EHMA 2024

Shaping and managing innovative health ecosystems

Implementing a Model of Digital Healthcare Ecosystem Based on Blockchain Technology – A Pilot Study

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Introduction

- The subject of this research paper is the possibility of implementation of digital healthcare ecosystem model that uses capabilities of blockchain technology.
- Some technical solutions were discussed and prepared to ensure functioning of the proposed digital healthcare ecosystem model.
- Main goal – to try to implement a blockchain-based software application in a healthcare institution.

Theoretical Background

- Blockchain represents a reliable and transparent mechanism for data storage and distribution.
- Blockchain technology can provide benefits through the following concepts:
  - Decentralization of data.
  - Permissionless data broadcasting.
  - Time stamping of recorded transactions.
  - Cryptographic hashing of data.
  - Consesus mechanisms for transaction validation.

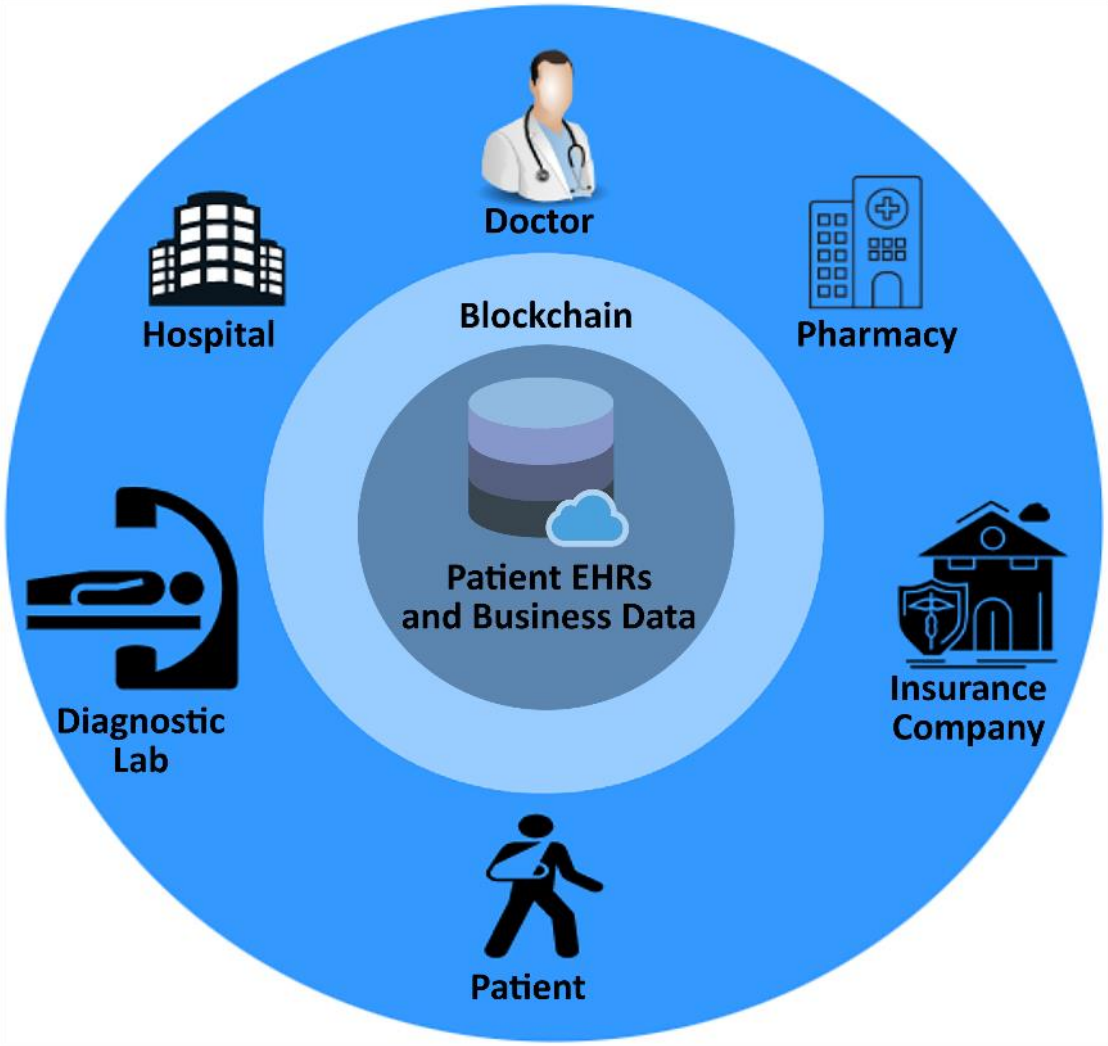
Theoretical Background

- Blockchain can offer a novel approach to improving the healthcare system.
- Main areas for application in healthcare sector:
  - electronic health records,
  - supply chain management,
  - handling and sharing of patient records,
  - tracking and verifying the authenticity of drugs,
  - paying for services with cryptocurrencies.
- Regarding the cybersecurity, blockchain technology can be used to improve the security of recorded data.

