaGo that humans will probably never be better than AI unless they evolve to have brains the size of their bodies (Source: Youtube video interview). However, there is indeed a way to slightly enlarge one's skull within their lifetime through the process of chewing food a lot, which in turn widens one's jawline to make room for wisdom teeth (Source: Dr. Mike and John Mew on the Orthropics Youtube channel). The Ancient Chinese philosopher and mechanic Mozi (Master Mo Di) also advocated eating primitive cooking comprised of vegetables like the Sage Kings did before him, which may explain why Mozi’s portrait shows him with such a wide jawline, and perhaps why the Golden Age of Philosophy (as mentioned by Professor Geoffrey Ashton) ended around Mozi’s time, because human brains were no longer able to grow to their full natural skull capacity, despite having the invention of writing to jot their ideas, but also having the unfortunately problematic invention of ceramic cooking-ware to make food soft. Although Mozi may not have played Go specifically, he did win each game of simulated warfare against Gongshu Ban to dissuade the Chu army from sieging the city that Mozi fortified. The fictional character Kaga of the Shogi Club in Hikaru no Go chewed gum in high-school (like Dr. Mew recommends), which perhaps explains his high level of generalized intelligence. Similarly, wisdom teeth are also only defined as 智齿 or 智牙, literally wisdom teeth, in Chinese (Source: ArchChinese.com), “the oldest written language still used today” (Source: Chinese101’s podcast). As aforementioned, to satisfy Ke Jie’s hope of cerebral humans, Mozi’s primitive vegetables and thriftiness, and the hunger of female players perhaps not entranced by the masculinity of weiqi, Go stones could possibly be played as different color round nuts, berries, seeds (even lotus seeds are edible, according to The Untamed), or dried crunchy nattō beans or for porcelain crowns chewy Mentos as a comment on TheDuddha’s 2012 video mentioned, and with Chinese rules (according to the Glass Bead Game by Ernest Brown) prisoners could be eaten as soon as they are captured without needing to be counted. They could also be reused as well.

But Ke Jie is correct for another reason as well, in that AI such as AlphaGo, AlphaStar, and Elon Musk's DOTA AI train quickly and use Parallel Computing (which is explained in a book by USF professor Peter Pacheco) to acquire 200 years of experience in a matter of weeks (as was the exact case with AlphaStar). Only a 1000-year-old ghost such as Fujiwara-no-Sai from the Heian period, reincarnated to possess 1900s Hon'inbo Shuusaku Torajiro and then later 200s Hikaru Shindo, would be able to tie with AI. Sadly, even Shuusaku himself did not have a long lifespan to play and died in an early age in his 30s due to an epidemic. No AI is perfect though (Source: AlphaGo movie) and Sai's ghost also made mistakes sometimes, which allowed Lee Sedol's God Move to defeat AlphaGo one out of five games, and also allowed Starcraft champion Serral to beat AlphaStar one out of five games. In the game AlphaStar lost to Serral, it was not allowed to forfeit but the developers did manually make it forfeit, perhaps learning from the previous obstinate loss with player MaNa.

As of 2020, the only game AI cannot officially beat is Minecraft. If it could, robots would be close to having the skills necessary to mining the raw minerals needed and to make electronic circuits to self-replicate. In a sense, it would be capable of fulfilling what some consider the most important aspect of filial piety, having offspring (though Mencius probably disagreed) (Sources: The Dark Lord, and "What did Mencius say about Weiqi?" on a question asking site). There is one A.I. rumored to have mastered Crystal PVP (Player Vs. Player) in Minecraft, so perhaps A.I. has indeed mastered mining in the game but not real life. As Fujiwara-no-Sai said, “if humans have gone to the moon, why are umbrellas still umbrellas [the same imperfect 1000 year old invention]?” Since the Crystal PVP bot is only offered to the highest bidder, it cannot be disproven to be exaggerated or fake (unlike the moon landing). Even if the bot is real, sometimes humans solve the hardest problems instead of seemingly easier ones more down to earth.

In Qin’s Moon, the fictional kid Tianming won a game of Weiqi with historical character Zifang’s help despite Tianming having accidentally opened with the tengen (center) move, which is the worst common opening sequence (Source: New York Go Institute) because forming territory using the edges of the board as natural borders is easier.

One thing that ought to be mentioned of culture and weiqi is the concept of guanxi, meaning connectedness or relations, from a scholarly article and a few other sources. For example, supposedly, when asked to draw a line between 3 words such as “chicken,” “grass,” and “cow,” non-Asian American kids drew the line between chicken and cow, but Chinese kids drew the line between cow and grass. It is categorical thinking versus relational thinking. The common Chinese phrase, mei guanxi (沒關係) means don’t worry, but literally it means something like “there is no connection, it’s unrelated, irrelevant.”

**Health and weiqi**

“In Asia, there is not as much stigma like there is in the West for becoming an expert/genius at the expense of letting the physical body deteriorate, like we see in The Theory of Everything.” (Source: An SFPL Go book). However, both Hikaru no Go, Misaeng, and The Surrounding Game subtly contradict the pessimistic view that weiqi is physically unhealthy (though perhaps not career-focused), showing that the most healthy players win. The Surrounding Game’s AGA tournament winner showed the camera the water bottle he bought from the vending machine, for instance, while his opponent did not bring anything to stay hydrated. Similarly, in a Starcraft match between Scarlett and Neeb, both pros took care of their health by drinking water (and Scarlett even paused the game to have the glaring bright spotlight turned off), but Neeb drank more water and narrowly won each 4 games (Source: SCVHL on Youtube). There is risk of overhydrating, though.

The main character of Misaeng, though violent and uneducated, explicitly says in the middle of Season 1 while running through a park that the best Baduk players first build the body to build the mind. In Hikaru no Go, the master ghost Sai leads Hikaru in stretching exercises, and Hikaru’s friend Waya follows suit, leading to both Hikaru and Waya becoming pros.

In Hikaru no Go’s episode “A Most Despicable Act”, Hikaru and Sai run to stop Mitani from cheating in a Go salon. Sai’s ghost does the “Naruto run” with his hands and arms trailing behind his back, as was the (exaggerated) fashion of running in ancient Japan according to the last ninja, to keep one’s center of gravity behind himself to prevent tripping. This method of running helped make carrying and swinging a sword easier/smoother but is also even more important in this era to avoid tripping on concrete (Source: interview on Asian Boss channel on Youtube). Mozi would say that it is the asphalt’s fault (inferred from source: SupremeMasterTV, Mozi about carriages), but nevertheless running like Sai would be helpful. Such a method will be important for both Go pros and *insei* like Geu-rae in Misaeng running to maintain mental and physical health and running to a match so as not to lose by default like Akira Touya did in Hikaru no Go, and will also help robot bipeds avoid tripping and damaging their expensive components, mitigating losses at the expense of speed. To test this, a Naruto run stick figure was tested against a track running style stick figure of the same weight and dimensions in a neuroevolution obstacle course simulation: <https://keiwan.itch.io/evolution> . The Naruto runner outperformed the track runner in the challenges such as high jumping, leaping over a rolling boulder (which is a good tripping simulator), and climbing stairs, and only performed slightly worse at running on a completely flat terrain, which didn’t even take into account the hazards of tripping on a hard surface. Avoiding broken teeth from tripping will ensure that white stones will still be made with oyster shells and not teeth, and will also make chewing more doable which facilitates the skull capacity expansion that pro player Ke Jie would want to see increase human brainpower. Similar to Hon’inbo Shuusaku’s premature death, Filipino boxing legend Pancho Villa also died young probably because of a tooth infection (Source, Pancho to Pacquiao, by Prof. Angelo Merino). Taking care of one’s health will avoid pro players vanishing during their prime, and perhaps if Shuusaku was still alive today, he would have been the best player to fight AlphaGo. Perhaps Go Seigen would’ve stood a chance, too.

Resigning not only gives more playing time to undetermined matches, but also gives more time for players to take care of their health. As USF Stock Investment Club Vice President Rock Gu said, “your health is 1, and everything else is zero; if you only have many zeroes, you have zero, but if you have One and many zeroes afterwards, you have 1000.” Without health, there is what Club Kasamahan calls “burnout”, which affects one’s work and efforts.

On the other hand, but perhaps only in extreme cases, “Addiction to Weiqi was considered by the Chinese philosopher Mencius (372-289BC) one of the five types of unfilial behavior.” (Source: HuffPo: Weiqi vs. Chess, see link). One of the five unfilial behaviors was also laziness of the limbs, suggesting weiqi can either be unhealthy or a waste of time like Confucius said or both. Confucius said gentlemen should only compete in archery and bow after the match. Yi Qiu (the weiqi teacher Mencius mentioned) had a failed Weiqi disciple who was distracted by archery. Archery is at least somewhat straining of an exercise, though sitting in seiza formal position and placing stones is also tiring (Source: Hikaru no Go). Ironically, Sai said that Hon’inbo Shuusaku died from the epidemic because he cared and looked after others. Early writers also heavily associated weiqi with gambling, and the prize money has also lasted until this decade. Gambling can also be addictive.

