USING ARTIFICIAL INTELLIGENCE IN FOREIGN POLICY ANALYSIS AND DECISION-MAKING: DESIGNING AN EXPERT SYSTEM

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Abstract: *In the digital era, technology has permeated every sector, including international relations, with artificial intelligence (AI) already being utilized in defense and diplomacy. In the case of Mongolia, AI systems such as Egune and Erdem AI have been successfully developed. However, there has yet to be an attempt to create a specialized AI system for international relations, particularly for foreign policy analysis and decision-making. Meanwhile, the need for such purpose-built AI systems is rapidly increasing. In light of this situation, and considering the necessity to explore the potential for developing and utilizing AI tailored for foreign policy decision-making, a model of an expert system has been developed based on interdisciplinary research findings. The following is a brief overview of the results.*

Keywords: *Artificial intelligence power balance, foreign policy decision-making, expert system modeling*

LITERATURE REVIEW

Attempts to model international behavior using artificial intelligence (AI) technology have been ongoing for over 50 years. Beginning in the 1970s, Professor Hayward Alker of the Massachusetts Institute of Technology (MIT) and his students initiated the first research on applying AI to international relations (Hayward Alker, 1972); (Hayward Alker, William Greenberg, 1976); (D. Mefford, 2018). They were the first to introduce the term "Artificial Intelligence and International Relations" (*hereafter AI/IR*) (Hudson, 2018, p. 18). These early works provided general concepts on how to translate international behavioral patterns into computer language, laying the groundwork for modeling international relations through the lens of AI development.

The work titled "Artificial Intelligence and International Politics" (1991) consolidated and expanded upon earlier studies, presenting the prevailing theories and practical issues of that time regarding the application of artificial intelligence in international relations. It included detailed research on how AI models could be applied to international relations and how they could be used to support foreign policy decision-making based on international events (Hudson, 1991). Building on some of the research proposals from this work, later studies developed approaches for modeling rule-based, case-based, and interpretive political models within artificial intelligence systems (G. Duffy and S. Tucker, 1995) (D. Mefford, 2018)

Over the past decade, artificial intelligence has advanced rapidly, transforming numerous fields-from medicine to strategy and communications. This technological revolution is inevitably permeating and reshaping the field of international relations as well. As a result, several studies have been published examining how AI technologies are impacting the discipline of international relations (Bhaso Ndzendze, Tshilidzi Marwala, 2023). These studies confirm that advances in AI are already creating a new landscape in international relations (Stephane J Baele, Iqraa Bukhari, Christopher Whyte, Scott Cuomo, Benjamin Jensen, Kenneth Payne, Eugenio V Garcia, 2024).

In the case of Mongolia, academic articles have been published on the practical application of artificial intelligence across various sectors, including medical practice, the construction industry, forest

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resource management, and credit data evaluation. For example, in 1997, an AI-based knowledge system was developed for application in medical practice (Жаргалсайхан, 1997). A comparative study was also conducted to evaluate the impact of artificial intelligence on government digital transformation and ~~to~~ define strategic policy directions. This research examined how different countries are utilizing AI across various sectors (Цахим хөгжил, 2023). The study also addressed the effectiveness, risks, and challenges of AI applications, as well as the legal and regulatory frameworks for artificial intelligence in other countries.

Realists argue that the development of artificial intelligence serves as a means of ensuring national security, and therefore, the issue of the balance of power requires the most attention (Ndzendze & Marwala, 2023). As a result, there is a growing need to examine how powerful states are utilizing AI and how this may lead to a transformation of the great power system. Great ~~Major~~ powers such as the United States, China and Russia~~, and China~~ are focusing on the security applications of artificial intelligence, viewing it as a tool for gaining strategic advantages—something clearly reflected in their national strategies. (*Table 1*)

Table 1: ~~Major~~ Great powers~~states~~' AI strategies and their discourses

AI Strategies	Strategic Objective	Strategic Content
China's New Generation Artificial Intelligence Development Plan (2017)	An economic game-changer with implications for development and security in which China must obtain a first-mover advantage	"Follow the coordinated development law for economic and national defense construction; promote two-way conversation and application for military and civilian scientific and technological achievements and co-construction and sharing of military and civilian innovation resources ; from an all-element , multi-domain, highly efficient new pattern of civil-military integration."
Decree of the President of the Russian Federation on the Development of Artificial Intelligence in the Russian Federation (2019)	AI as economically viable and growing; Russia as advantaged but behind; Russia as needing to catch up with a dominant minority on the globe	"The Russian Federation has considerable potential for becoming an international leader in the development and use of artificial intelligence technologies... Taking into account the current situation on the global artificial intelligence market and medium-range forecasts for its development, the implementation of the Strategy at hand is a necessary condition for the Russian Federation's entry into the group of world leaders in the field of the development and introduction of artificial intelligence technologies, and consequently, for the country's technological independence and competitiveness"
US's National Security Commission on Artificial Intelligence (2021)	Al being nefariously used by adversaries against the US; US losing likely to lose competitive edge if not proactive enough. Need for an expanded definition of security	"Simultaneously, Al is deepening the threat posed by cyber attacks and disinformation campaigns that Russia, China, and others are using to infiltrate our society, steal our data, and interfere in our democracy. The limited uses of Al-enabled attacks to date represent the tip of the iceberg. Meanwhile, global crises exemplified by the COVID-19 pandemic and climate change highlight the need to expand our conception of national security and find innovative Al-enabled solutions"

The United States, China and Russia~~, and China~~ are utilizing artificial intelligence for security purposes through techniques such as forecasting, analysis, and simulation (practical methods aimed at mimicking or visualizing systems or processes) (Bakshi, 2018). From the content of these countries' AI strategies, it can be concluded that they view artificial intelligence as a powerful tool for gaining geostrategic advantages (Bhaso Ndzendze, Tshilidzi Marwala, 2023).

