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Impact of Trade Protectionism on Economic Growth Based on Bayesian Networks and Fuzzy Logic

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Abstract: - A government policy known as trade protectionism limits international trade in order to support home industries. Since the global financial crisis, the country's economy has seen a slowdown in trade growth. The data is taken from the China Census Bureau (CCB) and after the data is fed in to data processing technique our proposed is Adaptive Square Root Cubature Kalman Filter (ASRCKF). The preprocessed data is fed into the Bayesian Networks (BN) decision making activities in different influencing factors to foreign trade protectionism and uses fuzzy logic (FL) analyze the China's foreign trade Protectionism. Set of data is-processing-decision making activities in which actual data using Bayesian networks and fuzzy logic are combined in the Trade Protectionism. The proposed model is implemented in MATLAB/ Simulink platform and the accuracy is compared to various existing approaches such as Particle Optimization Algorithm (POA) Radial Basis Function (RBF) and Support vector neural network (SVNN) method our proposed method obtains 98% of accuracy.

Keywords: Trade protectionism, Economic, Fuzzy logic, Foreign Trade, Bayesian network, decision-making, firm-trade.

I. INTRODUCTION

Since the reform and opening up, and particularly after China joined the World Trade Organization (WTO), the export of goods abroad has been essential to the country's economic development However, the global economy has been recovering slowly since the 2008 financial crisis, and residential nations led by the USA have been practicing unilateralism and protectionism in trade [1, 2]. It is not looking good for China's foreign trade.. China's entire foreign trade grew at an average yearly rate of only 3.35 percent. With the advent of a new era and significant changes to the global economy since the turn of the century, the domestic economy is developing its kinetic energy conversion and growing rapidly to accomplish a crucial transformational stage with excellence [3] International trade, which serves as one of our nation's primary means of communication with the outside world, is crucial for forecasting the amount of import and export commerce overall. It also enables us to make critical decisions and analyze the domestic and global economic environments with great accuracy [4].

A complicated time-varying nonlinear system is international trade. The foundation of creating a stable economic and trade environment is the analysis and forecasting of issues related to international trade [5]. There is a nonlinear relationship between these factors, meaning that international factors like global economic growth and international market demand also have an impact on international trade in addition to domestic factors like a country's or region's economic conditions, environmental conditions, and trade policies [6, 7]. The foundation of analyzing and forecasting export trade data is the development and use of suitable mathematical models [8]. The study shows how each country's distinct and dynamic international trade environment distorts the original data structure's basis for the basic linear model [9, 10], which makes it very difficult to analyze and forecast export trade. In the middle of the 2000s, a number of unfavorable viewpoints regarding the trade disputes among the China and US had already been stated. The main cause of the increase in trade disputes among the China and US is their substantial trade deficit, which could spark a trade war between them [11, 12].

Chinese political and economic dominance has led to notable changes in US policies, which China has noticed. The United States perceives China as a significant risk to its interests abroad [13]. It also eliminate the chance that China will progressively change to conform to the Western system, which led to a thorough assessment of US policy toward China over the previous several decades [14, 15]. Therefore, the economy is not the primary cause of the trade disputes between the two countries [16], but also as a result of the politics used to achieve worldwide hegemony. Along with analyzing potential effects of the trade dispute among the two countries on the Chinese economy specifically and the global economy as a whole, it also examines potential solutions to the trade friction. It also makes recommendations for averting future protectionism-based trade disputes.

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The answers to these questions are found in [17, 18] through cross-sectional analysis based on statistical data, inference, and critical review of the literature.

"The following is an outline of the paper's main contributions:"

This paper research the based on trade protectionism on economic growth based on BN and FL.

- Trade protectionism affects a range of economic metrics in complex ways. It is possible to separate these effects and pinpoint the precise pathways through which protectionism affects growth by utilizing Bayesian networks and fuzzy logic.
- Combining Bayesian networks and fuzzy logic offers a unique and innovative approach to analyze the complex relationships between trade protectionism and economic growth.
- Evaluating the performance using same datasets with different methods, analyzing the metrics accuracy, precision, f-score, and computational time.

Rest of these manuscripts is organized as follows: The literature review is reviewed in Part 2, the proposed strategy is explained in Part 3, and the results are confirmed in Part 4. and Part 5 concludes this manuscript

II. METHODOLOGY

Several works were suggested in the literature related to based on bayesian networks and fuzzy logic for trade protectionism on economic growth, a few recent works are reviewed here,

Han et al. [19] have suggested that the export volume's complexity, strong nonlinearity, noise, and randomness, it was challenging to characterize it using the conventional time series model algorithm. With several unique benefits, an SVNN can address high-dimensional, nonlinear, small sample pattern recognition issues. This study uses regression analysis and principal component analysis to look at the pace at which different influencing factors affect China's exports of products abroad. It also uses the support vector neural network approach to forecast and analyse the country's product exports.

Yang [20] have utilized that the evolution of the local environment and real economy had an impact on regional economy as well. For the economy to run smoothly, it was therefore vital to forecast the regional economy's potential for growth. The nation can now more precisely than ever understand the regional economy's development trend thanks to the ongoing technological advancements. The prediction methods currently in use, however, still have significant errors. This paper developed a data-mining model to anticipate the prospective growth of the local economy, with the goal of increasing prediction model accuracy.