According to the Alphago movie, “Lee Sedol grew up on a farm believing that pizza grew on trees” (which is good because pizza is generally unhealthy). Surprisingly, Lee Sedol's game-changing God move 76 where he beat AlphaGo once was right after his smoke break. According to the web, addiction may be reinforced because nicotine temporarily increases mental function (although decreases it in the long term). One could also argue that another player who faced Alpha, Ke Jie, who later played Lee Sedol, with both of them using the Kick move like Alpha), also has a kind of addiction to prescription glasses, like this paper’s author. Haylee from Haylee's World of Go also wore glasses even at a young age while her sister did not and her sister preferred to be more active (Source: Haylee’s World of Go: How I became an insei/Prodigy). Early science said that wearing glasses worsened vision, and Japan even has eyesight exams in gym class in recent decades (Source: Highscore Girl), suggesting that eyesight can be strengthened like a muscle. Overcoming a prescription glasses addiction would save money and time in the long term using the philosophies of Mozi and One Punch Man, which would save time for human experience playing Go, and then would help contribute to Ke Jie’s idea of humans learning to make a comeback against the machines.

In a Go Club even in the USA (and anywhere in Canada or East Asia), it would probably be expected to take off one’s shoes before entering, as seen in the insei building of Hikaru no Go. As Confucius subtly said that “not treating others the way you do not wish to be treated” is more respectful than “treating the others the way you wish to be treated”, Stephanie Yin 1p explains that 8 stones needed to capture 3 stones could instead be used to form larger territory in an empty corner. Therefore, it is usually wise not to invade someone’s territory, especially while wearing outdoor shoes. This has to do with both culture and sanitation.

**Art of forfeiting**

In a post-AI Japanese NHK tournament where the female *Kisei* (a title) won, the male player resigned like Lee Sedol did by placing one of his prisoners on the board. So, the Alphago movie resignation is not just something that Lee Sedol does. Why is silently placing a prisoner back on the board to forfeit considered a “very polite” way of resigning (source: AlphaGo movie with Korea’s Lee Se-dol)? Perhaps one reason is that talking out loud can transmit a virus. Go master Hon’inbo Shuusaku died in an epidemic, for example. Another reason could be to avoid signs of killing; as Mencius said, “君子遠庖廚” (junzi yuan pao chu / “a gentleman stays far from the kitchen”), meaning he cannot bear to watch an animal be butchered. Likewise, Confucists avoid using knives at the table and instead use chopsticks (which are ironically named in an aggressive tone with the word “chop”). Yet another reason could be that releasing a prisoner crosses the language barrier and allows the Three Brothers countries to compete.

The most important part of learning to play and master a game is to call it a night (give up sometimes) and sleep (Source: The King’s Avatar donghua version). It is interesting to think that not only can A.I. have dreams through backpropagation (a similar process to the guiding dreams of the T’Boli Dreamweaversin the Philippines), but that it possibly has nightmares as well. AlphaGo probably had nightmares after its weakness was found by Chinese Frenchman pro Fan Hui, and if Lee Se-dol’s matches were also counted as a training exercise, AlphaGo would’ve had a nightmare looking back on Sedol’s God Move 76 (a wedge in between AlphaGo’s chains) in Match 4 that only 1 in a 1000 pros would make. After that, AlphaGo literally knew it would lose that match. Since play style can show personality (Source: Hikaru no Go), AlphaGo could be thought of as having some essence of personality. Like a European computer scientist who helped coded AlphaGo said, people started referring to it as he or she. However, the coder may not have known that the words “he”, “she”, and “it” all sound the same in Chinese Mandarin, pronounced “ta”. On paper, the pronouns are written somewhat differently in modern times, but he and she are still a little ambiguous. Putting that together with Japan’s history of mechanical humanoid toys (like the one for rich samurais) and Shinto’s animism, perhaps it is not only AlphaGo’s skill that manifested its personality but also the Asian audience that was already willing to accept its anthropomorphism despite the divine challenge of Go. But going back to nightmares, during the AlphaStar bots’ matches with players TLO and MaNa, one of the bots obsessed over producing Observers, “as if it lost a game to Dark Templars [invisible extraterrestrials wearing cloaks and wielding white hot knives]”. Sounds like a nightmare. AlphaGo could’ve had nightmares of the Tiger’s Mouth shape of 3 stones (as called by Stephanie Yin NYIG founder). These nightmares can not only help improve one’s game by avoiding mistakes (such as allowing a cutting point in Go or a blind spot in Starcraft), but also could help a bot recognize that it is game over and time to resign if it is too late already.

Perhaps this is too irrelevant, but the art of resignation could be used in Minecraft and real life as well, where in both you can literally dig yourself into an (almost) unescapable hole. The appropriate thing to do is to restart the game or wait to be rescued in some real-life scenarios, rather than digging deeper in an attempt to find a rare underground cavern. If a drone gets stuck in real life, it should not struggle and waste mechanical and computational power on that one failed game, and instead be a gentleman to its peers by shifting its attention to the other drones’ views (like watching others’ Go games after resigning early) and giving advice if it is appropriate (cloud computing), though in a Young Lions Go tournament, advice is forbidden (Source: Hikaru no Go). Guanxi could be applied to the Inter-net of Things when drones are on a team.

Weiqi was (and still is) a stepping stone for A.I. to take advantage of the *sente* move opportunity when it comes to predicting epidemic pathogen protein folding configurations, and perhaps in the future, A.I. will also be able to design artificial proteins to bind to viruses as intelligently as human Foldit players can. Although nobody will again host a million-dollar reward for a human vs. computer Go match, Go will still be used as a benchmark for testing newer AIs against older AIs.

Similar to the art of resigning, there is also the placement of handicap starter stones for beginners playing experts (Sources: Hikaru no Go, The Glss Bead Game by Ernest Brown). Even in training strong programs like AlphaGo and Handol vs. weaker programs like Fuego and open-source GnuGo, the weaker programs were assigned handicap starter stones and played first as black rather than changing the komi, which would change the play style (Source: AlphaGo paper, and Go Pro Yeonwoo’s video “Bug sniper net bug occurrence!”). The Glass Bead Game said that handicap pieces are common in Go but uncommon in chess. Handicap pieces would make chess more enjoyable for pros (less boring) and newbies (more hope of winning in sight) and would also probably help train strong chess programs against weak chess programs. As Sai said in Hikaru no Go, playing against weaker opponents assigned a handicap surplus “teaches one to become an efficient marauder”. Initially, a cultural practice of assigning a handicap might seem irrelevant to training, which could also be evaluated by win-ratio, but the training processes of both AlphaGo and Handol help prove the efficacy of handicaps. Another method of handicap could be to give the beginner more thinking time.

**The Four Noble Things/Arts**

棋**/Qi as in** 圍棋**/weiqi, originally called Yi (Source: … and Why the East Plays Go)**

Go was not always accepted as an art but eventually became one of the Four Noble Arts.

**Music (guqin/古琴 instrument)**

This 1st Hikaru no Go opening song lyrics and translation since it was so hard to find. Karaoke version had translation: <https://m.youtube.com/watch?v=yDrNXLnln5E>

Unfortunately perhaps, none of the Hikaru no Go songs are explicitly about Go, including the first ED (ending song) Bokura no Bouken by Kids Alive (a minor key song, unlike the first OP (opening song) Get Over by Dreams and the major key parodies from AIG). The music video for Hal's song I'll Be The One seems nothing specifically related to Go, but is also in a nice minor key with instrumental parts that sound playable on a koto. And then there is one of the ED's, 2nd or 3rd, Music Is My Thing, probably by Hal. Perhaps it is hard to find Go related songs because the OP for Everlasting Firmament also has nothing to do with the anime according to Busiao Zu. The relation with that OP is probably just that the strings of the acoustic wooden guitar resemble the lines on the wooden Go board.

Ironically, the lyrics for Bokura no Bouken say "I will not cry, I will not lose", is perhaps appropriate as the first OP as Hikaru's beginner mindset and exploration phase when learning the basic rules, but later he learns to resign. There is also much crying. The heart pounding feeling a man in Weiqi Wonders describes is real. It is not felt so much when playing Western chess, even against a bully. Weiqi certainly brings out all your emotions such as greed as The Surrounding Game describes. It is probably emotional because it is so realistic because of the numerous pixels of the board, it is more high-definition than Tetris. It feels like real life and tells a story in each game. According to Hikaru no Go, playing style is unique for everyone and can tell you about the player's personality and identify the player if they are anonymous.

Surprisingly, both the Leela Go AI program and the song volume normalization app Foobar2000 were developed by the same person ([www.sjeng.org](http://www.sjeng.org/) , as linked by the Leela HelpLeela Homepage tab). Those programs are related to two of the Four Noble Things: Music and Chess. Additionally, with volume normalization, one can play both contemporary audio (which due to higher definition has higher volume) and historical music (like the guqin, which is a particularly quiet instrument). A 君子/junzi (gentleman) could use music to try and fend off mosquitoes in a peaceful land, and if war followed him into the swamp, he could use weiqi to plan ahead (and planning ahead is the essence of etiquette).

Part of the reasons why Go stones are held between the index and middle finger is that snapping the stone like that produces a nice click sound (Sources: Hikaru no Go’s animation and live action lessons, and also theduddha2’s 2012 video Learn Go in 15 mins: <https://youtu.be/JWdgqV-8yVg> ). The click noise can be thought of as a sound effect like in video games. It extends the game beyond the visual sense and into the auditory sense, and in *Hot and Cold Mediums,* Marshall McLuhan wrote that mediums that appeal to multiple senses at once cool down national tensions. This is just one intersection of Go and music and others of the Four Arts.

**Calligraphy (shù)**

Lee Sedol's autograph on the board he gave to Dennis Hassabis (the chess player and leader of AlphaGo) shows that his name Lee is the surname 李 which is also a Chinese character.