Realists hold that a nation's power is measured by its material capabilities, while neoclassical realists (such as Gideon Rose, Norrin M. Ripsman, and Fareed Zakaria) take into account internal political and social factors. In their view, power is not only measured by military and economic strength but also by domestic wealth, population size, and other crucial indicators, which they refer to as "latent power." In the era of artificial intelligence, this perspective has been redefined, and it is now considered appropriate to account for the "Artificial Intelligence power balance" (Bhaso Ndzendze, Tshilidzi Marwala, 2023, pp. 55-71). As AI technology continues to develop, critical issues are emerging regarding its impact on international relations and political leadership. Small countries, with fewer resources compared to powerful states, occupy a weaker position in terms of power. Therefore, realists argue that these small states~~countries~~ are more likely to be affected by the policies and actions of powerful states (Sinani & Hoxha, 2025). According to realists, "Small countries increase their ability to survive in the international environment by strengthening their defense systems, investing in modern weaponry and technology, and improving their internal security through the use of their internal resources" (Novikova, 2022).Therefore, for Mongolia, which shares borders with powerful great powers like China and Russia, there is an urgent need to intensify research and analysis in this area to establish a balance of artificial intelligence power.

REGARDING THE USE OF ARTIFICIAL INTELLIGENCE IN FOREIGN POLICY DECISION-MAKING: METHODOLOGY

Most AI/IR researchers strive to realistically model the cognitive processes of foreign policy decision-making~~ers~~. Political decision-making studies often overlook the cognitive foundation and critique the Rational Choice Model. In other words, while the multi-objective decision-making model is more flexible and better aligned with reality, it remains challenging to fully model the decision-making process—where people make choices that align with multiple objectives—using artificial intelligence and computational models (Purkit, 2018).

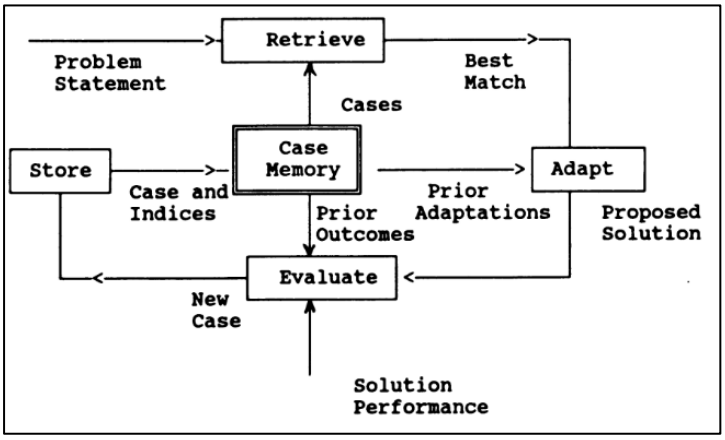
The capability of artificial intelligence to analyze information has developed rapidly since the 1980s, making it possible to study complex, time-dependent processes such as political science. In the 1980s, new branches of AI~~artificial intelligence~~ emerged, including ***Case-Based Reasoning (CBR)*** (Farrell, 1988) and ***Explanation-Based Learning (EBL)*** (Gerald Dejong, Raymond Mooney, 1986). Unlike traditional ***Rule-based systems (RBS)***, these new approaches were groundbreaking because they learned from real-world examples, accumulated experience, and adapted to dynamic changes. CBR and EBL did not just rely on data stored in memory but also incorporated new information based on real-world examples and experiences. This allowed them to modify decision-making structures stored in memory and make optimal decisions based on the specific context. Consequently, these approaches are crucial for realistically modeling decision-making and learning processes in constantly changing environments. Specifically, EBL can recognize recurring events from historical examples, which are often similar to past occurrences. For instance, in international relations, historical events influence current strategies and relationships, which, in turn, have a significant impact on political policies, beliefs, and development processes. The ability to model these complex features in computers has not only expanded the potential for using artificial intelligence in decision-making but also opened the

possibility of modeling political decisions from multiple perspectives, such as rule-based, planning-based, case-based, and historical experience-based approaches (D. Mefford, 2018).

Rule-based systems (RBS) are capable of performing tasks such as collecting user data, analyzing it, and making decisions. These systems identify specific patterns based on historical experience and use those patterns to plan decisions step-by-step, in a mechanical way, from initial planning to achieving political objectives (Luttwak, 1979) (Shortliffe, Edward H. , 1976) (Gael, Sidney, Chandrasekaran, B., & Sylvan, Richard, 1987). Initially developed from the late 1960s to the late 1980s, rule-based systems were originally designed to model actions under certain conditions, known as condition-action modeling. However, as they evolved, they went beyond simply processing data and began to incorporate more complex concepts, allowing for theoretical applications. These systems became capable of providing theoretically grounded explanations for specific cases. Even today, rule-based systems remain a foundational component of artificial intelligence development. They enable the rapid and efficient analysis of large volumes of information, supporting informed decision-making based on that analysis.