Park [21] have suggested that the USA negotiated changes to free trade agreements with South Korea, Canada, and Mexico. It continues to bargain for an Free Trade Agreement (FTA) with Japan. On the other hand, the US government adopted a various stance toward China in terms of trade, one that was predicated on imposing high tariffs on goods imported from China.. In response, China imposed steep levies on US imports. The trade dispute has actually had a detrimental effect on not just the economies of the US and China, but also the entire worldwide economy, since the two nations together, known as the G2, accounted for about 40% of the worldwide outcome. It was one of the most delicate topics regarding how global economic growth will impact the world economy going forward. This essay makes an argument for the cause of the trade dispute as well as a solution.

Mrowczynska et al. [22] have suggested that provides a framework for multicriteria decision-making and forecasting, and suggests using it to help decarbonize urban areas. An integrated set of activities for information processing and decision making, such as Bayesian networks ,Geographic Information System, the integration of real data, applying fuzzy inference rules to expert knowledge was used to maximize the multi-criteria approach to decision-making. By utilizing the tools that have been suggested, a new strategy for raising city energy efficiency and lowering CO2 emissions while utilizing renewable energy sources has been designed. With the use of the Fit for 55 packages, eco-friendly and energy-conscious smart cities were logically planned through the integration of contemporary computational methods.

Handley et al. [23] have suggested that the effects of the U.S. import tariff raise for 2018–2019 on the growth of exports from the country via supply chain connections. Employing firm-trade linked confidential data from 2016; we pinpoint the companies that ultimately experienced tariff hikes. They made up 65 percent of manufacturing jobs and eighty-four percent of all exports. There was an implied cost of $900 per worker in additional duties for the average affected firm. We create product-level indicators of exporters' exposure to increases in import tariffs and calculate the effect on the growth of US exports. 2018–2019 saw comparatively slower export growth for the most exposed products, with bigger effects in 2019.

Zhou et al. [24] have suggested that ecological balance, environmental preservation, and financial activity development in concert. The purpose of this study is to look into the relationship between green financing and economic development as well as environmental quality. For thirty Chinese provinces and municipalities, we used data on environmental quality, economic development, and green finance from 2010 to 2017. Initially, the principal component analysis worldwide was used to generate an indicator of green finance development. Second, the relationship among economic development and green finance was modeled, and the outcome indicate that green finance expansion promotes economic development.

Cengiz et al. [25] have suggested that the urban policies that prioritize economic growth and urban sprawl have a gradual impact on forests and green spaces. Evaluating the impact of Turkey's rapid urbanization policy on Istanbul's green spaces was its primary objective. The study's sub-objectives were to: (i) Determine the land's use and changes between 1984, 2000, and 2017.(ii) To describe how urban green spaces were responding ecologically to the pressure of land change, and (iii) to talk about how forestry and urban policies were hastening the conversion of land use. The study made use of media news on urban policy, statistical data, physical data, and socioeconomic data.

Wang and Zhang [26] have developed that the primary uncertainty pertaining to the world's energy, economy, and environment was the rise in protectionism. Moreover, the implementation of Intended Nationally Determined Contributions (INDCs) depended heavily on the decoupling among economic expansion and emissions of carbon. This study investigated how protectionism affected the decoupling of carbon emissions from economic growth by gauging trade openness using the data at hand. Trade openness affects carbon emissions differently in rich and poor countries. Decoupling economic growth from carbon emissions is beneficial in wealthy nations but detrimental in underdeveloped ones.

A. Motivation

A complicated time-varying nonlinear system is international trade. The foundation of creating a stable economic and trade environment is the analysis and forecasting of issues related to international trade. There is a nonlinear relationship between these factors, which means that international factors like global economic growth and international market demand also have an impact on international trade in addition to domestic factors like a country's or region's economic conditions, environmental conditions, and trade policies. The country's total economic progress is significantly influenced by regional economic development. Despite being a national strategic research goal, the support vector machine (SVM) overlooked the influence of micro-policy systems on local economic development and lacked reliable data. Zou used the least squares approach in his model to maximize the indicators of regional economic development that are characteristically nonlinear. His research's least squares method produced data that was both excessively inaccurate and riddled with large errors. Sava used the econometric model research approach to examine the building of a forecast model for regional economic development. The findings demonstrated that they had identified a few impacts on the way the nation's entire economic system operated. The was devoid of solid experimental evidence and was unable to clearly identify the ways in which the environment influences economic matters. There are some shortcomings. These drawbacks are motivated to do this work.

III. PROPOSED METHODOLOGY

Trade protectionism aims at protecting a nation's critical economic interests, including its major industries, commodities, and employment opportunities. However, free trade encourages more efficient use of natural and human resources as well as higher domestic product consumption. The data is taken from the CCB. The block diagram of impact of trade protectionism on economic growth is represented by Figure 1. Consequently, the following provides a thorough explanation of how trade protectionism affects economic growth based on BN and FL.