The Chinese drama The Dark Lord (夜天子) shows both Chinese chess (xiangqi) and calligraphy. As a video medium, it shows the intricacies of fine motor skill movements used for calligraphy, similar to how Hikaru no Go shows how to pick up a stone from the bowl and place it. There are also some differences between ways characters pick up stones in Hikaru no Go (such as Toya Meijin’s 3-finger-hold) and differences in holding a brush in The Dark Lord. The main character, Ye Xiaotian （Leaf 小天）holds his brush unlike the common three finger grasp that we hold pencils with. Ye Xiaotian holds the brush with all of his four fingers and thumb. This takes the brunt of the strain off of the middle finger which could be calloused from writing. However, the main villain king in the Dark Lord holds his brush as we normally hold a pencil. He is also skilled at xiangqi and made all of his opponents resign at the exact same time (which would require the pro level skill needed to play to a perfect draw) despite playing them all at once. Xiangqi is also quite related to calligraphy because the chess pieces are marked with Chinese characters. Additionally, to differentiate between the different loyalties of the pieces, one set is marked with homophones of the original words to symbolize their ranks (such as xiang/elephant, pao/cannon, general).

Go can also help teach Chinese and Japanese reading skills because most commentators’ large teaching boards have the rows numbered in Chinese, 一 二 三 四 五 六 七 八 九 十 十一 十二 十三 十四 十五 十六 十七 十八 十九 (1-19). Something interesting to note about the rows and columns notation is that in Hikaru no Go, Sai specifies coordinates on the board by the column number first followed by the row number 2nd. Perhaps this is because of the original Japanese and Chinese writing systems that read top to bottom first and then right to left after a column is finished. In programming a 2 dimensional array (a matrix if square), there is also often confusion as to whether the row or column is specified first, whereas in math, the horizontal X coordinate usually comes first, which would actually denote the column number. In the Nixboard code, there is a small bug or typo that doesn’t affect gameplay but affects debugging and programming A.I., which is that the Row variable actually specifies the column number and the Col variable actually affects the row number. Additionally, as Sai played against Hikaru for the first time and messed up in Hikaru no Go, to the player on the other side of the board (in real life), the row numbers are flipped.

But back to handwriting, A.I. is already capable of reading and generating handwritten Arabic numerals to an extent (Source: Siraj Raval), and will soon perhaps learn to read handwritten Chinese and Japanese Kanji (Source: AI Experiments With Google). Both humans and machines somewhat depend on stroke order to read and write Chinese, especially when someone is writing an imaginary character with their finger that does not leave an ink trail.

画**/hua/painting**

“Why does [forgot the name]’s painting of a Go board 25 by 25?”

Also, if you draw an abstracted two-dimensional neural network on paper, it looks similar to stones connected by lines on a Go boards. Of course, however, drawing was not merely an abstract art back then, as it was also a sheer necessity to depict an image as photography was not yet invented. The Chinese character hua is the same as the hua in the word donghua (animation, literally moving drawings). See the painting of Guan Yu being treated for an arrow wound while simultaneously playing Go. Go itself is somewhat like a canvas to paint on, especially if a board is big like in the painting of Guan Yu. Japanese Go style tends to be more artistic and aesthetic, while Korean style is more practical (source: Go Go Igo), and China is in between (source: Weiqi Wonders).

**Re-evaluating Go thesis with findings**

Thesis: The Art of Resignation (forfeiting) in Go can probably be used during Machine Learning training for Go and other games and it would also make the AI a more respectful junzi (Confucian gentleman) that would attract more pro players to play against the AI for practice.

**Findings**

Testing the art of resigning in a controlled manner using A.I. agents proved to be too difficult to program because the natural way to test it would be to use two boards, with two forfeiters on one board and two obstinate players on the other, and then swap half of the players on each board to pit the gentlemen against the xiaoren (petty) players. However, it turns out that copying all the variables required for one board to use them in another simultaneous board would be easily implemented with Object Oriented Programming, which is not easy in Javascript, the player-friendly language that Nixboard uses. In line with the Art of Resigning metaphorically, it was best to give up on the extensive programming part and revert the program back to its last stable state (which still includes an evolutionary algorithm) and instead focus on writing. For the sake of time, programmers must sometimes forfeit the art of forfeiting, even though it could help with neural training and junzi attraction of pro players in the long term.

However, while exploring the possible use of forfeiting in the protein folding game Foldit, an opportunity was found to modify the recipe/script GAB (Genetic Algorithm on rubber Bands) to have the AI agents reset the puzzle to a fair starting point rather than plagiarizing each others’ work on the folding puzzle. This delayed score increases in the short term, but by the 2nd generation of “critters” that properly evolved, the modified impartial recipe led to a 20 point advantage (a more realistic fold prediction) compared to 2 gens of the original recipe. Modification: <https://fold.it/portal/recipe/103467> . It was tested on aflatoxin protein but could be used for COVID19 protein folding prediction or even treatment binder protein design. Resetting the puzzle is in a sense forfeiting. In Hikaru no Go as well, an insei should resign if they accidentally cheat by picking up an already placed stone and moving it. Hopefully AI will be used in Foldit not only to refold a protein with “rubber bands” but also be able to choose amino acids with intelligence in protein design mode rather than using the built-in “mutate” function which seems too random. Then, AI might be able to use the art of resigning to beat humans at Foldit, and then humans should forfeit an ounce of pride to let AI find treatments for epidemics like the one that killed Shuusaku, creator of Shusaku’s Diagonal. However, humans should still try to find weaknesses in AI by training AI against humans with handicap stones or partly solved puzzles.

However, resetting the puzzle entirely for each critter (rather than going back to a fair save point built on the previous generation of critters’ work) resulted in less points than both the plagiarizing algorithm and the competitive algorithm even by the 2nd generation, though perhaps with many generations it could help if the puzzle is stuck in a rut (local best). Therefore, a combination of cooperation and competition is probably useful. Alternatively, if each critter is given much more time to solve the puzzle on its own without the help from previous generations, perhaps fully resetting the puzzle would help. Another step up from non-parallelized non-neural genetic algorithms could be using Gradient Descent, which involves momentum of a variable trying to find the lowest valley of error. The valley would be in this case of energy (inaccuracy) in protein fold configurations. Having the algorithm forfeit/reset too quickly resulted in the rank going down after 11 generations because it was outpaced by an online human player. Additionally, the agents also need to adapt to the endgame of the puzzle, which may require different tactics. For instance, in Go, playing tengen (center) and certainly the very corners of the board (1,1), (19,19), are not wise at the beginning of the game but can be played later (Source: a Ryan NYIG Random Opening Challenge). Therefore, expecting a simple agent to be able to play the fuseki (opening) and middle game and endgame could be difficult, so evolving the algorithms based on a partly solved protein may be easier than expecting the agents to have more generalized intelligence by starting from scratch.

While re-investigating more stable and translatable (has browser-based text that can be copied) science games like EteRNA and Nanocrafter, Nanocrafter’s news in May 8 2020 said that supposedly new virtual slot machines in 2020 (Year of the Virus) resemble Foldit or Nanocrafter in the sense that they require “connecting symbols and finding the right combinations” (Source: Nanocrafter.org). This makes gambling games merge with science simulations, which is interesting because Go was also heavily associated with gambling around its conception. This reinforces the idea that an AI that could learn to play Go could learn to play an also 2D game like Nanocrafter or EteRNA (though perhaps not 3D Foldit). Since Nanocrafter is about designing nano-machines, an AI capable of designing machines would be a step closer to filial piety (care for shared DNA) by producing offspring.

However, after reading the news, it turns out that Nanocrafter is no longer playable on the site. Therefore, the gambling site probably bought Nanocrafter’s domain and tacitly linked its news to the gambling site, and exaggerated the idea that a game like CatSushi is somehow related to science puzzles (besides maybe the “recipe” programs in Foldit). As a side note, Nanocrafter was definitely playable a few years ago. Speaking of a sushi game though, unfortunately, there is a lack of Asian presence on science puzzles like Foldit as well. This is probably because of the constant crashing of Foldit and the lack of encoded language support or even respect for Chinese, the #1 language. Even though there are a few Foldit players with Chinese names, they do not speak up much. One of the top Foldit players, LociOiling, seemingly knows Japanese, though, judging from the Discord channel communication. Because Korea’s program Handol outperformed AlphaGo (source: Go Pro Yeonwoo’s video “Bug sniper net bug occurrence!”), forfeiting a little American pride and enabling Asian language support (with UTF 16) for science games would help bring in Asian and Chinese experts that dealt with the originally named Wuhan virus more efficiently. But as the early 1900’s Spanish Flu was only named that because Spain was the only country that didn’t censor the news, perhaps Wuhan should only be seen in a positive light because of the name. For now, until people realize that reporting the virus should only be seen as good, the virus ought to be called coronavirus, which also gives hints to the virus’ crown shaped structure, which would help design microscopic treatments. In early 2020 I only referred to the COVID19 virus (which was ironically only named in 2020 in the US) as the Wuhan virus because it was obscure and back then and wasn’t sure that people would see it as relevant to Asian Studies. Now though, people in China are safely going outside and enjoying the Cherry Blossoms while the US is suffering due to its own contradictions: for instance, around March the CDC initially said only sick people and nurses need masks, and now it says everyone needs a mask. The CDC may have unknowingly said “a white horse is not a horse”, an Ancient Chinese paradox referenced by Moskowitz’s “Why the West plays Chess and the East plays Go” and Qin’s Moon.