In the next phase, development tends to shift~~ed~~ from rule-based systems to case-based systems, which enable~~sd~~ the creation of more refined plans and the formulation of more optimized strategies. Initially, in an effort to overcome the limitations of rule-based systems, researchers such as Davis and Clancey began to explore concepts like structured knowledge, which included the ability to review and justify the rules that had been created (Davis Randall, & Clancey William J., 1984). These types of systems carry out strategic planning tasks by sequentially executing actions to achieve their objectives. This progression opened the door for such systems to be applied in foreign policy analysis (Miller George A, Galanter Eugene, Pribram Karl H. , 1960); (Fikes Richard E, 1971). These systems were originally designed to represent the state of the world through logical formulations and to provide users with a complete sequence of actions required to achieve a goal. Such planning systems are still actively in use today—particularly in the U.S. defense sector. For instance, when dealing with major defense tasks, these systems allow the main strategy to be divided into hierarchical sub-plans, enabling more detailed and effective implementation. This type of planning utilizes AI~~artificial intelligence~~ methods such as Forward Chaining—which starts from given data and chooses appropriate actions step by step to transition to the next state until the final goal is reached—and Backward Chaining, which begins by identifying the desired end goal and then works backwards to evaluate possible ways to achieve it, selecting the most appropriate approach. These algorithms allow for the sequential processing and analysis of various data inputs.

Figure 1: Case-Based Reasoning. Basic Flow of Control



Forward and backward chaining help optimize decision-making and support the transition from the initial situation to the desired final state (Хиймэл оюун ухаан ба машин сургалт , 2021). This case-based model reflects on past cases that closely match the current situation and adapts them for present use (see Figure 1). By doing so, it creates the ability to draw conclusions that are more flexible and aligned with real-world conditions based on human experience. Such planning systems in artificial intelligence have proven to be highly effective in supporting operational planning and strategic development in the defense sector.

The Explanation-Based Learning (EBL) model has the ability to generalize structures and plans from a single example, making it an effective approach for use in defining political strategies and policies. Emerging in the early 1980s as the second major paradigm shift in AI, EBL does not require large datasets. Its core principle is based on George Polya's conceptual approach, which suggests solving problems by asking, "Have you seen this question before, or have you seen a similar problem in another form?" (Polya, 1945). A classic example is one of the earliest AI systems—the Logic Theorist program developed by Simon, Newell, and Shaw. In this system, previously proven theorems were stored in memory as cases and later slightly modified to solve new problems, which captures the essence of EBL. However, the EBL system was further developed using additional methods by researchers such as Mitchell, Keller, Kedar-Cabelli (1986), DeJong and Mooney (1986), and Mooney and Bennett (1986) (D. Mefford, 2018). Professor Roger Schank of Yale University and his students discovered that a wider and more diverse range of scripts (structured story-based patterns for behavior or reasoning) was required, compared to limited pre-coded response systems. They emphasized that manually coding scripts was labor-intensive and that computers should be capable of generating new scripts autonomously. To address this challenge, DeJong worked on what he called the "acquisition of explanation schemas", which refers to the ability of the system to automatically generate necessary scripts and related structures when encountering new situations (DeJong, 1979). One of the major advantages of EBL is its ability to connect new information with existing knowledge, enhancing the system's knowledge base over time (D. Mefford, 2018). The core idea of EBL is that even a few events—or even just one example—can be sufficient to derive meaningful concepts. This is particularly applicable in foreign policy, where long-term trends and path-dependent changes are essential. The ability to learn from concepts and reuse them in future planning or contingency strategies plays a significant role in influencing political dynamics. ~~For example, the Vietnam War had a profound impact on U.S. military strategy and foreign policy. It dramatically reshaped the understanding of military force deployment, intervention strategies, and perceptions of national security. Such past experiences, like the Vietnam War, heavily influenced decisions regarding military involvement in Central America. U.S. policymakers and the public drew lessons from Vietnam, leading them to consider a wide range of factors such as the course of military operations, public sentiment, and political support when evaluating future military engagements. This demonstrates that political change is a continuous, evolving process, grounded in analysis of past events and their lessons.~~ Therefore, the EBL concept can be directly linked to political system transformations and can serve as a method for studying political processes (D. Mefford, 2018).

When utilizing ~~artificial intelligence (~~AI~~)~~ in foreign policy decision-making, it is essential not only to ethically program AI systems to balance their advantages and disadvantages, but also to ensure that the use of AI itself adheres to ethical standards. At the core of AI lies data, and the concept of "Responsible AI" is based on the accuracy and reliability of that data (Whyte, 2020). Artificial intelligence is an ongoing process that attempts to model human intelligence. However, compared to the human mind, AI offers a unique advantage in supporting foreign policy decisions by predicting external events and performing data-driven, detailed analysis. Furthermore, AI can process vast amounts of data in a short time and analyze multiple scenarios, enabling faster and more optimal

decision-making. Given its capabilities in strategic planning, data analysis, and beyond, artificial intelligence presents valuable opportunities for small states~~er countries~~ like Mongolia to enhance their ~~independence and~~ decision-making capacity in the international arena.