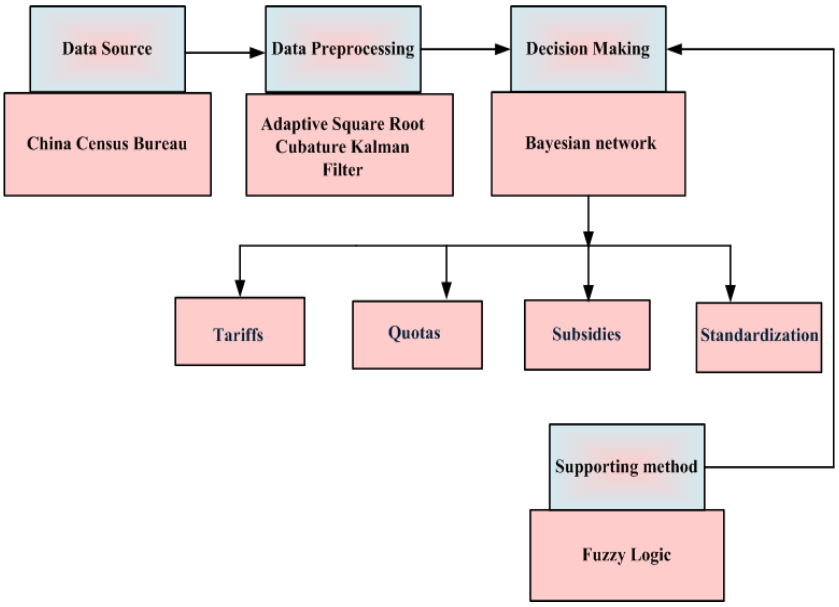

Figure 1: Proposed Methodology Diagram of impact of trade protectionism on economic growth analysis

A. Data collection

The CCB provides import and export data for China from 2015 to 2019. This data covers the 2017 [23] significant reworking of the HS nomenclature. We combine data from 2017 to 2019 in order to give time-consistent export flows at the 6-digit product level.

1) Import Tariff Data

As part of the Sections 201, 232, and 301 investigations, we gathered information on new tariffs imposed by the United States from 2018 to 2019 at the 8-digit tariff line level.

- China, Waves 1 and 2 (July 6, 2018, August 23, 2018, and September 24, 2018, with an increase on May 23, 2019) are the three waves. Numerous adjustments and alterations have been made, particularly to wave 3, where products have been added and removed in a sequence of Federal Register notices from earlier annexes.

2) Export Retaliation Tariff Data

According to Bown and Kolb's (2019) trade war timeline, lists of sources from destination countries are utilized to assemble new retaliatory tariffs imposed by other countries on China exports. We aggregate these lists to the HS 6-digit level because HS6 is the most disaggregated product category that is consistent across national boundaries. Tariffs are linked to the month that they were implemented. The entire value of trade that is subject to retaliatory tariffs is calculated in 2017 using HS 6-digit U.S. export data. We include the subsequent acts of retaliation:

- China, April 2018: Retaliatory tariffs on $2.4 billion of U.S. exports.
- China, July 2018. Retaliatory tariffs on $29.2 billion of U.S. exports.
- China, August 2018. Retaliatory tariffs on $15.3 billion of U.S. exports. China, September 2019: Retaliatory tariffs on $51.3 billion of U.S. exports.
- China, June 2019: Retaliatory tariffs on $39.8 billion of U.S. exports.

The primary task of data inspection involves verifying the accuracy and completeness of the test data before creating the index data. The foundation for additional analysis is the standardization index used in data processing. This is because different indicators have different effects on the forecast of influence and affect the path, making it impossible to directly compare indicators due to data dimension and scope differences. Qualitative indicators, such as predictors, and quantitative indexes, on the other hand, can distinguish between positive and negative indicators.

B. Data Preprocessing by Adaptive Square Root Cubature Kalman Filter (ASRCKF)

The data taken from the China Census Bureau for analyze and make decision for economic growth. To perform this, the method first applies Adaptive Square Root Cubature Kalman Filter [27]. The method reads the data and generates gray scale data from the data given and de-noises the data. Further, the method splits the data into number of regional images according to the window size considered. For each regional data generated, the method generates the gray histogram and computes the minimum gratitude value. Based on the gratitude value,

and improves the quality of the data. The quality improved data has been used to perform decision making. The procedure of ASRCKF is given bellow;

The four steps of ASRCKF are initialization of the state, prediction update, state update, noise covariance update.

The initial value of state assessment $(\hat{a}_{0|0})$, error covariance matrix $(p_{0|0})$ set by the equation (1),

$$\begin{aligned} \hat{a}_{0|0} &= e(a_0) \\ p_{0|0} &= e((a_0-\hat{a}_{0|0})(a_0-\hat{a}_{0|0})^t) \end{aligned} \tag{1}$$

Then the error covariance matrix is decomposed into singular values at time step $h-1$ is performed by equation (2),

$$p_{h-1|h-1} = d_{h-1|h-1}\begin{bmatrix} s_{h-1|h-1} & 0 \\ 0 & 0 \end{bmatrix} v^t_{h-1|h-1} \tag{2}$$

From this equation it generate the cubature points it is noted in equation (3),

$$A_{i,h-1|h-1} = d_{h-1|h-1}\beta_i + \hat{a}_{h-1|h-1} \quad i = 1,2,...,2n \tag{3}$$

Where the ith cubature points and the state vector's dimension are represented by β_i and n; $\beta_i = \sqrt{n}[1]_i, [1]_i = [e_{n\times n}, -e_{n\times n}], w_i = \frac{1}{2n}, e_{n\times n}$ is the identity matrix. w_i is denoted as the weight of the ith points.