**Conclusion**

Having AI agent forfeit the previous Agent’s work but not forcing them to fully resign and forget all its ancestors’ work after just 30 seconds indeed sped up the training process in Foldit (using the Lua 2 programming language for Foldit scripts). It was a small needed change to implement that one step back, two steps forward concept of resigning, even though in a normal adversarial machine learning game, agents are scored simultaneously rather than one after the other so falsely taking credit for the enemy agent’s work is not even possible. As Confucius said, “to know is to know that I know nothing.” Since the Foldit AIs were able to know that their peers’ work was not theirs, it helped them improve in the long term, and increased their learning rate. However, there is still the ML concept of the Law of Diminishing Returns, that says a primitive AI will eventually reach its limit and training further yields less improvement. Nevertheless, the art of forfeiting proved to be very useful to speed up the process of health science, at least when human pro players are Away From KeyBoard.

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Weiqi bibliography

About 15 articles/essays/books

About 30 sources in total including webpages

Mostly copied from the syllabus:

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Texts:

Public library books due to return on Mar. 6:

The Book of Go by William S Cobb (includes portable Go board).

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Stepping Stones to Go by Shigemi Kishikawa.

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By Shotwell, Peter

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Also found with keywords Mojia, weiqi.

<https://www.usgo.org/sites/default/files/bh_library/ApdxVIII.pdf> Note: large font in one column convenient for an auto-scroller, though not entirely professional language. Talks about 阴阳 / Yīnyáng ([https://translate.google.com/#view=home&op=translate&sl=zh-CN&tl=en&text=%E9%98%B4%E9%98%B3](https://translate.google.com/%23view=home&op=translate&sl=zh-CN&tl=en&text=%25E9%2598%25B4%25E9%2598%25B3) ). Also implies that the West has logical thinking, while the East has rational thinking (less abstracted). Page 152: “man has 360 joints, which match the number of Heaven....” [days, if 天]. Likewise, there are 361 intersections, like the 361 day Ancient Chinese calendar according to a different source. “Why the East plays Go” Page 152 also reinforces the idea of categorical vs. relational thinking. The compilation also includes a strategic Chinese proverb “muddy the waters to catch the fish” which can be applied to Go and warfare. This can be contrasted with the abstract English saying, “teach a man to fish,” which doesn’t actually give any fishing advice.

Utagawa [surname], Kuniyoshi. Japanese: 歌川 國芳. Painted “Physician Hua Tuo Scraping the Bone of Guan Yu to Treat an Arrow Wound”. Guan Yu is playing Go while being treated: <https://jamanetwork.com/data/journals/jama/4481/m_jcs90019fa.png>

Github Nixboard repository.

<https://storage.googleapis.com/deepmind-media/alphago/AlphaGoNaturePaper.pdf>

From before Lee Se-dol.

Alphago is probably named after Google’s parent company Alphabet Inc, not like alpha male, which could contradict the art of manful resignation. Additionally, the article has many Greek mathematical symbols such as alpha, gamma, and delta (which is recognizable from KamelCamellia’s J-Core song *Delta [symbol] for the Delta*.

There is also AlphaFold which was likely to be and now is folding proteins of the Wuhan virus.

# Hassabis, Demis. Silver, David and many other authors. Mastering Chess and Shogi by Self-Play with a General Reinforcement Learning Algorithm.

<https://arxiv.org/abs/1712.01815>

After beating Shogi as well

Hassabis, Demis and other authors.

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Same company as AlphaGo, using machine learning for disease protein folding in the game Foldit

Jan 2020

**弈鹿围棋拍手歌.**

Found with 围棋歌.

[https://m.v.qq.com/play.html?&vid=t0377ck97ew&ptag=duckduckgo.com%23v.play.adaptor%232&mreferrer=https%3A%2F%2Fduckduckgo.com%2F](https://m.v.qq.com/play.html?&vid=t0377ck97ew&ptag=duckduckgo.com%2523v.play.adaptor%25232&mreferrer=https%253A%252F%252Fduckduckgo.com%252F) Chinese Go kid’s cartoon song.

Hill, Brandon. Agent57 masters the 57 Atari games. <https://hothardware.com/news/deepmind-agent57-ai-can-now-master-classic-atari-games-like-pitfall-and-solaris>

High, Bob. Goe songbook (albeit American and European). Original transliteration was Ing Goe according to American Ing Goe society.

San Francisco Go Club by the Buddhist Church to the left of JYC (Japanese Youth Council). Has a sign that says 碁 as in 囲碁. However, was closed during coronavirus.

Fusion search

Competing for a Better Role Relation: International Relations, Sino-US Rivalry and Game of Weiqi

[https://link.springer.com/article/10.1007%2Fs11366-019-09638-7](https://link.springer.com/article/10.1007%252Fs11366-019-09638-7)

also on [http://eds.a.ebscohost.com/eds/viewarticle/render?data=dGJyMPPp44rp2%2fdV0%2bnjisfk5Ie46bFQr661Sq%2bk63nn5Kx94um%2bS62otUewprBInq%2b4Sq%2bwrlGexss%2b8ujfhvHX4Yzn5eyB4rOrSrCusFG0qbBJpOLfhuWz44ak2uBV49rxi%2bjppIzf3btZzJzfhrvb4ovx4PFGwqvCTsOuwVqk3O2K69fyVeTr6oTy2%2faM&vid=8&sid=892abcb2-3ae2-4372-a3d4-479fa8a0e3bc@sessionmgr4007](http://eds.a.ebscohost.com/eds/viewarticle/render?data=dGJyMPPp44rp2%252fdV0%252bnjisfk5Ie46bFQr661Sq%252bk63nn5Kx94um%252bS62otUewprBInq%252b4Sq%252bwrlGexss%252b8ujfhvHX4Yzn5eyB4rOrSrCusFG0qbBJpOLfhuWz44ak2uBV49rxi%252bjppIzf3btZzJzfhrvb4ovx4PFGwqvCTsOuwVqk3O2K69fyVeTr6oTy2%252faM&vid=8&sid=892abcb2-3ae2-4372-a3d4-479fa8a0e3bc@sessionmgr4007)

Login with Fusion search or Athens for full article

勢 power

references Moskowitz

"Last but not least, weiqi allows a player to accept defeat and resign at any time, without having to count the amount of space each player has taken. Practically, players save time this way, so they can start another game."

also has many references to articles, like:

[https://link.springer.com/article/10.1007%2Fs41111-016-0015-1](https://link.springer.com/article/10.1007%252Fs41111-016-0015-1)

which seems to refute Wikipedia's statement that Go is a zero-sum game. I think this source and others also describe the 4 arts as being weiqi, music (which the CCTV documentary describes as being specifically the guqin, as Prof. Kumiko Uyeda said about Confucius), shu (not the character for book)/calligraphy, and painting. In the capstone syllabus, I mistakenly wrote poetry instead of painting.

<https://www.usfca.edu/center-asia-pacific/perspectives/v15n1/hird>

Weiqi mentioned

Fall 2017 Article

In League with Gentlemen: Junzi Masculinity and the Chinese Nation in Cultural Nationalist Discourses

By Derek Hird, University of Westminster

Not to be confused with Marc Moskowitz's article actually titled Weiqi And Masculinity:

Go Nation : Chinese Masculinities and the Game of Weiqi in China

by Marc L. Moskowitz

<https://ebookcentral.proquest.com/lib/usflibrary-ebooks/detail.action?docID=1350171>

Jhu.org

Jstor

<https://www.goodreads.com/book/show/17739556-go-nation> ("Amazon prime read free" but book is almost $1000 in print, only $16 kindle)

//////////start copy-pasted

Deep Learning and the Game of Go / Max Pumperla.

Detail Only Available

eBook

By: Pumperla, Max. Manning Publications, 2019. 1 online resource (384 pages) Language: English, Database: Ignacio: USF Libraries Catalog

Summary: Deep Learning and the Game of Go introduces deep learning by teaching you to build a Go-winning bot. As you progress, you'll apply increasingly complex training techniques and strategies...

Subjects: Electronic books

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[View Online] View Online View in Catalog

3.

Go Nation : Chinese Masculinities and the Game of Weiqi in China

Full Text Available

Book Jacket

eBook

By: Moskowitz, Marc L. Series: Asia: Local Studies / Global Themes. Berkeley : University of California Press. 2013. eBook., Database: eBook Collection (EBSCOhost)

Go (Weiqi in Chinese) is one of the most popular games in East Asia, with a steadily increasing fan base around the world. Like chess, Go is a logic game but it is much older, with written record...

Subjects: SOCIAL SCIENCE / Anthropology / Cultural & Social; HISTORY / Asia / General; SPORTS & RECREATION / History; Games--Social aspects--China; Go (Game)--China

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4.

Development of cognitive and neurodynamic function of 6-year-old children using the integrated application of the game of Go and exercise of game character.

Full Text Available

Academic Journal

KOZINA, ZHANNETA; ABROSIMOV, EVGENII; SAFRONOV, DANIL; PERETYAHA, LYUDMILA; DOVZHENKO, TETIANA; BUGAYETS, NATALIA, Journal of Physical Education & Sport Dec2018, Vol. 18 Issue 4, p2483 (English Abstract Available), Database: SPORTDiscus with Full Text

The purpose of the work is to identify the features of the dynamics of cognitive and neurodynamic functions of children 6 years old when using the game of Go in combination with physical exercise...

Subjects: PHYSICAL education; PHYSICAL activity

[Despite being labelled as Phys. Ed., the article's game of Go is indeed Igo and not some other game.

[http://eds.a.ebscohost.com/eds/pdfviewer/pdfviewer?vid=11&sid=892abcb2-3ae2-4372-a3d4-479fa8a0e3bc%40sessionmgr4007](http://eds.a.ebscohost.com/eds/pdfviewer/pdfviewer?vid=11&sid=892abcb2-3ae2-4372-a3d4-479fa8a0e3bc%2540sessionmgr4007)

Part of the reason why I often use the word weiqi instead of Go is because one syllable can lack precise SEO and clarity, although weiqi also yields chemistry results in Fusion search]

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5.