MODELING AN EXPERT SYSTEM FOR FOREIGN POLICY DECISION-MAKING: METHODOLOGY

The artificial intelligence expert system is a form of programming that emerged in the mid-1970s. Unlike a programming language, an expert system is a program designed to perform tasks based on a knowledge base that simulates the actions of a human expert in a specific field. The main objective of this area is to study and develop programs capable of understanding and emulating the extensive theoretical and practical knowledge of leading experts in a given domain. Among the various definitions of expert systems, R. Fortsyt describes it as follows: "An expert system is a program that creates components that are understandable and accessible to a domain expert, and utilizes that expert's habits and experience to make accurate decisions and generate new models" (Leondes, 2002). Despite the variety—and at times, contradictory—definitions, the following are commonly accepted core characteristics of expert systems:

- It is a knowledge-based system that addresses complex, practical problems that are typically difficult to solve using standard approaches.
- An expert system tailored to a particular field contains and applies the knowledge of domain experts during its decision-making processes.
- It includes a self-explanation capability, meaning it can provide the rationale and step-by-step process behind its decisions.

Given these characteristics, expert systems have broad applicability across multiple fields such as diagnosis, planning, forecasting, optimization, and training. An expert system typically includes the following main components: Inference engine (also called the interpreter), Working memory, Knowledge base, Knowledge acquisition module, Explanation subsystem, and User interface. This system approaches problem-solving by emulating the logical reasoning principles of the human mind. The process generally consists of several key actions, including:

- Identify: Analyze the problem based on cause-and-effect relationships and accumulated experience. One of the core features of expert systems is their ability to "forecast" or predict future developments.
- Study and Analyze: Examine the characteristics of each event, their relationships, and answer questions about specific aspects. This reflects the system's own method of reasoning.
- Generate Hypotheses: Formulate predictions through analysis of possible outcomes, using relevant data, algorithms, and experience-based assumptions. Many expert systems generate parallel hypotheses and, after comparing them, determine the most appropriate solution.
- Make Decisions: Provide recommendations to achieve concrete goals. Expert systems consider not only algorithms but also practical advice based on expertise.
- Communicate: Understand information provided by humans in any form and produce clear, actionable advice. Expert systems interact with users not in programming language but in everyday natural language (G.Sol, 1987).

From these features, expert systems can generally be defined as software designed to build a knowledge base in a specific field and use that foundation for analytical reasoning. In other words, they are intended to solve problems that cannot easily be formalized or expressed using traditional models. In this sense, expert systems are considered highly suitable for foreign policy analysis and decision-

making. Several researchers have developed a simulation platform that integrates Artificial Intelligence (AI) into the foreign policy decision-making ~~process~~, with a specific focus on diplomatic negotiations in Southeast Asia (ASEAN). The platform is based on an Expert System and Rule-Based Model, utilizing forward chaining logic (i.e., IF–THEN rules) to generate foreign policy alternatives and assess their potential consequences. The AI/IR platform successfully simulates foreign policy decisions in response to dynamic circumstances and evolving national interests (Putri, Chairil, Bela Pertiwi, & Tirtawinata, 2020)**.**

A typical expert system consists of three main components: the knowledge base, the inference mechanism, and the user interface. The knowledge base contains information known about a particular subject at a given moment. The inference mechanism uses this information to deal with uncertainties. The user interface facilitates the interaction between the user and the expert system. A group of experts, working as a team, compiles the knowledge base by analyzing and validating other sources, facts, observations, and methods for analyzing conditions (Bhatele, 2024). Through the user interface, the system queries issues to be resolved. The information contained in the knowledge base is processed using the inference mechanism, which employs various methods such as experience-based connections, "**IF-THEN**" rules, and searching for possible solutions. The user interface conveys the results in a form that is understandable to the user. The core of this structure is the mechanism that searches the knowledge base using rational logic rules to derive a solution. This inference mechanism interacts with the user by asking questions and obtaining answers, performing the following tasks:

- Comparing the user's questions with the information in the knowledge base.
- Searching for and identifying the defined goals and causal relationships.
- Evaluating the relative definitions of the facts based on their corresponding confidence coefficients.

The operation of the inference mechanism is similar to the process an expert would use to evaluate an issue and propose a solution. This mechanism continues searching the knowledge base until it finds the most reliable path for suggesting a solution. For example, in the case of foreign policy decision-making ~~program~~, it first analyzes the data unrelated to the specific situation and tries to identify the causes, then proceeds to determine the most effective decisions. The user interface enables the exchange of information between the user and the inference mechanism, thus the system must be able to recognize sufficient terms for information exchange on the subject at hand. During the knowledge base processing, pre-defined logical rules are used (G.Sol, 1987). To perfect the knowledge base, real-life experience is more critical than mere knowledge, and it should come from the work of consultants, textbook authors, researchers, and experts in the relevant field. Thus, at each level of the management object's structure, the knowledge base has its own level, with each base having its own algorithm, and each algorithm having its own programming environment. In constructing the knowledge base, various types of knowledge and their specific models and programming languages are developed to express them. (This will be demonstrated with an example in the section on creating the knowledge base.)

