# SECTION XV.
# SYSTEM ANALYSIS, MODELING AND OPTIMIZATION

# INTELLECTUAL SYSTEM FOR SENTIMENT ANALYSIS OF USER REVIEWS IN E-COMMERSE SERVICES

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Creating an intelligent system for analysis of user attitudes in electronic commerce services holds significant importance in today's digital landscape. An intelligent system for analyzing user attitudes allows businesses to gain deeper insights into their customers' preferences, needs, and sentiments. By examining user attitudes and behaviors, businesses can better understand customer expectations, improve their products or services, and tailor their marketing strategies accordingly. With an intelligent system in place, businesses can deliver personalized experiences to their customers. By analyzing user attitudes, preferences, and past interactions, the system can provide targeted recommendations, personalized offers, and relevant content. This level of personalization enhances customer satisfaction and fosters long-term loyalty. The ability to analyze user attitudes in real-time enables businesses to make data-driven decisions promptly. By monitoring and interpreting user sentiments, businesses can identify emerging trends, address customer concerns, and make necessary adjustments to their strategies or offerings. This agile decision-making process can give businesses a competitive edge in the fast-paced e-commerce industry. Online reputation [1] is crucial for businesses operating in the e-commerce domain. An intelligent system for analyzing user attitudes allows businesses to monitor and manage their online reputation effectively. By identifying negative sentiment or potential reputation risks, businesses can take proactive measures to address concerns, rectify issues, and maintain a positive brand image. Analyzing user attitudes in electronic commerce services provides valuable market intelligence.

The authors of an article [2] aim to develop a proactive social-sensor service that can detect early signs of mental health issues by analyzing users' tweets. The topic is timely and relevant, as social media platforms increasingly serve as sources of valuable data for various research fields. The article provides a comprehensive overview of the proposed methodology for proactive mental health monitoring. The authors explain the steps involved in collecting and preprocessing Twitter data, as well as the application of machine learning techniques for classification and sentiment analysis. They present the results of their experiments and discuss the effectiveness of their approach in identifying potential mental health concerns.

One of the notable strengths of this article is the meticulous explanation of the data collection process. The authors describe their methodology in detail, including

the selection of appropriate keywords and the use of language processing techniques. This transparency allows for better understanding and reproducibility of the study. Furthermore, the incorporation of machine learning algorithms for sentiment analysis is commendable. The authors discuss the choice of algorithms [3] and provide insightful analysis of the results obtained.

The article highlights the potential of machine learning in detecting mental health patterns from social media data. While the article provides valuable insights, there are a few areas that could be further developed. Firstly, the article could benefit from a more extensive discussion of the limitations [4] and challenges associated with using Twitter data for mental health monitoring. Addressing these limitations would enhance the article's credibility and provide a more balanced perspective on the topic. Additionally, the article could include a section on ethical considerations. Given the sensitive nature of mental health data, it is important to address privacy concerns and potential biases in the dataset. Discussing the ethical implications of such research would add depth to the study. One of the notable strengths of the article is its methodology. The authors employ rigorous data collection and preprocessing techniques, ensuring the local reliability and quality of the given dataset. Figure 1 shows datasets with information about social communications, online shopping, spending on social services.
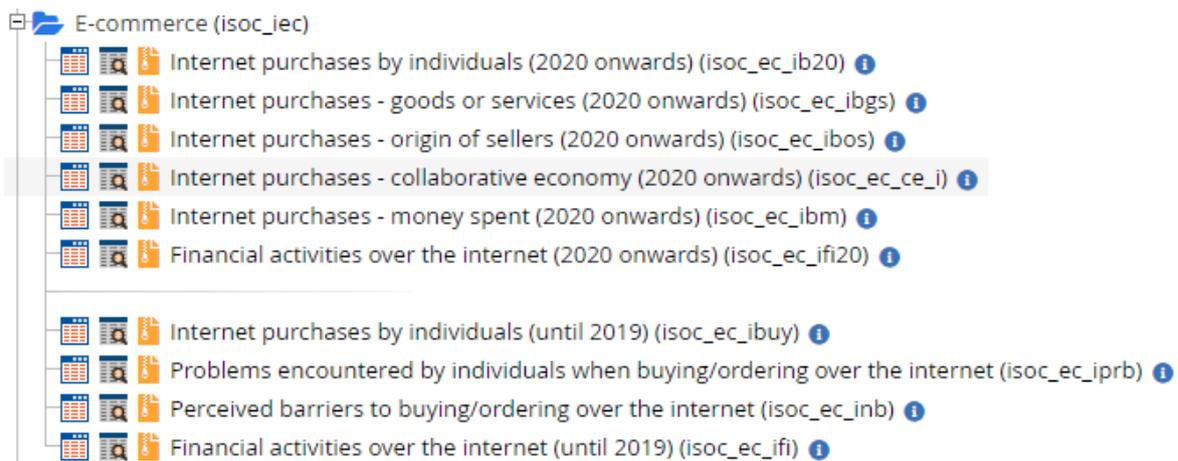


