

### СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

1. Гребінь О. П. Основи звукотехніки : навч. посіб. / О. П. Гребінь, В. Б. Швайченко, Н. Ф. Левенець. Київ : КПІ ім. Ігоря Сікорського, Вид-во «Політехніка, 2023. 466 с. ISBN 978-966-990-091-3
2. Penney Terry. Noise over 8 LONG HOURS of WORK has a new safety formula for you to apply. 2016. URL: <https://www.linkedin.com/pulse/noise-over-8-long-hours-work-has-new-safety-formula-you-terry-penney> (accessed: 06.03.2025).
3. Sound Meter. Додаток до смартфона. URL: [https://play.google.com/store/apps/details?id=app.kiwwi.sound\\_meter2&hl](https://play.google.com/store/apps/details?id=app.kiwwi.sound_meter2&hl) (accessed: 06.03.2025).

*UDC 004.9:631.1*

#### **Dorenskyi O.**

*PhD tech. sci., Assoc. Prof., Cybersecurity and Software Academic Department,  
Central Ukrainian National Technical University, Kropyvnytskyi, Ukraine*

#### **Isachenkov E.**

*Student, Central Ukrainian National Technical University, Kropyvnytskyi, Ukraine*

### **DIGITAL TRANSFORMATION OF SOIL ASSESSMENT IN AGRICULTURAL ACTIVITIES**

Currently, Ukraine is experiencing an active digital transformation of business processes [1], particularly within the agricultural sector [2]. One of the key directions of this transformation is soil bonitation (analysis) [3], which is conducted at agricultural enterprises and represents a crucial factor for enhancing production productivity, increasing profitability, and fostering overall agribusiness development.

The research [3] proposes a cybersecurity model for a client application of an analytical soil database. The present work focuses on implementing this model to practically realize the digitalization of soil bonitation, as well as to develop software ensuring cybersecurity and information protection for a client application of a cloud-based database.

The authors have synthesized the following design solution. The proposed system ensures secure data storage and transmission through encryption and decryption using the Kalyna algorithm in CBC mode. The process begins by encrypting the user file in a .json format. The file is read, divided into 128-bit blocks, and if necessary, padded with additional bits using the PKCS7 method. Subsequently, the data is encrypted utilizing a key and an initialization vector (IV) stored within a key file. The encrypted information is then recorded in a binary file, rendering it unreadable. After encryption, the files are uploaded to Dropbox cloud storage via the HTTPS protocol using an Access Token for authentication. Upon

downloading data from Dropbox, the system performs the inverse operation: binary files are retrieved, decrypted using the same algorithm, and any additional padding bits are removed from the resulting data. As a result, the original user file in .json format is recovered. Each step involves memory clearing procedures to ensure enhanced data security [3].

The presented design solution forms the basis for developing a functional model of the system intended for soil bonitation (analysis) – Fig. 1.

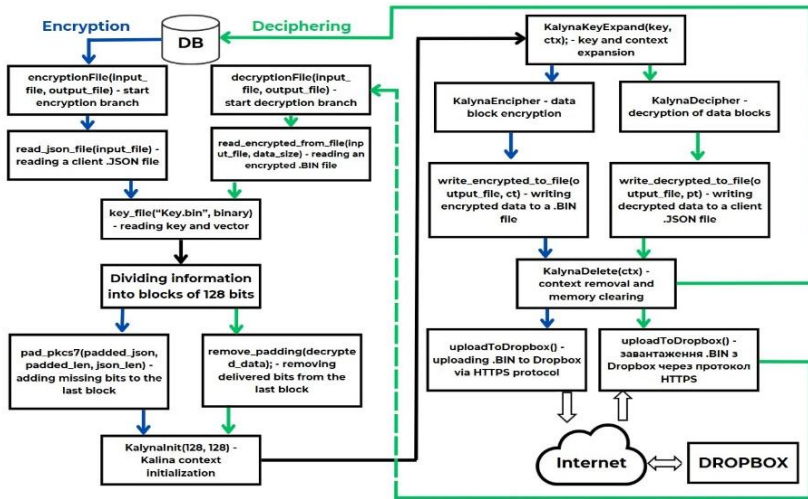


Fig. 1. Functional Model of the Client Application for the Analytical Soil Database

The developed model (Fig. 1) serves as the foundation for designing the architecture, detailing (algorithm creation), and developing the software for the client application module of the analytical soil database (including cybersecurity functions) within the soil bonitation system for agricultural enterprises.

## REFERENCES

1. Dorenskyi O., Drobko O., Drieiev O. Improved Model and Software of the Digital Information Service of the Municipal Health Care Institutions. *Central Ukrainian Scientific Bulletin. Technical Sciences*. 2022. P. II, Issue 5. P. 3-10. DOI: 10.32515/2664-262X.2022.5(36).2.3-10.
2. Помаз Р.Ю. Бонітування ґрунтів як складова комплексної оцінки території. *Проблеми безперервної географічної освіти і картографії*. 2012. Вип. 16. С. 100-102. URL: [http://nbuv.gov.ua/UJRN/Pbgo\\_2012\\_16\\_31](http://nbuv.gov.ua/UJRN/Pbgo_2012_16_31) (дата звернення: 20.03.2025).
3. Доренський О.П., Ісаченков Е.В. Структурно-функціональна модель забезпечення кібербезпеки клієнтського застосунку бази аналітичних даних ґрунтів. *Комп'ютерне моделювання у наукоємних технологіях (КМНТ-2024)*: зб. наук. праць міжнар. наук.-техн. конф. (Харків, 27-29 лист. 2024 р.). Х.: ХНУ імені В. Н. Каразіна. С. 78–79.