

## ABSTRACT

Master's dissertation: 86 pp., 15 figs., 15 tables, 41 sources, 1 appendix.

**Topicality.** The COVID-19 pandemic, caused by the SARS-CoV-2 coronavirus, has had global socio-economic consequences worldwide.

Disease forecasts, deaths, and daily hospitalization rates can help inform health ministries. This information will help in decision-making, as you can at least partially predict the consequences of the epidemic. First of all, it is important to predict hospitalizations, as it is important to understand the situation of free beds in the regions.

Mathematical and in particular statistical models come to the aid of forecasting, although they perform tasks only partially and provide short-term forecasts.

Modified forecasting methods should be introduced, thus helping to develop follow-up strategies and decision-making at the state level. With these methods, we can assess the situation in the past, and thus it will better predict the situation that may develop in the future.

**Connection of work with scientific programs, plans, themes.** The work was performed at the Department of Automated Information Processing and Control Systems of the National Technical University of Ukraine "Kyiv Polytechnic Institute. Igor Sikorsky" in the framework of the topic «Effective methods for solving problems of schedule theory» (No DR 0117U000919).

**The purpose of the study** is an analysis of the spread of acute respiratory viral disease caused by SARS-CoV-2 virus and increase the efficiency of its prediction in Ukraine.

To achieve this goal it is necessary to perform the following **tasks**:

- review the relevant literature to determine what the main methods are used to analyze the processes of epidemiology;
- perform an analytical review and conduct a detailed analysis of existing modern forecasting methods, compare their accuracy;
- to develop an expert algorithm for predicting the spread of COVID-19;

- to develop a software implementation of COVID-19 forecasting in real time, using current statistics;
- perform an experimental study of the developed forecasting methods and their effectiveness.

**The object of research** – there is research is the course and processes of disease spread.

**The subject of research** – there are methods for forecasting unique processes.

**The research methods.** To perform the tasks were used in the work: statistical forecasting methods (Holt-Winters, ARIMA) and the method of forecasting machine learning XGBoost. These methods were used to analyze and compare the results of forecasting, to further create a new forecasting algorithm.

**The scientific novelty of the obtained results** lies in the developed forecasting algorithm, which on the basis of the basic forecast adjusts the results in accordance with similar time series in the past.

**Publications.** Materials of the work are published in the collection of the Fourth International Scientific and Practical Conference PRIORITY DIRECTIONS OF SCIENCE AND TECHNOLOGY DEVELOPMENT, as well as in the materials of the VI All-Ukrainian Scientific and Practical Conference of Young Scientists and Students "Management and Technology" Information.

COVID-19, METHODS OF FORECASTING, TIME SERIES.