Now, let's consider how to design this knowledge system for foreign policy decision-making. Building an expert system involves a whole team of professionals from various fields. Specifically, it includes: Expert professionals in the relevant field, ~~d~~D~~D~~ata engineers who develop processes for logic and symbolic components, Programmers who create the working environment. In other words, the participants involved are:

1. Software specialists,
2. Expert specialists (mainly the expert team),
3. Data engineers,

4. Users. This system will be developed in three main stages:
   - Defining the knowledge (Research, choosing the method, and formalizing the knowledge into an official format).
   - Designing the software.
   - Refining.

These stages follow a 3:5:1 ratio, meaning the software design phase requires the most time.

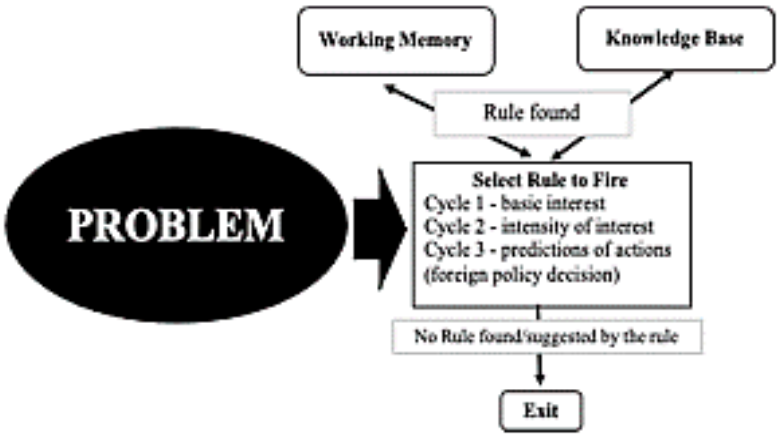
One of the challenges in creating an expert system is extracting all the knowledge from the expert. When modeling an expert system for practical use, such as foreign policy decision-making, this research will demonstrate how it can be designed for decision-making in urgent situations or during discussions and negotiations. In developing the logic inference mechanism for a rule-based expert system, the forward-chaining method will be used. This is because forward-chaining is commonly used in modeling AI~~artificial intelligence~~ to simulate human brain processes, where reasoning is made in upward stages based on logic. It can be modeled as a system that uses the facts stored in the working memory and the conditions of each rule in the knowledge base. The rules of the knowledge base can be described in an "IF...Then" structure, and the process can continue until all possible conclusions are reached.

In terms of operation, forward-chaining involves repeating the following steps:

1. Check the rules whose conditions (IF statements) match the facts in the working memory, and continue until no further rules can be satisfied.
2. Add the conclusion (THEN statement) from the reasoning process to the working memory. The derived decision becomes a new case and can later match with the remaining rules.

"Modeling the knowledge base and the logical control mechanisms is the first step in designing this type of system. The key is to develop the Working Memory (WM) and Knowledge Base (KB), which express the expert's knowledge for interrupting the foreign policy decision-making process. This research will mostly use the Rational Choice Theory (RCT) and will include other theories that study international relations and foreign policy.

Figure2: Forward chaining inference for foreign policy decision making



In international relations research, there are various theories explaining the decision-making process, but the Rational Choice Theory allows for the mechanical calculation of the costs and benefits of foreign policy decisions. However, the Knowledge Base can be improved by incorporating other models of foreign policy decision-making, such as state institutional or psychological approaches. Rational Choice Theory suggests that participants choose the actions/strategies that bring the highest

benefit to achieving their goals. Participants must also consider the actions and counteractions of others, as these affect the outcomes of the decision. This theory is based on several assumptions:

1. *Participants desire to achieve specific goals.*
2. *Some of these desires are more important to participants than others.* Participants rank their interests by assigning different levels of utility (value) to them, and this ranking remains stable during decision-making.
3. *Participants will calculate the action that gives them the highest utility.*
4. *Participants can only calculate the expected utility of an action, which includes considering the likelihood of certain outcomes.* Based on this, they decide whether to adopt a risk-prone or risk-averse strategy.
5. *Participants behave strategically*, meaning they attempt to outmaneuver other participants and ensure that they themselves benefit the most (Mearsheimer & Rosato, 2023).

In short, the Expert System provides the technical support for decision-making through rules and logic, while Rational Choice Theory serves as the thinking framework for foreign policy decision-makers who aim to achieve the greatest benefit with the least risk.

EXPLANATION-BASED LEARNING IN MONGOLIA'S ~~HISTORICAL FOREIGN~~ POLICY DECISIONS IN THE PAST AND INSIGHTS FROM RATIONAL CHOICE THEORY: FINDINGS

Understanding a country's interests is crucial in foreign policy analysis, as it helps to identify the potential benefits and losses that may arise from the actions of policymakers. The approach developed by Donald D. Nuechterlein aids in evaluating a country's core interests and ranking their importance (intensity of interests). This method provides valuable insight into how policymakers prioritize and make decisions based on the weight and significance of various national interests (E.Nuechterlein, 2019).

This is essential for defining the participants' goals and prioritizing interests. However, Nuechterlein's approach does not fully capture the contemporary international political landscape. His research fails to encompass modern global issues such as global health security and cross-border environmental concerns. Therefore, in this study, the categorization of core interests has been adjusted to include a broader view of security, incorporating defense interests as a critical factor.