The error covariance matrix's square root and the prediction update of the state variable is calculated by the equation (4),

$$s_{h|h-1} = tria\left(\left[\lambda_{h|h-1} s_{q,h-1}\right]\right) \tag{4}$$

Here $s = tria(e)$ is denoted as QR disintegration $q_{h-1} = d_{q,h-1}\begin{bmatrix} s_{q,h-1} & 0 \\ 0 & 0 \end{bmatrix} v^t_{q,h-1}$, $\lambda_{h|h-1} = 1/\sqrt{2n} A^*_{1,h|h-1} - \hat{a}_{h|h-1} - i = 1,2,\ldots 2n$.

The q_{k-1} is a process of noise covariance

The innovation covariance matrix's square root can be calculated using Eqn. (5).

$$s_{ff,h|h-1} = tria\left(\left[F_{h|h-1}\, s_{r,k}\right]\right) \tag{5}$$

Where, $F_{hh-1} = \sqrt{\frac{1}{2n}}\left[f_{1,h|h-1} - \hat{h}\Big|_{hh-1} - \hat{h}_{h|h-1}, \ldots, f_{i,h|h-1} - \hat{f}_{h|h-1} \right]$, $r_h = d_{r,h}\begin{bmatrix} s_{r,h} & 0 \\ 0 & 0 \end{bmatrix} v^t_{r,h}$, the r_h is represents the missing and redundant data covariance.

This preprocessing method computes the least gradient value for the trade data and based on that the method computes the new value for the alphabet to improve the quality of the data and eliminate the missing and redundant data. After preprocessed data is transformed feature extraction process.

C. Future Extraction

In this paper need to analyze the large number of variables it may cause a decision making algorithm not suitable for the training samples. Feature extraction is process of diminishing the data set and of trade protectionism on economic growth practices to reduce the size of the data set.

D. Bayesian Network

Among the considerations is a suggestion to construct a Bayesian network to aid in choosing the trade protectionism scenario. In a work [24], a fuzzy BN 2 -stage decision model was presented to select trade data in China. After the triangle membership function was used to defuzz the fuzzy location criterion, for each node in the Bayesian network, the input probabilities of events were acquired. The model demonstrated efficacy, suggesting that a comparable methodology could yield satisfactory outcomes in forecasting the impacts of trade protectionism and formulating strategies to safeguard a country's essential development. The Theorem of Thomas Bayes links the conditional probability of 2 occurrences that determine one another's primary source of dependency when constructing a Bayesian network. Equation (6) presents the Bayes theorem, and Equation (8) provides the theorem of conditional probability.

$$p(A/B)=\frac{p(b/a)\times p(a)}{p(b)} \tag{6}$$

$p(b)>0; p(a/b)$ is the event probability a if an event occurs b, and $p(b/a)$ is the event probability B if an event occurs a. Here, a and b are the events.

$$p(A/B)=\frac{p(b\cap b)}{p(b)} \tag{7}$$

where the probability of an event's common component a and b is denoted by $p(A\cap B)$. A notion fusing graph theory and Bayesian inference has been proposed as a result of the methodical development of the statistics problems. This idea led to the creation of the mathematical tool known as Bayesian networks, which applied decision theory. Acyclic directed graphs, or BNs, are graphs with vertices representing events and edges defining the causal linkages between the events. The network nodes' probability were ascertained using the traditional definition of probability, commonly referred to as the Laplace definition. It was shown by the following equation (8):

$$p(A)=\frac{|a|}{|\Omega|} \tag{8}$$

The number of all elements in a particular collection $p(a)$ is the probability of event A, where Ω indicates the set of all possible elementary events and a is any member of the file . The conditional probability of the entire Bayesian network was filled in by using those mentioned assumptions.

E. Fuzzy Logic

The process of making decisions is most significantly impacted by the identification of criteria. But this method does not lessen the uncertainty of the outcomes, which is the primary issue with decision-making and frequently cannot be resolved by probabilistic models [28] Fuzzy systems are therefore suggested as one of the instruments to aid in decision-making and assess economic growth. By figuring out the membership function $F(y)$ value, fuzzy logic makes it possible to examine data that is erroneous or unclear. A given element's membership in the fuzzy set is determined by its degree of membership. The membership functions that are most commonly used are trapezoidal and triangular. Language variables can also be converted into fuzzy numbers using triangular functions. Owing to its benefits, a triangle membership function, denoted by Eqn. (9):

$$F(y)\begin{cases}\dfrac{(y-L)}{(M-L)}\,if\ L<y<M\\ \dfrac{(P-y)}{P-m}\,if\ M<y\le q\end{cases} \tag{9}$$

Where, $0\,ify\le L$ and $0\,ify>p$. The input data, which included variables influencing the best trade protectionism option and the evaluation of potential economic growth scenarios, was obscured by the use of the triangular membership function. Choosing the right number of linguistic variables to describe the factors' influence is necessary for this kind of approach. While an inadequate number of variables makes it more hard for decision-makers to discern between variables and raises the number of inference rules, an excessive number of linguistic variables results in an erroneous description of the degree of effect of particular components. Equation 10. defines linguistic variables as fuzzy triangular numbers F = (l, m, p).

$$L=\sum_{j=1}^{n}w_j l_j\quad M=\sum_{j=1}^{l}w_j m_j;\ P=\sum_{j=1}^{l}w_j m_j; \tag{10}$$