Fig. 1. **Social communications, online shopping, spending on social services**

In the course of the task, well-known data sets were selected and new data about the object of research for the past 3 or more years were collected, as well as collected statistical data about the object of research are presented in separate files, the trends of changes in these data were studied, and a forecast was made for the next 3 years, where the results are presented in tables and shown in figures, a conceptual formulation of the problem and specification of the regression model was carried out, parameters of the regression model were estimated according to e-commerce features, the model was checked for significance according to the Fisher test, the significance of the parameters of the regression model and correlation coefficients were estimated, thus specification of the regression model of electronic commerce and its parameters are shown in Figure 2.

The predictive values of the resulting indicator for three values of the factor characteristic, an analytical reference was prepared for making an effective decision on solving the tasks. The method of building dynamic series was chosen to perform the task. This is a metric algorithm for automatic object classification or regression. In the case of using the method for classification, the object is assigned to the class
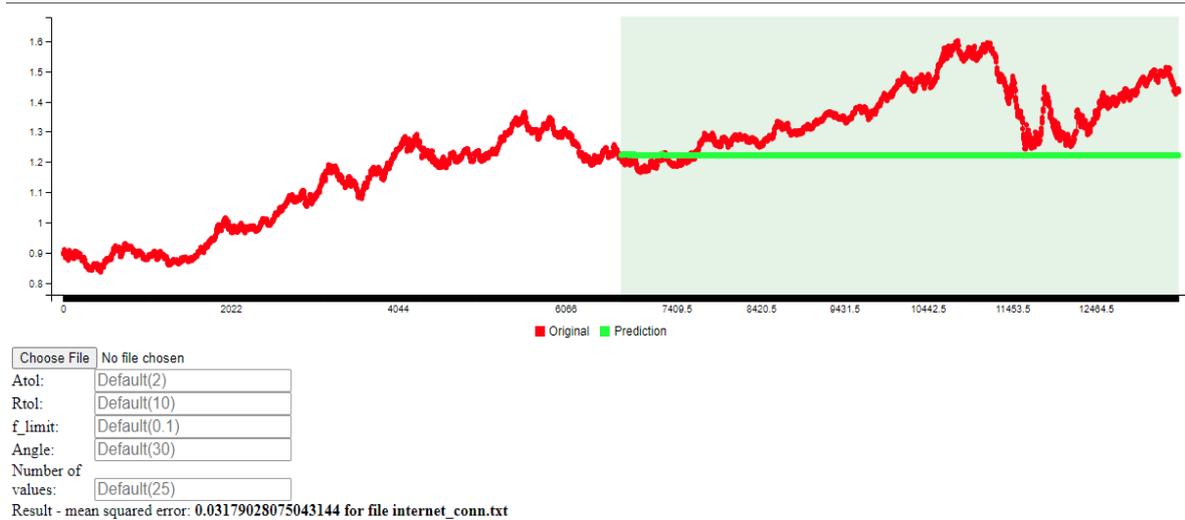
Fig. 2. **Specification of the regression model of electronic commerce and its parameters**

that is the most common among the m values of this element, the classes of which are already known. In the case of using the regression method, the object is assigned the average value of m objects closest to it, the values of which are already known.