Table2 E. Nuechterlein, "National Interests and Foreign Policy: A Conceptual Framework for Analysis and Decision- Making,"

Basic interest	Description	Code	Samples of the problem domain
Defense and security	Protection of the state, its system of government, territory, and the citizens against the threat of physical and non-physical violence from another state/actor/entity	A1	Overt military attack (aggression), invasion, internationalized war, transnational terrorism, use of WMD, transnational organized crimes, transnational environmental issue, global health insecurity, cyber-attack, internal conflict, etc.
Economic	Maintaining the well-being of state's economy	A2	Trade competition, inflation, recession, balance of payment, economic growth issues,

	in relations with other states/actors		competition over emerging markets, energy and the environment problem, economic inequality and financial imbalances, etc.
World Order	Maintaining an international political and economic system	A3	Unequal distribution of power, hegemony, failure of global political leadership, ineffectiveness of international institutions and norms, etc.
Ideological	Protection and promotion of state's ideological values	A4	Ideology-based propaganda, ideology based transnational sociopolitical mobilization, naming and shaming at the global level for ideological-related matters, etc.

Source: British Journal of International Studies, vol. 2, no. 3, 1976.

The issue may involve a combination of several core interests. Therefore, in order to avoid oversimplifying or generalizing the complexity of international relations, the system must establish a specific classification for each issue. If a single issue involves multiple core interests, the system should develop foreign policy options that address all those interests and define procedures for implementing a strategic plan. Based on the definitions of core interests, rules will be formulated within the scope of the issue. Events and trends in the international environment that may positively influence our national interests will be deliberately included. As a result, the foreign policy outcomes generated by this system will not only consist of strategies for resolving issues but also decisions aimed at continuing cooperation between countries.

Rule 1: IF there is a continued threat of physical or non-physical violence from other actors/states

AND/OR a threat of physical or non-physical violence from other actors/states to the national governance system,

OR a threat of physical or non-physical violence from other actors/states to citizens,

OR a threat of physical or non-physical violence from other actors/states to the territory,

OR there is a positive impact from other actors/states in protecting the state, governance, territory, and citizens from such threats,

THEN [Core Interest: A1]

Rule 2: IF there is either a negative impact on national economic well-being

OR a positive impact on national economic well-being,

THEN [Core Interest: A2]

Rule 3: IF there is a negative impact on the International political system,

OR a negative impact on the international economic system,

OR a positive impact on the international political system,

OR a positive impact on the international economic system,

THEN [Core Interest: A3]

Rule 4: IF there is a continued threat to national ideological values,

OR a positive influence in promoting national ideological values,

THEN [Core Interest: A4]

Once the core interests (A1–A4) have been identified, the next step in the forward-chaining inference process is to determine the priority level of each interest (B1–B4). The level of importance is ranked as explained below — from interests essential to "existence" to those considered "secondary".

Table 3. E. Nuechterlein, "National Interests and Foreign Policy: A Conceptual Framework for Analysis and Decision- Making,"

Intensities of interest	Description	Code
Survival	The existence of the state is in jeopardy due to an immediate threat of massive physical violence from other states/actors	B1
Vital	Serious harm to the state's political and economic well-being is likely to occur unless strong measures are undertaken	B2
Major	Political, economic, and ideological security of the state are negatively affected by events and trends in the international environment	B3
Perhipheral	Political, economic, and ideological security of the state is not negatively affected by events or trends in the international environment	B4

Source: British Journal of International Studies, vol. 2, no. 3, 1976.

The approach developed by Nuechterlein evaluates a country's national interests based on two main factors. First, values — these are indicators used to assess how closely an event or issue aligns with the country's core national interests. Second, consequences — this involves evaluating the potential risks to economic, diplomatic, military, and reputational aspects that may arise in interactions with other countries or actors (E.Nuechterlein, 2019).

However, in order to make well-founded conclusions, it is necessary to have concrete measurement tools for both values and consequences. For this purpose, existing indexes and models developed by other scholars can be used to calculate the relevant components. For example:

- Form of government: such as the Global Democracy Index (value 5),
- Models for assessing a country's military capabilities (consequence 2),
- Methodologies for evaluating a country's economic potential (value 3),
- Software designed to monitor media headlines and social media trends in order to observe domestic public opinion (consequence 6). (*Table 3*)

Table 3. E. Nuechterlein, "National Interests and Foreign Policy: A Conceptual Framework for Analysis and Decision- Making"

Values	Costs
1. Proximity of danger	1. Economic costs of conflict
2. Nature of the threat	2. The number of troops needed
3. Economic stake	3. The probable duration of hostilities
4. Sentimental attachment	4. The risks of enlarged conflict
5. Type of government (related to ideological interest)	5. The likelihood of success
6. Effect on balance of power	6. The reaction of domestic opinion
7. National prestige	7. World reaction
8. Attitude of allies and friends	8. The impact on internal policies

Source: British Journal of International Studies, vol. 2, no. 3, 1976.