Triangle membership functions for individual language variables can be used to compute equation (4), producing fuzzy numbers that take individual expert weights and competence into consideration. The assessments made by experts in fuzzy values must be defused before being compared. The center of gravity method, which is highly accurate and allows for the consideration of the population's distribution, was used in the article to defuzzify the data. Eqn. (11) is then preceded by the defuzzification of fuzzy linguistic words.

$$d(y)=\frac{\int_{y} yF(y)dy}{\int_{y} f(y)dy} \tag{11}$$

Where, $d(y)$ is the defused value and y the input variable's value, linguistic variables' $F(y)-a$ triangle membership function . The final defuzzified value was calculated using Equation (12):

$$d(y)=\frac{\int_{L}^{M} y\frac{y-1}{M-1}dy+\int_{M}^{P} y\frac{P-y}{P-M}dy}{\int_{M}^{L}\frac{y-1}{M-1}dy+\int_{M}^{P}\frac{P-y}{P-M}dy}=\frac{1}{3}(L+M+P) \tag{12}$$

The fuzzy number values for the language variables determined by using Equation (10)

IV. RESULT AND DISCUSSION

The experimental result of the trade protectionism on economic growth based on the machine learning using BN-FLC method is discussed in this section. MATLAB is used to perform the simulations. MATLAB is used to simulate the proposed method under various performance criteria. Outcome of BN-FLC analyzed with existing approaches such as, SVM, RBF and POA.

A. Metric Performance Measures

The efficiency is determined to assess the model's performance. Metrics are employed in measuring. Any model will assess the output of the pattern in relation to these metrics. True Positive (TP): It is the ratio of actual positives to those that are predicted to be positive.

- True Negative (TN): It is the proportion of real negatives expected to be negative.
- False Positive (FP): It is the proportion of fake positives expected to be positive.
- False Negative (FN): It is proportion of fake negative expected to negative.

1) Accuracy

It is total accurate degree or grouping accuracy, represented in equation (13),

$$Accuracy=\frac{TP+TN}{TP+FP+TN+FN} \tag{13}$$

2) Precision Rate

The precision rate is represented in equation (14),

$$\Pr ecisionrate=\frac{pt}{(tp+fp)} \tag{14}$$

3) F score

F value is represented as in equation (15),

$$F\ measure=\frac{2*recall*precision}{(recall*precision)} \tag{15}$$

4) Computation Time

Computation time is represented as in equation (16),

$$ComputationTime=\frac{Instructioncount*CPI}{Clockrate} \tag{16}$$

The most export sector is -7 in 2014 and the export sector rate is increased to 6 in 2019 to 2020 after the export rate is decreased to 3 in 2022. The overall export sector rate in 2014 is -14 after the export rate is increased to 9 in 2022 it is shown in Figure 2. The export and import is 0.5% and the import and export tariff change 0.15 the tariff changeincreased to 1.1% and the import tariff exposure of exports is gradually increased 0.25 the tariff is also increased to 3% after the import tariff exposure of exports is increaed to 30.3 the tariff change is 0.3 it is shown in Figure 3. The trade deflect in 2017 to 2018 is -275% and the trade deflect is decreases to -325% in 2019 and the trade conflict is decreases to -375% in 2020 after the trade deflect is increased to -350% and the trade conflict is decreased to -425% in 2021 to 2022 it is shown in Figure 4. The trade deflect in current scenario is -0.49% and the trade deflect of worst case scenario is -1.02% it is shown in

Figure 5. The tax income is 10% after the tax income is increased to 15% in 2017 and the income tax is increased to 15.3% in 2018 and the tax income is decreased to 13% in 2020 and the tax income is constant in 2021 and 2022 it is shown in Figure 6. The import of developing country that china is also developing country it is 30% after the import is decreased to 20% in 2018 and the import is gradually decreased to 10% in 2021 and the import is again decreased to 2022. The developed country import is 10% in 2017 and the import is slightly decreased to 4% in 2020 and again the import is decreased to 2.5% in 2022 it is shown in Figure 7. The export surrender requirement is 81% in 2017 to 2018 and the export requirement is decreased to 80% in 2018 and the surrender requirement is constant through 2019 to 2020 after the export requirement rate is decreased to 30% in 2022 and the non-united exchange rate is initially 41% and the exchange rate is increased to 60% and gradually decreased to 41 and again the exchange rate is decreased to 20% in 2020 after the exchange rate is decreased to 10% in 2021 and the exchange rate is increased to 20% in 2022 it is shown in Figure 8.