Modeling the Game of Go by Ising Hamiltonian, Deep Belief Networks and Common Fate Graphs

Detail Only Available

Academic Journal

By: Rojas-Dominguez, A.; Barradas-Baustista, D.; Alvarado, M.. In: IEEE Access Access, IEEE. 7:120117-120127 2019; USA: IEEE Language: English, Database: IEEE Xplore Digital Library

Three different models of the game of Go are developed by establishing an analogy between this game and physical systems susceptible to analysis under the well-known Ising model in two dimensions...

Subjects: Aerospace; Bioengineering; Communication, Networking and Broadcast Technologies; Components, Circuits, Devices and Systems; Computing and Processing; Engineered Materials, Dielectrics and Plasmas; Engineering Profession; Fields, Waves and Electromagnetics; General Topics for Engineers; Geoscience; Nuclear Engineering; Photonics and Electrooptics; Power, Energy and Industry Applications; Robotics and Control Systems; Signal Processing and Analysis; Transportation; Games; Analytical models; Biological system modeling; Adaptation models; Computational modeling; Energy measurement; Atomic measurements; Artificial intelligence; graphical model; machine learning; Monte Carlo methods; pattern analysis; unsupervised learning

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6.

Playing Go without Game Tree Search Using Convolutional Neural Networks

Detail Only Available

Report

By: Barratt, Jeffrey; Pan, Chuanbo. 07/02/2019 , Database: arXiv

The game of Go has a long history in East Asian countries, but the field of Computer Go has yet to catch up to humans until the past couple of years. While the rules of Go are simple, the strateg...

Subjects: Computer Science - Artificial Intelligence; Computer Science - Machine Learning

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A GFML-based Robot Agent for Human and Machine Cooperative Learning on Game of Go

Detail Only Available

Report

By: Lee, Chang-Shing; Wang, Mei-Hui; Chen, Li-Chuang; Nojima, Yusuke; Huang, Tzong-Xiang; Woo, Jinseok; Kubota, Naoyuki; Sato-Shimokawara, Eri; Yamaguchi, Toru. 01/22/2019 , Database: arXiv

This paper applies a genetic algorithm and fuzzy markup language to construct a human and smart machine cooperative learning system on game of Go. The genetic fuzzy markup language (GFML)-based R...

Subjects: Computer Science - Artificial Intelligence

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Full TextFull Text

9.

PFML-based Semantic BCI Agent for Game of Go Learning and Prediction

Detail Only Available

Report

By: Lee, Chang-Shing; Wang, Mei-Hui; Ko, Li-Wei; Tsai, Bo-Yu; Tsai, Yi-Lin; Yang, Sheng-Chi; Lin, Lu-An; Lee, Yi-Hsiu; Ohashi, Hirofumi; Kubota, Naoyuki; Shuo, Nan. 01/09/2019 , Database: arXiv

This paper presents a semantic brain computer interface (BCI) agent with particle swarm optimization (PSO) based on a Fuzzy Markup Language (FML) for Go learning and prediction applications. Addi...

Subjects: Computer Science - Artificial Intelligence; Computer Science - Human-Computer Interaction

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"La culture arrogante du go [Le weiqi, une façon chinoise de voir le monde]: Le weiqi, une façon chinoise de voir le monde" by Elisabeth Papineau in French. I do not know French but this article seems to criticize the culture of Go.

[http://eds.a.ebscohost.com/eds/detail/detail?vid=0&sid=622bf846-702e-4728-803c-9586ade5156c%40sessionmgr4007&bdata=JkF1dGhUeXBlPXNzbyZzaXRlPWVkcy1saXZlJnNjb3BlPXNpdGU%3d#AN=edsper.perch.1021.9013.2000.num.62.1.2569&db=edsper](http://eds.a.ebscohost.com/eds/detail/detail?vid=0&sid=622bf846-702e-4728-803c-9586ade5156c%2540sessionmgr4007&bdata=JkF1dGhUeXBlPXNzbyZzaXRlPWVkcy1saXZlJnNjb3BlPXNpdGU%253d%23AN=edsper.perch.1021.9013.2000.num.62.1.2569&db=edsper)

links to full article:

<https://www.persee.fr/doc/perch_1021-9013_2000_num_62_1_2569>

Mentions L'art de la guerre de Sunzi (Art of War) on its 3rd page, page 47 of the journal it is from. Given the Art of War documentary on Youtube, which also references the game of Go, Sunzi (Sun-tzu) did indeed seem like an arrogant man back then, because he killed an innocent concubine to prove a point.

Strumfels, David J. <https://amedleyofpotpourri.blogspot.com/2019/05/chinese-culture.html?m=1>

Mohism, weiqi. Note: only cites Wikipedia and the Shiji by Sima Qian.

[Jesús Chavero García-Esteban](https://www.researchgate.net/scientific-contributions/18104615_Jesus_Chavero_Garcia-Esteban) .

<https://www.researchgate.net/publication/31513899_Proyecto_de_juego_de_Go> . A Spanish and English intro to A.I. and Go.

<http://www.supersummary.com/the-tale-of-genji/summary/>

Hikaru Genji

https://m.youtube.com/watch?v=KsYl8-yTsHA

Cicada woman chapter genji

Hikaru no Go (like Hikaru Genji)

If possible find Bokuno Cup special episode

<https://www.essaywriting.expert/essay-on-mencius-and-xunzi/>

Mencius statue with short nails (worn down more than Kongzi from playing Go?)

“An anecdote titled "Two Students Learn Weiqi" (二子学弈), collected in the ca. 300 BC philosophical book Mencius, revolves around Yi Qiu and his two disciples, whose attitudes were in stark contrast with one another.[3] The first student was easily distracted, whereas the other was focused and diligent in studying weiqi. Consequently, the former found no success whereas the latter excelled in the game. Mencius used this tale to expound that even a simple game like Weiqi demands one's full attention.[4] This is also the earliest known historical reference to weiqi, making Yi Qiu the first recorded weiqi player in history.[5][6][7]” Wikipedia Yi Qiu

HuffPo/HuffingtonPost:

<https://www.huffpost.com/entry/weiqi-versus-chess_b_6974686>

“Just one game, they said. That was yesterday.” SFPL book proverb Ancient China.

361 days Ancient China calendar, 19x19=361 intersections on board, black and white day and night

- Hikaru No Go’s Go Go Igo ep. 60-72

<https://gobase.org/reading/history/china/>

围棋

(圍棋) [ wéiqí ] the game of Go

archchinese.com

The Glass Bead Game 1 page essay by Ernest Brown

Referenced by a douban .com english page with other articles listed

Originally, I thought the Knight’s Move (As referenced in Hikaru No Go and NHK Go tournament videos on Youtube) was named after the knight in European chess but Xiangqi also has the same knight’s move.

-My roommate Irene from Shenzhen

“But for some reason, men are stronger Go players” -Haylee’s World of Go/Baduk, “How I became a Go professional” video. Peak rank 9 d.

I doubted the gender skill divide so I watched a match between the female Hon’inbo and a 7 dan male player and the female Honinbo actually lost.

This may be because according to the first chapter of the Treasure Chest Enigma, by Peter Shotwell, “women have busier lives than men so do not have as much time to spend on such puzzles.”

<https://en.m.wikipedia.org/wiki/Go_ranks_and_ratings>

Rankings in Go are complicated in a few ways. For one, an 8 Dan professional is different from an 8 Dan amateur. An 8 Dan professional label would be shortened to 8p, and an 8 Dan amateur label would be shortened to 8d. For example, Haylee’s World of Go/Baduk shows a game where her rank was listed as 7d.

Another confusing aspect is that kyu levels (pre-amateur) count backwards (Source: Weiqi Wonders). The ranking system can be thought of as similar to the historical dates system of B.C.E. and A.D.

Another small confusing aspect is the irregularity of numbers. Kyu levels range from about 34 (Source: New York Go Institute) to 1, and then Amateur Dan levels range from 1 to 8 and there is no 9 (Source: Weiqi Wonders), and then Pro Dan levels range from 1 to 9, such as 9 Dan Pro, Lee Sedol, the best human Go player of the last decade. Perhaps the recently deceased player Go Seigen could’ve beaten AlphaGo? Unless Go Seigen lost to a currently alive top player, which is probable. There is also a title called 10 Dan in Japan but it is just ceremonial because one of the top 9 Dan Pros from Korea such as Lee Sedol could beat a 10 Dan Pro from Japan (Sources: Hikaru no Go, Wikipedia: Go rankings).

However, despite the confusing rankings for Go, it is still somewhat clearer than some rankings for video games, which rank players by precious metals and jewels such as Tin, Silver, Gold, Platinum, and Diamond. The reason is that the values of precious metals change over the course of history (according to Wikipedia, silver used to be more expensive than gold in Ancient Egypt) and diamonds are actually more common but more expensive than emeralds. This is why the game Minecraft (我的世界) is surprisingly realistic in some ways because of its value of emeralds over diamonds, and if A.I. succeeds in going from beating Go and Starcraft to beating Minecraft, A.I. robots will be able to do even more in real life than Japanese Tea Ceremonies (as mentioned in Japanese Robotic Innovations).

Lee Se-dol went on to win a tournament after losing to AlphaGo (source: AlphaGo documentary) but later on retired and scheduled to play against another program with a 2 stone handicap. “Even if I become number one...” (source: duckduckgo search). However [spoiler], retiring does not necessarily mean quitting, as Hikaru no Go explains.

