

# Game Modeling Algorithm of the Belt and Road Fusion of Chinese Information Based on Information Fusion and Prediction Model

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**Abstract:** This paper analyzes the characteristics of the full-ballistic flight of aerospace vehicles, and designs an overall scheme of multi-source information fusion navigation system based on redundant configuration of navigation sensors for the needs of navigation in different stages of full-ballistic flight of aerospace vehicles. The trading countries and product combinations that bring the greatest opportunities to foreign trade, the noise in the participants' own decision-making, the rewards of neighbors, and the pressure of public opinion on the betrayal by the Internet on the "Belt and Road" countries' game strategy selection, use simulation methods to test the correlation. Conclusion, and discussed our country's coping strategies.

**Keywords:** Game Modeling Algorithm, Belt and Road Fusion, Chinese Information, Aerospace Information Fusion

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## 1. INTRODUCTION

The "Belt and Road" initiative includes two components, the "Silk Road Economic Belt" and the "21st Century Maritime Silk Road" [1]. It was proposed by Chinese President Xi Jinping in his speeches in Kazakhstan and Indonesia in 2013. It is the background of today's world economy. It is an important strategy to fully communicate the trade exchanges of countries along the route and provide a new impetus for China's exports [2]. The report of the 19th National Congress of the Communist Party of China pointed out that it is necessary to focus on the construction of the "Belt and Road", adhere to both importing and going global [3], follow the principle of extensive consultation, joint contribution and shared benefits, strengthen openness and cooperation in innovation capabilities, and form a land-sea linkage, east-west two-way mutual aid. Open pattern [4].

The "Belt and Road" construction adheres to the principles of consultation, co-construction, and sharing, and is open and inclusive [5]. It is not a solo piece by one country, but a chorus of countries along the route. Cross-border credit cooperation, as an important measure for the industry to tackle tough problems [6], is an important pen and ink to compose this chorus, and it is the consensus and urgent development needs of various countries. On the road of building a well-known think tank in China [7], the International Cooperation Center has always been exploring and actively innovating around the great initiative of the "Belt and Road". Through this meeting, the International Cooperation Center of the National Development and Reform Commission and its subordinate units will further improve international cooperation information [8], Research and build a long-term mechanism for the credit system, and comprehensively promote the construction of the social credit system [9].

In addition, in order to improve the reliability of the navigation system of the space shuttle and other space shuttles [10], in addition to the multi-source integrated navigation technology, the redundant design of the same type of navigation sensors is usually adopted [11]; The core of the integrated navigation system is the reliability of the inertial navigation system. The inertial navigation system has

attracted much attention because of its unique advantages of continuous, autonomous and reliable work [12], and has become the key equipment of the aerospace vehicle navigation system. Its algorithm performance is directly the key factors affecting the navigation performance of aerospace vehicles. Different navigation [13] reference frame arrangement methods have corresponding effects on the performance of the navigation system [14]. The existing traditional geographic reference frame navigation arrangement methods have their shortcomings when applied to the navigation of aerospace vehicles. Inertial navigation systems can be continuous, autonomous and reliable [15]. The unique advantages of the work have attracted much attention and become the key equipment of the aerospace vehicle navigation system. Its algorithm performance is a key factor that directly affects the navigation performance of the aerospace vehicle [16]. Different navigation reference system arrangement methods have corresponding effects on the performance of the navigation system [17]. The existing traditional geographic reference system navigation arrangement methods have their shortcomings when applied to the navigation of aerospace vehicles. Quantitative assessment of the country's export opportunities [18].

Therefore, we will identify and investigate China's export opportunities in other ASEAN countries (Brunei, Cambodia, Indonesia, etc.) [19], as well as China's export opportunities to 18 countries in West Asia (Iran, Iraq, Turkey, etc.), 8 countries in South Asia (India, Pakistan, Bangladesh, etc.) [20], 5 Central Asian countries (Kazakhstan. In 2017, China hosted the "Belt and Road" International Cooperation Summit Forum in Beijing. The summit achieved 76 major items in five categories: policy communication [21], facility connectivity, unimpeded trade, financial integration, and people-to-people bonds, more than 270 specific achievements. In October 2018, the "Belt and Road" International Cooperation Cities Credit Alliance [22] Summit, co-hosted by the International Cooperation Center of the National Development and Reform Commission of China and the Jinan Municipal People's Government, was held in Jinan, Shandong Province. Build an exchange and cooperation platform for alliance members to share information, resources, and

achievements, and establish a credit information sharing mechanism among alliance members [23]. To sum up, the environmental adaptability, accuracy, and reliability of the navigation system for aerospace vehicles to fly across the sky for a long time. In addition, considering the needs of aerospace vehicles in different flight stages and flight control tasks, their navigation reference coordinate systems will also change. Different flight environment characteristics and motion characteristics across the sky [24].

## 2. THE PROPOSED METHODOLOGY

### 2.1 The Aerospace Information Fusion and Prediction Model

Kalman of the Massachusetts Institute of Technology proposed the Kalman filter theory and successfully applied it to the system of the American Apollo program. Therefore, the Kalman filter theory directly affects the establishment of the optimal estimation theory, and it is still the field in the field at home and abroad. The research focus of information fusion application technology. Experience the overseas life of Chinese employees. The program fully presents the infrastructure interconnection between China and countries along the "Belt and Road" initiative, the investment direction and the industrial layout of the countries along the route. Chinese-funded enterprises are "going out" Overcoming many difficulties in the process of "localization", integrating and coexisting with other countries' cultures, and enhancing the audience's understanding of the "Belt and Road" initiative.