These tools assist decision-makers in making detailed, evidence-based judgments and decisions. In order to measure each of the values and consequences, a broad theoretical evaluation and comparison of indicators is necessary. However, due to limitations in time and resources, this research is not able to develop a fully comprehensive set of rules for determining the overall priority of national interests based on all possible values and consequences. Therefore, additional detailed research and analysis will be required to fill the gaps left by this study. Nevertheless, the following rules serve as examples of how the system may determine the ranking of interests:

Rule X: IF [A1 – Core Interest: National Security]

[Proximity of Threat: Neighboring countries]

[Nature of Threat: Direct, tangible, with significant potential for physical damage caused by other states]

[Economic Interest: Very high]

[Form of Government: Authoritarian]

[Ideological/Spiritual Affiliation: Weak or non-existent]

THEN [Interest Priority Level: B1 – Vital Interest]

Rule Y: IF [A2 – Core Interest: Economic Well-being]

[Economic Interest: High]

[Impact on Balance of Power: Negative]

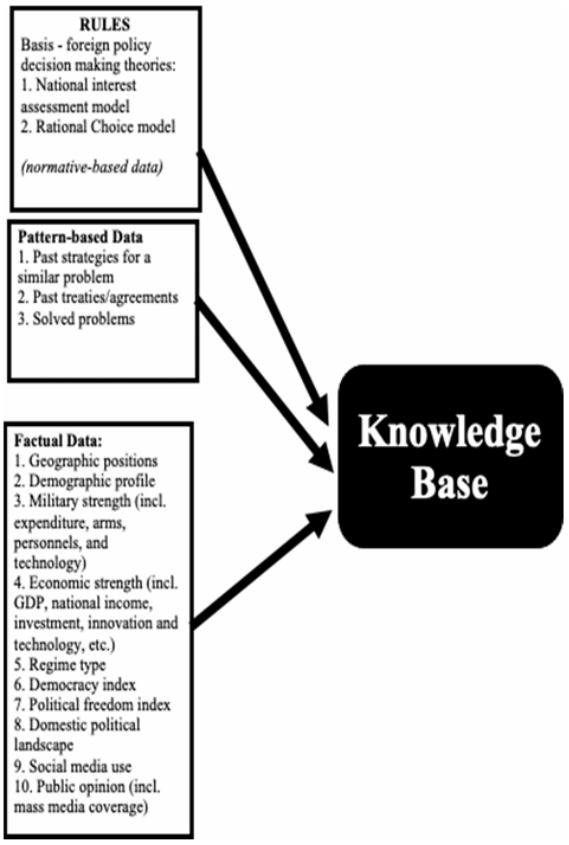
[Economic Cost: High]

[Impact on Domestic Policy: Negative]

THEN [Interest Priority Level: B2 – Important Interest]

Based on the explanation above, the Knowledge Base of this system will collect and operate on three types of data:

Figure 3. Knowledge Base (KB) data development model



- **Rule-based data:** Mechanisms for problem-solving grounded in theory, including case studies. This forms the foundational basis for the rules.
- **Data related to similar situations:** Strategies previously used in similar issues, past agreements, and a repository of resolved case experiences. This data enhances and supports the rule-based data.
- **Factual data:** Includes geographical information, population structure, military strength, economic power, law and order indicators, terrorism index, democracy index, political freedom index, social media usage, and public opinion, among others.

This international relations and artificial intelligence system considers two stages in its forward-chaining process: identifying core interests and determining their priority ranking. The next step in this research is to build a computer system that generates a set of foreign policy options and calculates the effectiveness of each country's decisions.

Nuechterlein does not propose a model that predicts what actions a country will take to achieve its interests. Therefore, models from foreign policy and international political studies—particularly those related to foreign policy strategy—are used instead. By applying these models, we can develop alternative foreign policy strategies that a country may use to respond to events in the international environment.

In this way, by modeling the knowledge base and the forward-chaining logic control mechanism, it becomes possible to simulate and test specific cases within the system. For example, in the case of Mongolia, Explanation-Based Learning (EBL) can be used to analyze historical data as part of the system's “similar situation” dataset. Explanation-Based Learning (EBL) is a model that can generalize structure and planning from a single example. It is an effective method that can be applied in determining political policy. One key advantage of the EBL method is that it does not require large amounts of data. The EBL process can be described in the following four steps:

1. Processing Basis: Gathering facts and relationships related to a specific domain.
2. Concept Function: Defining the function or goal used to interpret the acquired understanding
3. Training: The program explains the characteristics and role of the given example
4. Verification: Checking whether a given object belongs to the defined concept.

In this way, one of the key advantages of EBL is that it enables the system to connect new information with existing knowledge, allowing for continuous refinement of the knowledge base. In the case of a historical example:

Past Decision: The policy decision for the Khalkh Mongols to align with the Qing Dynasty.

Reason for Decision:

1. Tushiyt Khan Chakhundorj was in a border dispute with Russian Empire, which the Qing Dynasty exploited to incite him against Russian Empire. This led to a significant deterioration in Khalkh Mongolia-Russian Empire's relations. As a result, Chakhundorj and the Bogd Gegeen (the spiritual leader) made the decision to oppose Russia.
2. A rumor spread that Galdan Bogshigt received help from Russian Empire when invading Khalkh, which further distanced the Bogd Gegeen and Chakhundorj from Russian Empire and pushed them towards the Qing Dynasty for protection (Natsagdorj, 2014).

Decision-Making Logic:

1. If a country is interested in bringing Khalkh Mongolsia under its control, it is beneficial to incite Mongolsia against another country, driving a rift in relations and avoiding negative consequences for the state involved.
2. If rumors influence public opinion, and decisions are made without verifying the accuracy of the information, it can be too risky. Thus, ensuring the accuracy of information before making decisions is crucial.

– Rules:

1. Avoid worsening relations if there is a dispute with either Russia Empire or Qing DynastyChina.
2. Verify the accuracy of the data (information) used in decision-making.