“Early writings depicted Weiqi as a waste of time, but eventually became included in the four noble things of gentry.”

“I remember the chill of the Go stones” -Fujiwara-no-Sai in Hikaru no Go. Go stones are indeed a little chilly. Boards are indeed made of wood. Placing stones on the intersections of the trenched lines probably makes them less likely to move around.

Go stones can literally be stones or bottle-caps (Hikaru No Go’s Go Go Igo live action videos) (or expensively made from large white seashells (source: Chinese weiqi documentary series of Go even in jail and also in religion)). A kifu is a record of a game on paper (Hikaru No Go). With these things in mind, Go can be played with just paper sheets and a pen. Although Go is “a very hard game” (librarian), there are less physical limitations and rules to learn than chess.

Expensive quality Go boards are made with kaya wood which is light colored and produces a sharp clack when a stone is placed. Fake *kaya* called shin-kaya is often made from imported spruce to Japan and has the same color but lacks the sound. There is also another type of wood for boards. (Hikaru no Go).

The Japanese Robotics Innovations speaker who was a robotics patent decider particularly for toy robots and also video games, told me about the relation of AI to the game of shogi.

My favorite part of the talk was how he explained the need for robotics due to Japan’s aging population.

Hon’inbo Shusaku (surname) Torajiro (given name) died early in his 30s due to an epidemic. Shusaku invented Shusaku’s Diagonal, “a series of opening moves that remains popular in games without komi” (Go Go Igo).

There is also an app game called BadukPop which has powerups (Haylee’s World of Go).

Hikaru no Go has an episode “No winning allowed” in which the challenge is to play to a perfect draw without the opponent realizing what the pro is doing.

(Rated TV-MA) “Misaeng” episode 1,3 on Netflix, a Korean series about a failed Go/baduk prodigy. But I only found it by searching for 囲碁　in Japanese. Episode 1 shows the pronunciation of Baduk/Paduk 바둑.

Hikaru no Go Chinese Mandarin dub: 棋靈王

<https://www.youtube.com/watch?v=H-vYfpSRByc&list=PL3vk5NhxtTzgrBj28-S6ghfG3ESnACzR8>

<https://www.youtube.com/watch?v=L29nQpXm6Lw&list=PL3vk5NhxtTzgrBj28-S6ghfG3ESnACzR8&index=76>

棋靈王OVA 邁向北斗杯之路 HD ~喜歡的話!!幫訂閱Q3Q

Chess Ghost King (Hikaru no Go’s Japanese title). OVA means special episode.

Shuusaku (long U) pronounciation

-Hikaru no Go manga 171,172

Sanitation in Go is important because in Go Salons, the stones need to be washed (Source, Hikaru no Go). Perhaps a reason that wooden Go boards have prevailed over plastic (besides in magnetic Go boards, probably) is because wooden cutting boards are supposedly more antibacterial than plastic cutting boards (source: https://www.rowandsons.co.uk/blog/myth-fact-antibacterial-properties-wood/ although this site sells wooden and plastic cutting boards, it references this article: <https://www.johnboos.com/uploads/files/PDF/wood-vs-plastic-cutting-boards.pdf> although this site also sells wooden cutting boards. Also, water in wooden cups or plastic bottles with bamboo chopsticks smells less stale than water in ceramic cups (without chopsticks) or plastic bottles without chopsticks).

Part 1 2 3 weiqi history, emporor Yao’s son. Preset stones.

<https://www.youtube.com/watch?v=W0gSVWceSuc>

<https://www.youtube.com/watch?v=YmpXJBOf4zo>

<https://www.youtube.com/watch?v=BPvP9hviqIA>

<https://www.quora.com/What-did-Confucius-say-about-the-game-of-weiqi-Go?share=1>

Answer 2

Weiqi is often compared to war or the creation of starry galaxies (Hikaru no Go, Ernest Brown's The Glass Bead Game), but weiqi seems more like white blood cells consuming their enemies. The ease in which AlphaGo transitioned to folding proteins shows how realistic weiqi looks, especially on a molecular or cellular scale.

The art of resigning (The Treasure Chest Enigma book) could be used not only with human vs. AI matches but also during AI training with itself, as it may speed up the process (with the expense of reduced meticulousness). The Art of Resigning chapter says the main difference between pros and amateurs is that pros resign more often. This may be because pros are more able to see a match's fate (Sai in Hikaru-no-go) and also because resigning helps give players more training time to become pros. It is not quite clear from papers and README documentations as to whether AIs already implement resignation for training with itself. Looking at the code might be necessary. However, it is difficult even to simply program the rules of Go because capturing involves analyzing many links between stones. Quality Go game emulators are sometimes only commented with Chinese. A way to test the effectiveness of resigning could be to give at least 4 virtual players the same amount of time to play multiple games, with 2 players playing to resign and the other 2 players playing out the entire games without resigning.

A way to make Go more appealing to women might be to label it more like Candy Crush and focus more on the eating aspect of the game rather than the surrounding part.

<https://www.youtube.com/watch?v=K7X2l2MKTNs> <- Go Game School

"Onegaishimasu" at the beginning of games, as also subtitled in Hikaru no Go.

The proper way of holding Go a stone is between the index finger and middle finger with the index finger underneath the stone (Source: Hikaru no Go's ending lessons Go Go Igo Let's Play Go). This is true in Japanese, Korean, and CHinese videos as well. However, there are different ways of resigning. In the Hikaru no Go animations, the method of resignation in-person was to bow one's head and say "I resign." Afterwards, the other player says, "Thank you (arigato) very much for the game." In online Go, when the opponent resigned, a pop-up notification says "没了" meaning "Resigned". I typed 没了 in Chinese as I don't know Japanese but the characters are almost if not exactly the same. In Chinese pinyin, it would be spelled "mei le".

Terms for move spacings in Go like the knight's move and the elephant's eye (hazama) probably come from Xiangqi (象棋, the Elephant Game, Chinese Chess) even though Go/Weiqi came first.

<https://www.youtube.com/watch?v=WXuK6gekU1Y&list=PLNq5j1X6NDH7RP_VATdvb9MkGqij87NR->

^ AlphaGo movie documentary new March official link

<https://www.youtube.com/watch?v=6w96cPUt1vM>

Styles of Go from 1800s to post-AI (not very serious)

<https://www.youtube.com/watch?v=3_qmLqRwvtU>

Painting of emperor Yao

^ There is an actual mountain named "Rotten Axe Handle (Lanka) Mountain"

^ There are 181 black stones, 180 white stones.

I guess white goes 2nd (plays *Gote* instead of Sente) because clamshells are harder to find than slate. Probably not, but an idea.

From my experience playing chess with inpatient players tired of moving pawns, the preset stones in the original Go in China before Qing dynasty might have been a way to save time. It also suggests to people around that the game is ready to play, and it is not a cutting board, and since the stones alternate, it is not just somebody sorting stones by color.

<https://www.youtube.com/watch?v=a3DLjcoacXA&list=TLPQMjEwMzIwMjB-hgAWaAz5Ow&index=2>

<https://www.youtube.com/watch?v=lwdhp1aXcgA>

To go into Byo-yomi probably means to go into overtime, when the slow player must now make each move within a certain amount of time, such as one minute for 'insei's in Hikaru no Go. searching for byo-yomi yields a Wikipedia article about time-control in board games. According to Hikaru No Go, time clocks were not used even as late as Shusaku in the 1900s.

Beginning of <https://www.youtube.com/watch?v=rrfpqTy5c-k&t=424s> NHK cup

Stylized the 囲　in 囲碁 as a square Go board with the intersecting lines. That makes me wonder about the origin of the character but either way it is an easy way to remember how to write the character "i" in "igo". Writing is an important aspect of culture because in Chinese, culture is defined as wenhua/文化, which includes language.

Hon'inbo Shuusaku (surname, also written Shusaku) Torajiro (given name, or was it the individual name he chose for himself?) died early in his 30s from an epidemic. He has a grave in Inno-shima (shima meaning island) in Hiroshima and also in Tokyo made by his students.

According to the film A Beautiful Mind, John Nash lost a game of Go and the bet was to do laundry for the semester. (Scene found in Youtube playlist of Go and the Art of War).

And playlist also has a Minecraft implementation of Go capturing rules.

Go Minigames:

Badukpop app explained by Haylee's World of Go/Baduk

Random opening challenge <https://www.youtube.com/watch?v=a3DLjcoacXA&list=TLPQMjEwMzIwMjB-hgAWaAz5Ow&index=2>

One-color Go (Hikaru-no-Go)

Blind Go (mentioned by Qin's Moon in the Confucists' beach, also in Hikaru no Go and in the Surrounding Game, played with a blindfold with flat white stones that I guess cannot be felt).

First capture Go (The Book of Go, Hikaru-no-Go's Go Go Igo Let's Play Go).

Go board in the shape of North America (Surrounding Game). Shows different board shapes and sizes can be used.

Original Ancient preset stones on the star points of a 17x17 board. Alternating colors:

black white

white black

.

Play to draw (Hikaru no Go)

"Mohist chess"/Othello/Reversi as fictionalized by Qin's Moon in the Mechanical City episodes. According to Wikipedia, Reversi was not invented until later. Mohism is also not directly linked to weiqi although often mentioned in the same webpages or articles. Mohism focuses on self-defense rather than the Art of War.

Playing without komi is another way to play, especially with Shuusaku's Diagonal (Go Go Igo). It encourages the original joseki (local skermishes shapes).

For the Hon'inbo competition, games are played over 2 days. A move is sealed hidden on paper at the end of day 1 so that the opponent does not get the night to think about it and react to it.