Different attributes can have a different range of represented values in the sample (for example, attribute A is represented in the range from 0.1 to 0.5, and attribute B is represented in the range from 1000 to 5000), so the distance values can be highly dependent on attributes with large ranges. Therefore, the data is usually subject to normalization. In cluster analysis, there are two main methods of data normalization: minimax-normalization and Z-normalization. Minimax normalization is obviously optimal for this task, so significance of Fisher's test of social communications is shown in Figure 3.
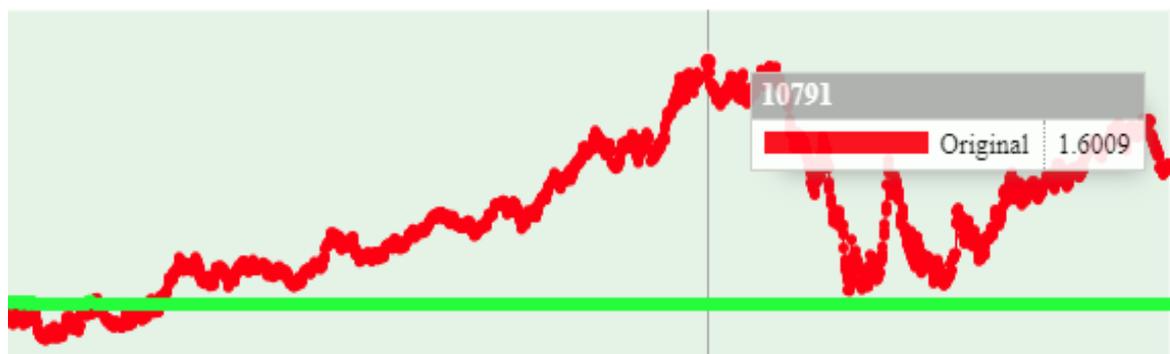


Fig. 3. **Significance of Fisher's test of social communications**

Also, significance of Fisher's test of online shopping is shown in Figure 4. According to the theorem of the dynamic series construction method, the sufficient embedding size for phase space reconstruction, topologically equivalent to the original space, is equal to *2m + 1*, where *m* is equal to the size of the attractor of the system, and the embedding can be performed by delaying the coordinate of one observable. The theorem states a sufficient condition but the embedding size for many embedding systems can be achieved with a smaller number of sizes. It is worth highlighting the main values that are necessary during the operation of the method.
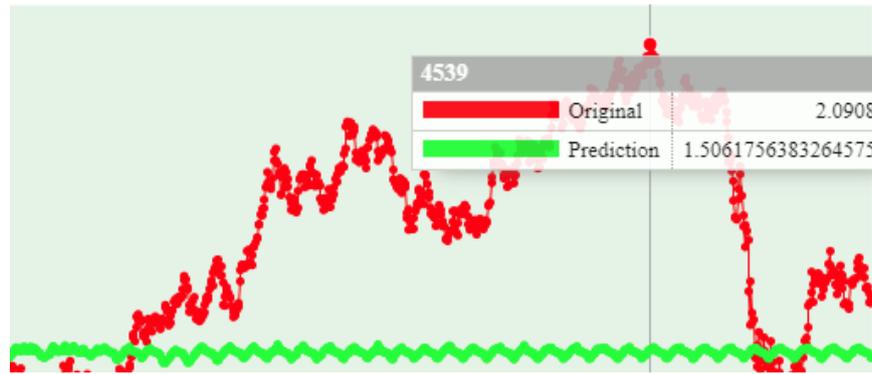
Fig. 4. **Significance of Fisher's test of online shopping**

In conclusion, the development of an intelligent system for the analysis of user attitudes in electronic commerce services holds great importance in the realm of online business. This system offers valuable insights into understanding customer sentiments, preferences, and behaviors, which are crucial for businesses to enhance their offerings and optimize customer satisfaction. It empowers businesses to better understand their customers, improve decision-making processes, and ultimately enhance customer satisfaction and loyalty.

## References:

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