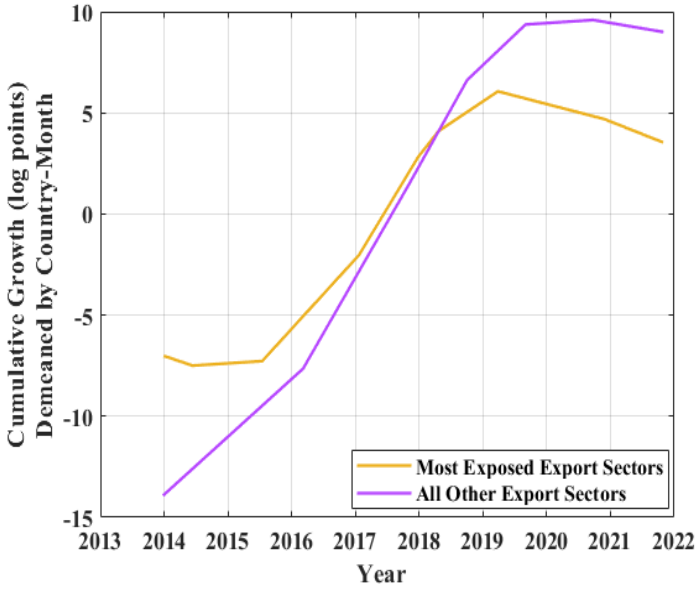

Figure 2: Analysis of export sectors impacts in china

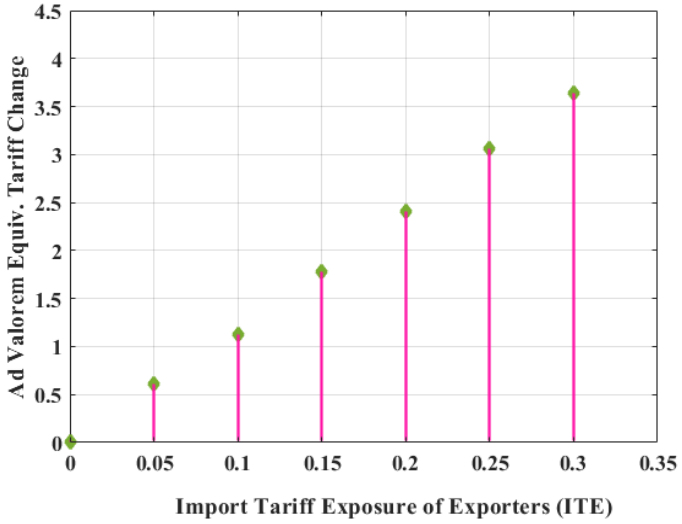

Figure 3: Analysis of import and export tariff change

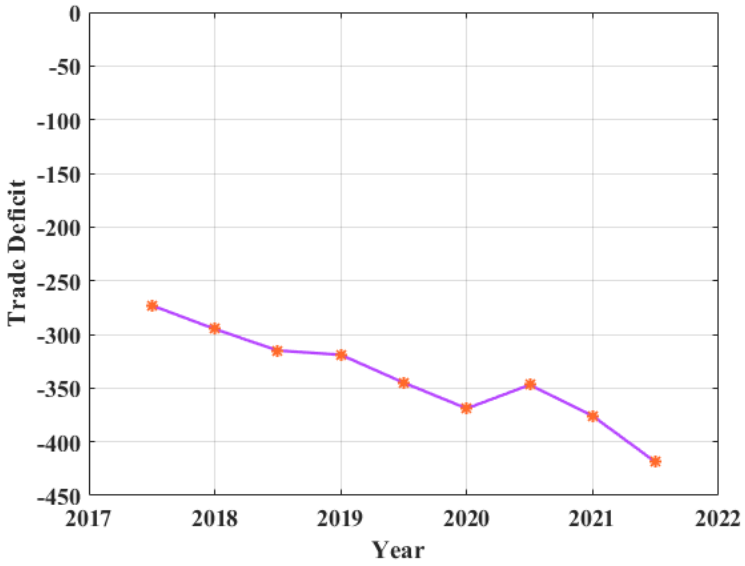

Figure 4: Trade deflect impact of economic growth

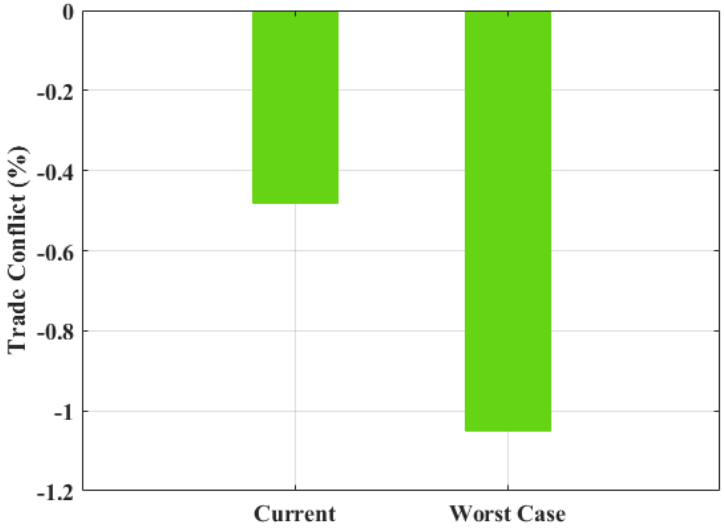

Figure 5: Analysis of trade conflict of current and worst case

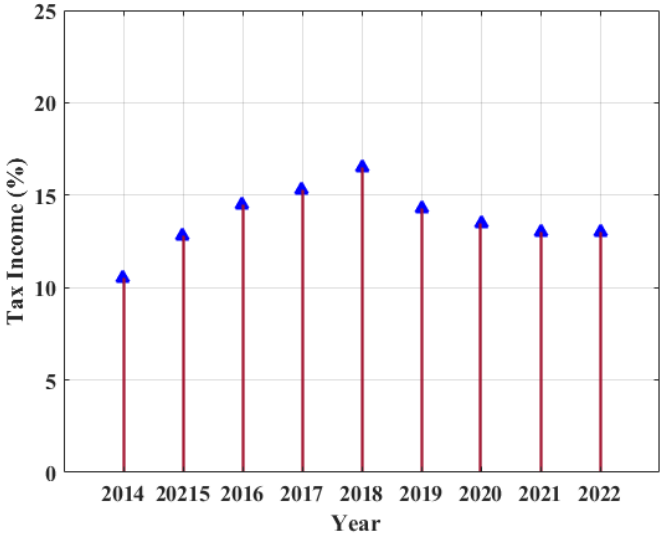

Figure 6: Evaluation of china tax income

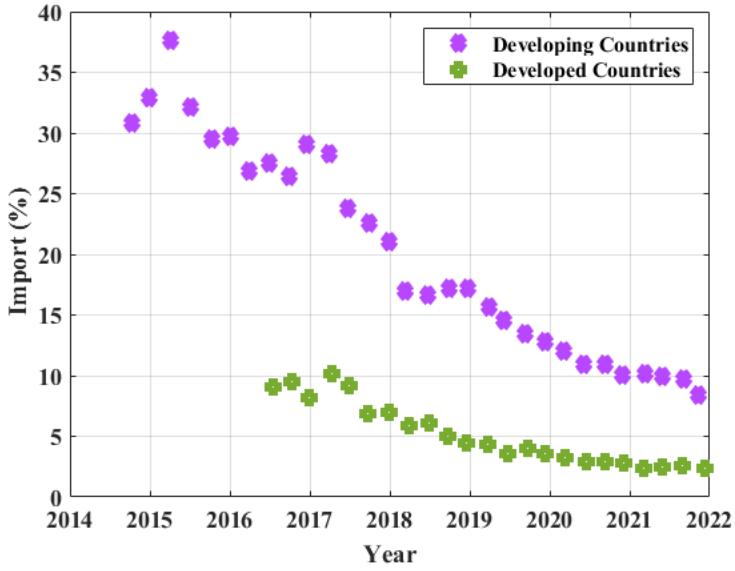

Figure 7: Comparison of import of developing country and developed country

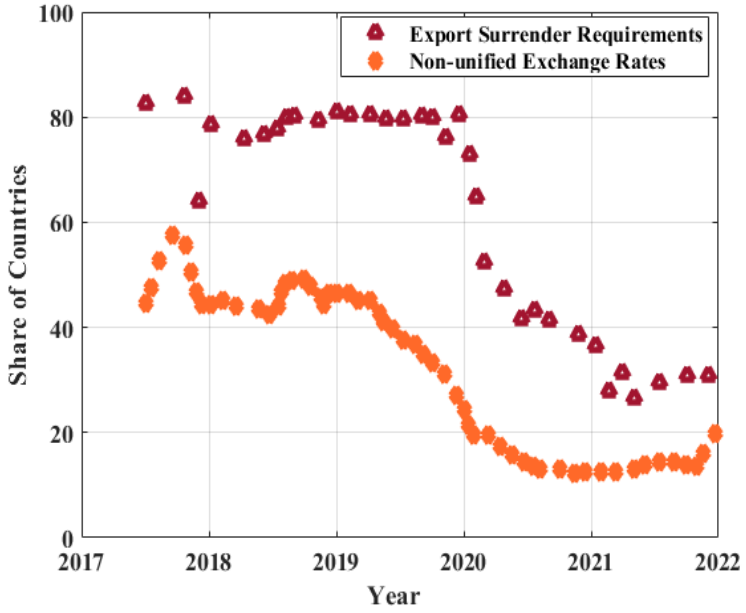

Figure 8: Analysis of export requirement and exchange rates

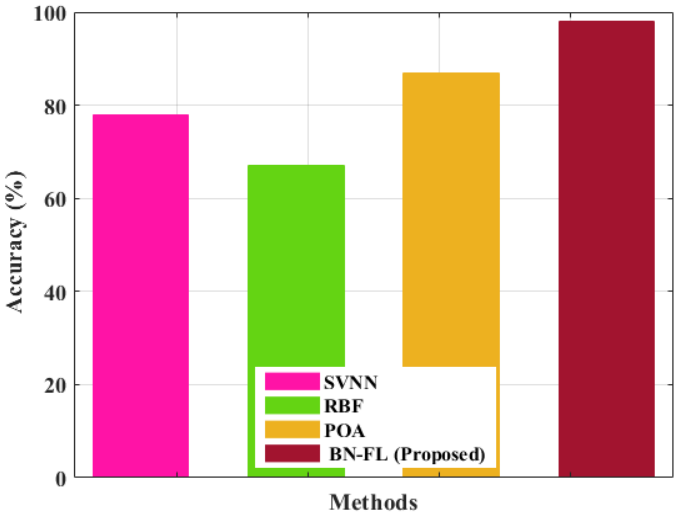

Figure 9: Accuracy of the BN-FL and existing approaches

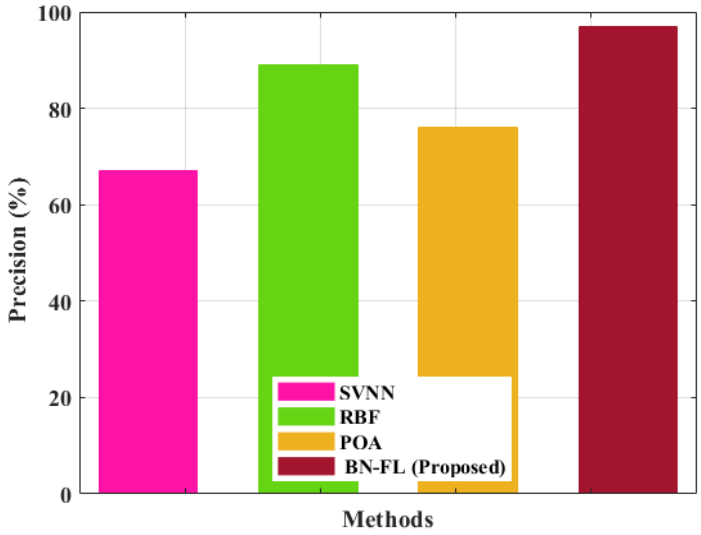

Figure 10: Precision of BN-FL and existing approaches

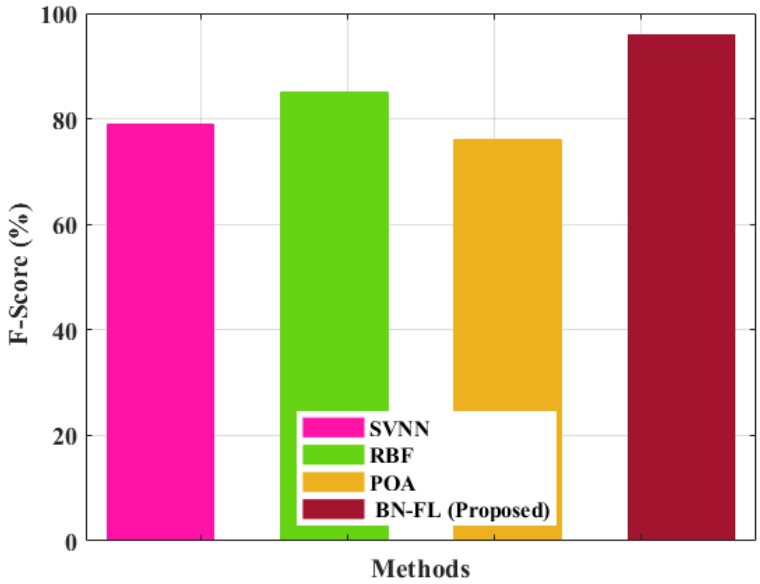

Figure 11: F-Score of BN-FL and existing approaches