For my first implementation of making AI play Go, I would go easy on myself for programming and make the board even smaller than Tic-tac-toe, making it a 2 by 2 board. IF I cannot easily directly mesh an AI project with a Go project. Go boards traditionally have an odd number of lines to have a center point (Go Go Igo). In a 2 by 2 game, black would win without komi if it plays first (sente) and plays on the corner which it must and then white plays oHane (extension) adjacent to black. Black would then capture white and form 2 eyes. White must play on the diagonal to meet a draw or an endless game of recapturing.

Nigiri (choosing color stones) is in a way itself a game of rock-paper-scissors, though the end result is like a coin flip.

Nigiri is picking up a handful of stones and the opponent guesses whether the number is even or odd by placing one or two of his stones down.

It is somewhat philosophical (or arguably coincidental) that black plays first in Go but 2nd in Chess of Europe. Mohism perhaps prefers to stay in the darkness (Qin's Moon). I remember reading years back that Daoism also prefers yin/dark /soft over yang/light/hard. In a famous wuxia/fantasy movie about a fox-spirit lady, the male lead (spoiler) turns out to be a good guy partly because he wears black armor so that his comrades are not concerned by his blood. Even my parents watched that and my mother remembers it.

This is contrasted with the unfortunate terminology of Europe like blacklist and black magic which labels black as negative though Japanese also has a negative term like black company which was also referenced in the Korean Misaeng series.

I am not sure if it is listed in the credits or if Netflix skips the credits, but I think I recall the Japanese minor-key song in the Surrounding Game was Rokudan, played on the koto zither.

Minigame: 3 or 4 player Go with red or gold pieces (source: the controversial Chinese animation series Everlasting Firmament and also Surrounding Game).

Minigame: Doubles (pairs) Go where players cannot give each other hints and take turns playing as the same color. Source: Hikaru no Go. There is also a video from an NHK tournament of a Pairs game.

One of my favorite aspects of Hikaru no Go is the Heian period's clothing fashion of the noble's ghost Fujiwara-no-Sai. Sai wears a long sleeved shirt/tunic with two layers. The outside layer has a gap around the shoulders. Those gaps probably provide adequate ventilation for warm seasons like summer and Spring while the long sleeves provide warmth in the Autumn and Winter, maybe even in the snow like in the series. Sai also wears white shoes or thick socks that have a separate big toe. Years ago I remember reading on Wikipedia about construction workers in Japan wearing boots with separate big toes for extra dexterity/balance. The article was probably about toeshoes. I have tried wearing individual-toe-shoes and also toeshoes that group the pinky and 2nd smallest toe together, which is more convenient. Individual-toe-socks are a little tight and can affect the sizing of the shoes. I suppose the main reason I stopped wearing toeshoes was because I accidentally shrunk them in the dryer. However, I do wear Hatsune Miku style sleeves that are similar to Sai's outfit, but without the inner layer, though sometimes I also wear a thin inner layer as well. Hikaru himself sometimes wears a hoodie with short sleeves, which I do as well. The tank top hoodie is becoming more popular in SF now that it is Spring, but only a few months ago it was a style that I had only seen in anime and donghua (Chinese animation).

Probably another reason that Go boards are traditionally made of wood is that ceramic breaks easily and into shards. Go stones can be chipped (Source: Hikaru no Go, especially if they are glass I suppose, However, I think the small round shape of the stones would make them less likely to break than an entire glass board. There is an ancient painting shown in the Surrounding Game of a man in Samurai armor knocking over a Go board in anger. John Nash also knocked over a Go Board by accident after he lost and left in A Beautiful Mind and didn't even bother to pick up the stones either even though he lost the bet to do the laundry. "Ragequitting" is a term common in video gaming and controllers are somewhat delicate.

However, according to the "Survivor Bias" video by Veritasium, traditional buildings like the ones in Korea may look that way and have superior architecture perhaps just because they are the only buildings from the past that have survived this long. Therefore, perhaps Go boards were not all wood in the past, but only the wooden ones survived.

Wang Gu Xian Qiong (Everlasting Immortal Firmament) is the controversial donghua that references Go probably the most out of the 50 something donghua with English subtitles.

Yin, Stephanie and Lee, Ryan. NYIG. <https://www.youtube.com/watch?v=140-R-XShFc&list=TLPQMjEwMzIwMjB-hgAWaAz5Ow&index=5> . Game and review with a game possibility tree.

One of the four noble things was playing guqin (古琴). According to Prof. Kumiko Uyeda, Confucius hated the Se, the larger predecessor of the guzheng (古筝). If I had to guess why Confucius hated the Se, besides the typical skepticism of new technology and also the idea that the guzheng is from the ethnic minority rather than the Han majority, I would guess that it is because guzhengs are usually tuned to play a major pentatonic scale. Major scales are almost always used in national anthems, which can be thought of as war songs and prideful. The game of Go is indeed a war game, but it also focuses on accepting one's own loss, which national anthems rarely do. However, I do not think that Confucius would necessarily hate the newer instrument, the 扬琴 (yangqin), as it shares the same chracter qin for zither (though the guzheng is also a zither) and the character gu 古 in both guzheng and guqin simply means ancient and doesn't necessarily mean that they are more similar than a yangqin and guqin.

The yangqin is tuned with strings for all 12 chromatic notes, and the guqin icmalso makes it easy to play in a chromatic scale because the strings are unbridged and the pitch is controlled by pressing down on the strings with fingers. The yangqin can play both minor and major scales without being retuned, similar to a guqin. A guzheng (such as the one in the 25-string guzheng youtube song) could also be retuned to play all 7 European notes which includes both apentatonic major and minor scales. In a similar way that a Go board has many possibilities, a guqin also has infitely many notes going beyond the precision of 12 notes and could even play a 24 note key, though it would require close listening.

Go in the Tale of Genji translated by Dennis Washburn, pages found using Amazon Kindle:

(By searching "playing go"):

Page 55

Page 144

210

211 "weren't able to play Go today.' Murasaki was still lying facedown...”

Footnote explained on Page 389 "Murasaki is alluding to a Chinese legend about a young woodcutter, Wang Chih, who encounters immortals playing Go...", actual footnote on Murasaki's quote on page 379.

498

695

915

930 "play on words associated with Go (e.g. kazoeru 'to count [territory],' makeru, 'to lose/be defeated,'

1057 "challenged Kaoru to a match..."

1143

1285

Now searching "go board":

55

62

91

346

910

1057 Kaoru

1286 "... he fancied himself as the High Priest of the Go Board, as if he were the equal of Tachibana Yoshitoshi himself! [he in this quote is not necessarily Kaoru]"

1308 (a little more than the previous search yielded) "His formal name as a master of Go was Kanren, but he was also given the sobriquet, High Priest of the Go Board (Kisei Daitoku)"

According to Hikaru no Go's Let's Play Go, the "the oldest title in Japan is Hon'inbo" not even Kisei, so therefore the Hon'inbo title must be even older than the Tale of Genji, 3000 year old book, and Go also existed in China before Japan.

According to a webpage something like SparkNotes.com or another site I cannot remember, Murasaki Shikibu, the author of the Tale of Genji (Genji Monogatori), was named in post after her death after the characters Murasaki and Shikibu in the book. Her real name was forgotten and "her similarity to the characters is unknown." I had not realized the connection between the author's name and the characters. There is also perhaps a connection with Genji's original name, Prince Hikaru, and Hikaru in Hikaru no Go, who meets a ghost also from the Heian period. The Tale of Genji also has supernatural events, too;

Starcraft is another game dominated by Korea. After mastering Go, DeepMind moved on to Starcraft, but did not yet teach the agents the Art of Resigning in Starcraft, and as a result, Mana said "such manners" when AlphaStar did not GG (Good Game/resign) when losing and perhaps the agents lacked Junzi and a potential skill for them to save time training. Also, the "most bizarre game" AlphaStar played with Mana was similar to the territorial and "resource efficient" (quote: The Art of War documentary) game of Go, because an AlphaStar agent tried to steal the player Mana's natural gas and also set up a supply depot building in the middle of Mana's starting base. AlphaStar also focused heavily on economy building rather than using their workers to fight. It was probably coincidence that AlphaStar and AlphaGo played in similar ways, though.

The Art of Resignation may also be used by the disease solving game Foldit by resetting the puzzle fully.

Experiments with Google:

handwriting <https://experiments.withgoogle.com/interplay-mode/view/>

and drawing recognition

Note: Onegaishimasu means "please" in Disastrous Life of Saiki K. ep. 16 13:10

Note: I think of liberties in Go as spaces for social distancing and agriculture which are necessary during epidemics that often arise during war. For example, according to a Genghis Khan video on Youtube, one city that Genghis Khan seiged fell to an epidemic. Later on, while Genghis Khan seiged another city, his Mongol troops' camp experienced an epidemic of their own, so they made somewhat of a truce.

Another similarity Go has with epidemics is that the stones form chains, similar to sidechains on a protein backbone, which can be designed to bind to viruses. Some sidechains such as tryptophan (an amino acid in pumpkins) also have hexagon or pentagon shaped holes that look similar to the simple eye shapes in Go. Tryptophan in particular has two eyes, one hexagon and one adjacent pentagon. Having two eyes is necessary for defense in Go. Tryptophan is also a large sidechain that fills voids for points in the game Foldit. Similarly, having large eyes in Go such as an L shape (which is not a false eye according to the New York Go School on Youtube) is beneficial because it scores territory points.

