

МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ



МАТЕРІАЛИ
106-ї підсумкової науково-практичної конференції
з міжнародною участю
професорсько-викладацького колективу
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Матеріали підсумкової 106-ї науково-практичної конференції з міжнародною участю професорсько-викладацького колективу Буковинського державного медичного університету (м. Чернівці, 03, 05, 10 лютого 2025 р.) – Чернівці: Медуніверситет, 2025. – 450 с. іл.

У збірнику представлені матеріали 106-ї науково-практичної конференції з міжнародною участю професорсько-викладацького колективу Буковинського державного медичного університету (м. Чернівці, 03, 05, 10 лютого 2025 р.) зі стилістикою та орфографією у авторській редакції. Публікації присвячені актуальним проблемам фундаментальної, теоретичної та клінічної медицини.

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in resistance with increasing bacterial concentration for both species and characteristic changes within the 10–100 kHz frequency range. Time-dependent impedance differences were also observed. The semicircular shape of Nyquist plots at high frequencies indicated faradic electron transfer at the electrodes, while the low-frequency spectrum reflected diffusion processes of bacterial waste products to the electrode surface. The presence of live *E. coli* cells led to a decrease in impedance compared to dead cells, with $R_{s+R_{ct}}$ values decreasing by approximately 50%.

Conclusions. The proposed method of selective detection of bacterial cells can be used to identify two types of bacteria *E. coli* and *S. aureus*, to qualitatively characterize the differences between dead and live cells and to estimate their concentration in samples with an unknown number of bacteria per unit volume.

Ivanchuk M.A.

MATHEMATICAL METHODS IN MEDICAL PREDICTION

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Introduction. Medical forecasting involves predicting the probability or course of a disease and its potential outcomes by understanding the patterns of pathological processes. This study explores various mathematical methods that can help build accurate prognostic models in medicine.

The aim of the study. The primary aim is to explore the use of mathematical methods in medical prediction.

Material and methods. The study involved analyzing research on mathematical methods for medical forecasting.

Results. Several mathematical methods are used in medical forecasting, each with unique strengths. Cluster analysis is an unsupervised learning method. Unlike supervised models, cluster analysis does not require predefined groupings. Instead, data is grouped into clusters based on inherent patterns (e.g., patients with or without a specific disease). Researchers can then analyze the characteristics of each cluster to understand why certain patients were grouped together and make conclusions based on these patterns.

Support vector machines are supervised models that classify data by identifying an optimal hyperplane to separate two data classes. Using known patient data, an SVM model is trained to classify new cases, making it suitable for tasks such as disease prediction.

A naive Bayesian classifier is a probabilistic classifier that uses Bayes' theorem to determine the probability that an observation belongs to one of the classes. That is, if, based on the values of the variables, it is possible to unambiguously determine to which class the observation belongs, the Bayesian classifier will report the probability of belonging to this class.

A Markov process is a stochastic process describing a sequence of possible events in which the probability of each event depends only on the state attained in the previous event. In medicine, Markov processes can be used to build epidemiological models and predict disease prevalence.

Conclusions. The above list of mathematical methods that can be used in medical forecasting is far from complete. The selection of the method for a specific task depends on the available medical data and the goal of the researcher.

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ADVANCED MATERIALS FOR FLEXIBLE WEARABLE SENSORS OF BODY AREA NETWORKS: PHYSICAL LIMITATIONS AND PROSPECTS

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Introduction. Personalized medicine and telemedicine involve the use of Body Area Networks (BANs) for real-time monitoring physiological parameters. The functionality of BANs is effective in case of using flexible wearable sensors. Designing of new advanced materials is the way to enhance the performance of these sensors.