When applying the logic from the Khalkh Mongols aligning with the Qing Dynasty to modern-day Mongolia:

– Disputes with neighbouring statesForeign Countries (Russia, China): If Mongolia were to enter a foreign policy dispute with Russia or China, especially involving economic or security issues, Mongolia could face the risk of becoming dependent on one of these staescountries. In such a scenario, Mongolia should learn from the historical experience of the Khalkh Mongols' decision to ally with the Qing Dynasty.
– Internal Political Conflicts: If Mongolia faces internal political challenges and the government is divided, making decisions could be risky. Since internal conflicts influenced the decision of the Khalkh Mongols to ally with the Qing Dynasty, it is important to learn from this experience.

Application of the EBL Model in Decision-Making (Recommendations for Similar Situations):

– If Mongolia is in a conflict with Russia or China, it might be beneficial to avoid implementing policies that take sides against either of the two countries.
– Ensuring the reliability of the information used in decision-making and making informed choices can guarantee Mongolia's national security and economic stability.

By training the logic of past decisions and the corresponding rules, we can:

1. *Analyze Past History*: We analyze decisions made in the past from multiple perspectives, identifying the reasons, conditions, and subsequent consequences. For example, the reasons behind the decision "Khalkh Mongols aligned with the Qing Dynasty."
2. Establish Decision-Making Rules: Based on past decisions, it is not only important to understand the conditions of that time but also to identify the rules that applied in those circumstances and the logical framework used for decision-making. For example, the rule "If there is a dispute with either Russia or China, avoid worsening relations" was applied.
3. Automatic Processing of New Data: By doing so, if new data comes in, it becomes possible to automatically process this new information based on previous rules and decision-making logic.

As a result of the research, we have developed a “User Interface / Demo of the Expert System for Analyzing Mongolia's Foreign Policy and Decision-Making” and a “Chatbot / Demo for Analyzing Historical Data and Providing Recommendations Using the EBL Model”. The research still needs further improvement with the help of professional software developers and additional support.

APPLYING AI AND OPEN DATA TO MONGOLIA’S ~~FOREIGN~~ POLICY DECISIONS: DISCUSSION

Looking at the preconditions for using artificial intelligence in foreign policy decision-making, the government’s action plan, “Vision-2050,” a long-term policy document for Mongolia, is being implemented in alignment with this. As a result, measures are being taken to develop and apply artificial intelligence, conduct research, improve the legal environment, and prepare human resources in this area. Additionally, to facilitate the use of artificial intelligence in policy decision-making, 691 government data sets were made open, enabling the integration of this data and the creation of data architectures for state decision-making, which must also be put into economic circulation. Given this, the focus of this research is on examining how to use artificial intelligence, particularly open data, in foreign policy decision-making.

In this article, we demonstrate the possibility of modeling an expert system for foreign policy decision-making. By using the rational choice model and other theories and methods, we show that it is feasible to further improve the system for micro-level analysis, decision-making, urgent response actions, and negotiations. Models such as forward-chaining and explanation-based models can be applied for these purposes. To create the working environment for this modeling and to test it in practice, professional software developers will be required.

Researchers have varying perspectives on the use of artificial intelligence (AI) in international relations, and there are numerous challenges and obstacles in applying AI to decision-making. While the use of AI in international relations offers enormous opportunities, it continues to face criticism regarding ethics, policy oversight, and human involvement. This issue is not only a technological solution but also a critical topic that requires consideration of political, social, and ethical perspectives. This is because the use of AI in international relations, particularly in foreign policy decision-making, can raise ethical concerns. For instance, there is no guarantee that AI will make decisions that are not harmful to humanity (Casebeer, 2020). Additionally, depending on the quality of data, AI may provide incorrect, misleading, or poor-quality information, as AI draws conclusions based on how it is trained (Whyte, 2020). Consequently, issues related to human involvement arise. Some researchers warn that unequal technological development could lead to a risk where certain countries become dependent on technologically advanced countries due to widespread use of AI in international relations (Amaresh, 2020).

However, AI/IR researchers are actively studying potential solutions to these issues, and several solutions that can be directly implemented in practice already exist. For example, AI can be modeled in an ethical way by incorporating ethical theories during the training of artificial intelligence. By training AI with ethical principles, decisions can be made in an ethically sound manner (Casebeer, 2020). Additionally, discussions are not limited to programming AI ethically; there are also ongoing conversations about how humans can ethically use AI. Furthermore, certain aspects of machine learning, such as algorithms, data, training levels, and evaluation, are seen as decisions that can be controlled, allowing for the training process to be monitored and ensuring transparency of information. Some researchers have highlighted this approach in their works (Carabantes, 2019).

International relations is a multidisciplinary field that requires decision-making based on a wide range of data. The use of AI in foreign policy decision-making allows for processing large amounts of data, enabling faster, more accurate, and well-calculated decisions. When people make decisions based on intuition rather than specific logic or detailed calculations, simplified psychological rules tend to influence their decisions, which can lead to more subjective judgments (Purkit, 2018). In contrast, AI reduces human decision-making errors and subjective biases, making more data-driven and objective conclusions.

Through this research, we aimed to demonstrate that AI could~~an~~ be used in international relations, particularly in the ~~foreign~~ policy decision-making of Mongolia, and that expert systems can be modeled and applied for this purpose.

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