In filter 1 of the DSM model, countries with too high political or commercial risks will be screened first, followed by countries with small macroeconomic scales and slow or regressive macroeconomic trends. And When the aerospace vehicle is in different flight stages, different flight environments will lead to different navigation technology problems, such as the inability to transmit electromagnetic waves in the black-barrier area and the failure of some sensors due to changes in environmental conditions during long-duration flight, as well as large overload and The impact of high dynamic flight with drastic changes in angular velocity on sensor equipment, etc.

Different from traditional aircraft, aerospace vehicles need to fly across the sky and the flight environment is harsh. Relying on the inertial navigation system alone cannot meet the high-precision navigation performance requirements of aerospace vehicles; while the traditional single inertial/satellite, inertial/astronomical combination Navigation systems, due to their respective shortcomings, are the main battlefield of information warfare in modern air and space battlefields, and navigation information is an indispensable part of them. In the process of full ballistic flight, the aerospace vehicle must overcome the multi-stage working problem of the navigation system and the problem of navigation system failure.

### 2.2 The Belt and Road Integrates Chinese Information

Targeted research on a navigation system with high adaptability and reliability for aerospace vehicles. The federated filtering algorithm is different from the traditional centralized filtering. As a decentralized processing algorithm, it processes information through a two-level decentralized structure. with fusion. First, a main navigation system is selected as the public reference system, usually the inertial navigation system is selected, and then other navigation systems and the main navigation system are combined into a combined system. The full ballistic flight cycle of an

aerospace vehicle can be divided into an ascending segment and an on-orbit segment, return to the reentry segment and the landing segment.

A single inertial navigation system will accumulate errors over time during operation, which will eventually lead to the divergence of navigation information. Therefore, a suitable multi-source integrated navigation system is constructed for different flight stages of aerospace vehicles. The main idea of EKF is to integrate nonlinear The function is expanded by Taylor series at a certain point, and the higher-order terms of the expansion are directly ignored and discarded. Through such a process, an approximate first-order linearization model of the system can be obtained, which is convenient to use Kalman filter to deal with the problem of state estimation. The main role of filter 1 is to remove some countries that lack trade potential early in the overall screening process, so that subsequent filters can focus on a refined "country-product" combination. Using the ONDD risk indicator and per capita GDP, after the first round of filtering, a total of 101 countries were retained that met the two sets of criteria.

Based on the size and growth of demand in these markets (determined in 2) and the relative market share of the exporting countries (determined in filter 4), the overall screening process makes the table divide the country's actual export opportunities (determined in filters 1 to 4). 3) are classified into 20 units. Star and Wilson (1995) proposed a model in which participants have different levels of policy complexity. They distinguished three levels of reasoning: level-0 reasoners, level-k reasoners, and level-k-1 reasoners, with different levels of reasoning. The players choose different strategies in the repeated game, and some new rules are introduced into the structured model of decision rules. The "five links" of the "Belt and Road" allow countries along the route to cooperate more smoothly, and at the same time, the cooperation of the countries along the route will also affect each other through the "Belt and Road". In this context, the threat of future cooperation from a third country is more significant for China-Singapore credit reporting cooperation.

### 2.3 The Game Modeling Algorithm for Integrating Chinese Information along the Belt and Road

According to the above analysis, China has a high share of REOs with high or high "potential" market shares in countries along the "Belt and Road" (units 11 to 20), which account for 99.7067% of the total value. China For most REOs, China has more export opportunities in the market with a larger share. The structured model of decision-making rules shows that different types of decision-makers appear at different frequencies, get different payments and benefits, and the decision-makers choose There are also differences in optimal strategies; at the same time, the model also incorporates the observation method of information search into the game, and makes a better explanation for the results of some endogenous factors and information factors affecting decision-making.

Most of the time, the aerospace vehicle is in a maintenance state, but in the orbit change stage, the navigation system needs to provide accurate attitude and position information. In the orbit maintenance phase, the astronomical navigation system and the satellite navigation system are used to provide attitude information and position information, respectively. When maneuvering, the inertial navigation system is used to provide navigation information. For the multi-information fusion integrated navigation system of aerospace vehicles, the position information of the satellite navigation system and the

celestial vector information of the ultraviolet sensor do not need to be used at the same time, and one of them is selected according to the actual situation. Therefore, the inertial/satellite/star sensors and inertial /star sensor/ultraviolet sensor two combination modes are simulated and verified.

Among these 59,032 real export opportunities, most of the real export opportunities (REO) can be traced back to Turkey (15% of the countries along the "Belt and Road"), the United Arab Emirates (11.42%) and the Philippines (9.88%). The actual export opportunities of other countries are more or less distributed in the remaining countries along the "Belt and Road". The potential value of China's exports to countries along the "Belt and Road" is enormous, and China has a relatively large or large market share in the vast majority of actual export opportunities. Therefore, export promotion strategies should focus more on maintaining stability and long-term growth.

### 3. CONCLUSIONS

In the simulation process of this study, the initial matrix of the game is set as the prisoner's dilemma matrix, and the game type of the "Belt and Road" countries may also be the deer hunting game or the snowdrift game; The potential export value of countries along the "One Road" route is huge, and China has a relatively large or large market share in the vast majority of actual export opportunities. In the follow-up research, the random distribution of decision-making types and the influence of random noise in decision-making on the cooperative decision-making of the countries along the "Belt and Road" will be considered, and the interpretation scope of the research conclusions will be expanded.

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