In the Internet Go game on FlyOrDie.com/go , black is stylized as fire (火) and white is stylized as ice (冰/bing1, though maybe it would be more currently relevant in San Francisco as 病/bing4/sickness). Black might appear irrelevant to fire using an English vocabulary mindset but in Chinese, the word black/黑, has the fire radical on the bottom 灬 . As Laoshi Wenchi Chang explained, black has the fire radical to show its meaning because fire burns things and chars them black. Perhaps part of the reason that black goes first in Go is that the philosopher Mozi/墨子 has the super-radical (as opposed to sub-radical, a term I might be making up) 黑/black in his surname. 墨家/Mojia, his philosophy, was not as widespread as Confucianism, Daoism, or Legalism (Qin and Han dynasties), but Mozi was a carpenter and emphasised the value of precision, and built catapults for self defense. Therefore, the carpentry aspect of Mohism could be connected to the wooden Go boards, and the self-defense seige-engines could be connected to the Encirclement Game. Go is also about creating as well. Similar to the game Starcraft, Go involves creating "bases" (Source: Wikipedia). Therefore, the construction aspect of playing the game can be related to Mohism.

<http://www.rodingmusic.co.uk/frwebsite/gosongs/x29ShodanRip.pdf>

Song about Go resignation

From <http://www.rodingmusic.co.uk/frwebsite/gosongs/gosongs.htm>

<https://www.youtube.com/watch?v=-Z3K9bkBWK8>

Weiqi Wonders documentary directed by Marc L. Moskowitz to go along with his article Go Nation: Masculinities of Weiqi in China.

According to Weiqi Wonders, weiqi was prohibited for commoners at one point in ancient times, because of fear that they would learn warfare tactics to uprise.

Like a Go player in Weiqi Wonders says, "an injured but spared soldier returns to his home country and becomes a burden to his society." Likewise, soldiers returning home from World War 1 spread the Spanish Flu pandemic that killed more people than World War 1 and World War 2 combined (source: the Pandemic documentary on Netflix). Even if soldiers do not bring sickness, we do have many homeless veterans who have lost legs and many drunkards in San Francisco, like the weiqi player talked about. He explained how laying a small mine instead of a big mine wins the war in the end, which relates to weiqi and the Art of War.

One of the weiqi players in Weiqi Wonders also said that there is no such thing as a weiqi player who is a bad person.

Seiza "formal sitting position" in Hikaru no Go and Youtube seiza tutorials.

Lee Sedol is the #1 player and Lee Changdol is the #2, according to Wikipedia and Geu-rae’s sensei in Misaeng, hence, I refer to Lee Sedol by his given name.

“Go Pro Yeonwoo” Youtube channel. Her ChoChikun video says she has the same surname [趙] as Cho Chikun. However, Cho is pronounced Jo in Korean Hangul (Wikipedia Cho Chikun, GTranslate).

*March Comes in Like a Lion*. Shogi anime. Shows that Shogi boards look similar to Go boards but only have 10 intersections and pieces are placed in the squares.

My weiqi playlist (have watched half): <https://www.youtube.com/playlist?list=PLNq5j1X6NDH7RP_VATdvb9MkGqij87NR->

LowkoTV Youtube channel: Lowko vs AlphaStar. <https://youtu.be/3HqwCrDBdTE?t=1495> . Note that the player account suspected of being AlphaStar actually resigned while playing Terran, its weakest faction. Right before it resigned, it lifted-off all of its structures (similar to some traditional Filipino houses made of palm trees that can be lifted and carried). Since Alphastar could not resign to MaNa and could only accept its loss once all its structures had been destroyed, perhaps AlphaStar’s Terran agents learned to cheat the training system by running away with its bases to survive a little longer, which it may have been given a bonus for. Alternatively, if AlphaStar’s programmers hardcoded that it should resign at a certain threshold of winning probability (like 10% for AlphaGo) or in the case of Starcraft, when almost all its bases are destroyed, then an agent may have cheated the resigning system by saving its bases by flying them away even though they would be ungrounded and nonfunctional. On the other hand, having the structures evacuate is a normal Terran strategy, and could be thought as a metaphorical resignation. Initially, it might seem dubious from that video that it was AlphaStar or even another bot, but given Lowko’s previous commentary about the official news of AlphaStar entering the online games if human players opt-in, it seems likely: <https://www.youtube.com/watch?v=89vWpB14RIs> .

Liu (surname) Cixin’s book The Three Body Problem adapted into machinima anime *Mine Threebody*《我的三体》的2李《黑暗森林》 The *Three Body Problem*’s Dark Forest analogy. <https://www.youtube.com/watch?v=1vLgnN5yVi4> . Mine Three Body S02E10. Also on BiliBili.com with Season 2 named after Luoji. Note: vulgar language in both Chinese and English in the donghua adaptation, not sure about the book by Mr. Liu.The Dark Forest of hidden snipers with limited territory can be used to explain the stones coming out of hiding on the board, and also how a high komi can be too much because black reveals its location and plan to white first so too soon. Also explains why the darkness of black is preferred for strategic survival and thus is allowed to move first because the hei black in *heian* (darkness in Chinese though not Japanese) has the covert properties needed for a surprise attack. Also see Mine Threebody’s Season 1’s Qin army episode for an intro to computers, only on Youtube not Bilibili probably because of early low animation quality.

WeTV English.*【ENG SUB】Candle in the Tomb: The Lost Caverns EP16 Clip: You should play Go in the tomb to survive!* [#candleinthetomb](https://www.youtube.com/results?search_query=%2523candleinthetomb) [#thelostcaverns](https://www.youtube.com/results?search_query=%2523thelostcaverns) [#鬼吹灯之龙岭迷窟](https://www.youtube.com/results?search_query=%2523%25E9%25AC%25BC%25E5%2590%25B9%25E7%2581%25AF%25E4%25B9%258B%25E9%25BE%2599%25E5%25B2%25AD%25E8%25BF%25B7%25E7%25AA%259F) . May 5, 2020. <https://www.youtube.com/watch?v=ZuE-RFXbt9Q> . Not available in the US without VPN, probably due to copyright. As such, quality cannot be determined without watching.

More unrelated notes:

Modern History of Japan class at USF or its reading showed a painting of women chewing leather during a famine. Shows the importance of chewing for natural human skull size and wisdom teeth capacity. As 9p Ke Jie said, “humans will not beat A.I. unless they evolve to have brains the size of their bodies.” Even though Einstein had a small brain, he probably had his wisdom teeth (he did according to <https://www.answers.com/Q/Did_Einstein_have_his_wisdom_teeth> and judging from his relatively wide jawline), allowing a brain to grow to its full capacity that it evolved to. Similar to tooth crowding, if a brain is too squished in a skull, it may reduce performance. Stephanie Yin 1p, founder of NYIG, also has a properly wide jawline. Einstein’s brain weighed 1,230 grams (dummies.com) and he was only 5’7.5”, 172 cm tall. Average male brain weight is 1345 g (Wikipedia), and USA male height is 175.4 cm (healthline.com). Einstein’s brain to body ratio was 1230/172=7.15. Average male brain to body ratio in the US is probably 1345/175.4=7.67. So my idea is wrong. I suppose a giant robot with a laptop with a pretrained AlphaGo neural network could still beat a human pro despite its small brain to body ratio. However, even though brains adapt through reinforcement learning, neuroevolution is more efficient (at games but not facial recognition) through parallelization (which is natural in the real-world Darwinian evolution). Having a small brain is OK as long as it is the size that it evolved to require through millennia. Einstein probably still had a large brain for someone of his height, although before ceramic cookingware, everyone probably had larger brains due to larger skulls for wisdom teeth from chewing partly raw food. However, if humans grow more intelligent, they will also create better A.I. algorithms that overcome their creators.

In some ways, all games and simulations are unrealistic. For example, even Minecraft portrays all dogs as peaceful, and portrays bats as the least influential animal; either bats or pangolins were the source of COVID19. Board games are obviously very abstract, even weiqi to an extent, even on a 21 by 21 board like in the painting of Guan Yu. Weiqi is more peaceful than chess and even more peaceful than Minecraft, but it still doesn’t have the pacifist philosophy of 2D tic-tac-toe, where experienced players can only manage to end the game in a draw, as referenced in the movie *War Games* -- called the most realistic AI fiction movie -- drawing similarities between tic-tac-toe and a Global Thermonuclear War simulation, where “the only winning move is not to play [attack]”. Likewise, according to HuffingtonPost, Nixon almost launched a nuclear strike on Vietnam because he was showed a computer simulation that portrayed the bomb as saving lives. By tweaking the parameters of a simulation, like in the video *Survival of the Friendliest?*, one can make altruism either more beneficial or less beneficial. Surprisingly, though, “Go AI’s can use overtime [byo-yomi]” (Source: Ryan Lee, NYIG). Overtime is realistic, especially in an office setting like in *Misaeng*. Using an open-source version of Minecraft called Mineclone 2 seemed like the best way to modify it and make it more realistic, but a small change in the code crashes the game eventually due to lack of memory. Likewise, Tibetan Go has different rules entirely regarding the Ko fight rule (source, Wikipedia, and Tibet is also shown in the Chinese only weiqi documentary), which might make remembering the rules and strategies for Tibetan Go and Chinese/Japanese/Korean Go difficult. Even within one ruleset of Go itself, there are different play styles one must decide on and stick to for aggressive or passive playing (like Mitani in the tournament in Hikaru no Go). It is similar to playing an unfamiliar character in a video game such as in 全时高手，or when adding a new line of code that may require even more lines of code to stabilize it. In some cases, though, one line in the right place is enough, though it is good practice to write something like “Wei Wuxian was here” to remember which parts were modified.