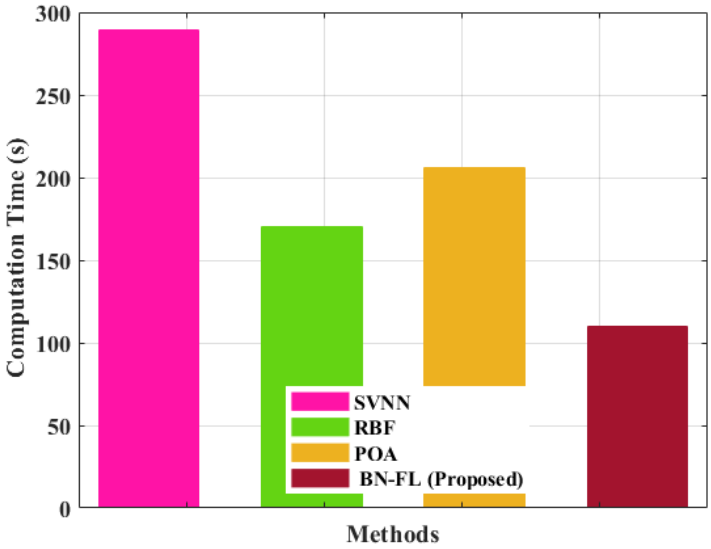

Figure 12: Computation time of BN-FL and existing approaches

The accuracy of the SVNN is 78% and the accuracy of the RBF is 68% and the accuracy of the POA is 85% and the proposed method's accuracy is 98%. Hence the accuracy of the proposed method is higher than the

existing approaches it is shown in Figure 9. The precision of the SVNN approach is 68% and the precision of RBF is 90% and the precision of POA is 75% and the precision of the proposed method is 95%. Hence the precision of the proposed is higher than the existing approaches it is shown in Figure 10. The F-Score of the SVNN approach is 79% and the F-Score of the RBF is 85% and the F-score of the POA is 75% and the F-Score of the proposed BN-FL is 95%. Hence F-score of the proposed method is higher than the existing approaches it is shown in Figure 11. The computation time of the SVNN method is 285s and the computation time of the RBF method is 170s and the computation time of the POA is 200s and the computation time of the 110s. Hence the computation time of the proposed method is obtains less computation time than the existing approaches. It is displayed in Figure 12.

V. CONCLUSION

This work uses BN and FL to provide a technique on the realistic characteristics of China's terrible foreign trade export condition and the complicated elements impacting China's foreign trade export. According to the analysis, domestic environmental factors account for over half of export growth and have the biggest impact on export and import in international trade. Based on BN and FL accuracy, the proposed approach includes the effect of trade protectionism on economic growth. is 98% and precision of the proposed method is 95% and F-Score of the proposed BN-FL is 95% and the computation time of the 110s. Hence the proposed method obtains high accuracy, precision, F-score and less computation time.

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