Proposed Model

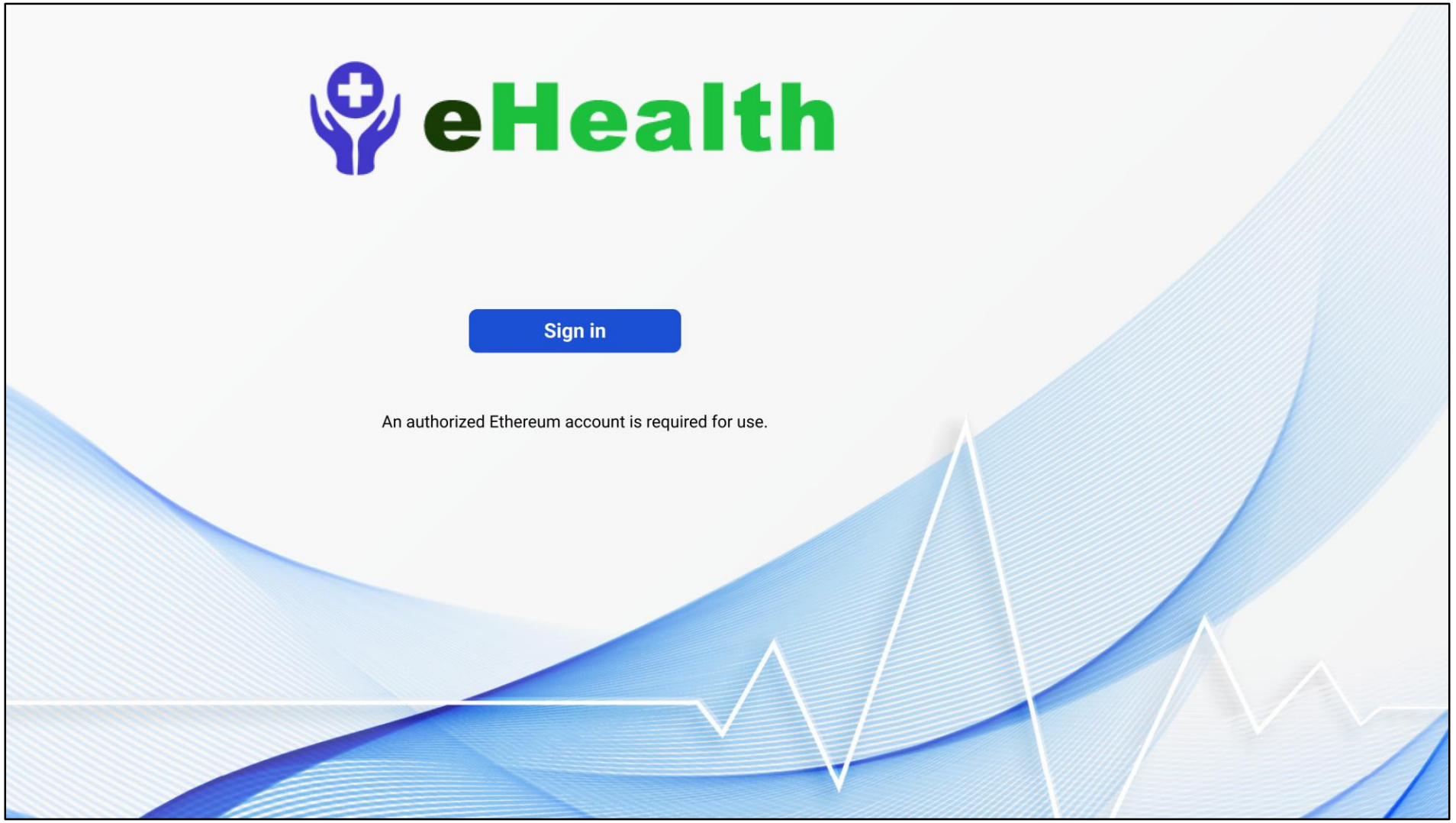
- Developed model of a digital healthcare ecosystem based on blockchain technology has the following characteristics:
  - The core of the model is a database containing electronic patient health records and business transaction data between participants in the healthcare ecosystem.
  - Institutional data interoperability is achieved by the exchange of information of the healthcare institutions with other stakeholders.
  - Data transactions in the proposed model are based on blockchain technology and its main concepts.

Proposed Model



Functioning of the proposed model

- For the purposes of the proposed model, a software application was developed that consists of the following main components:
  - Healthcare services – used by medical staff to enter data into patient health records. Patients can also use this component to access personal health records and to share them with interested parties.
  - Business data sharing – used by participants of the healthcare ecosystem for storage and sharing of institutional business data.


eHealth
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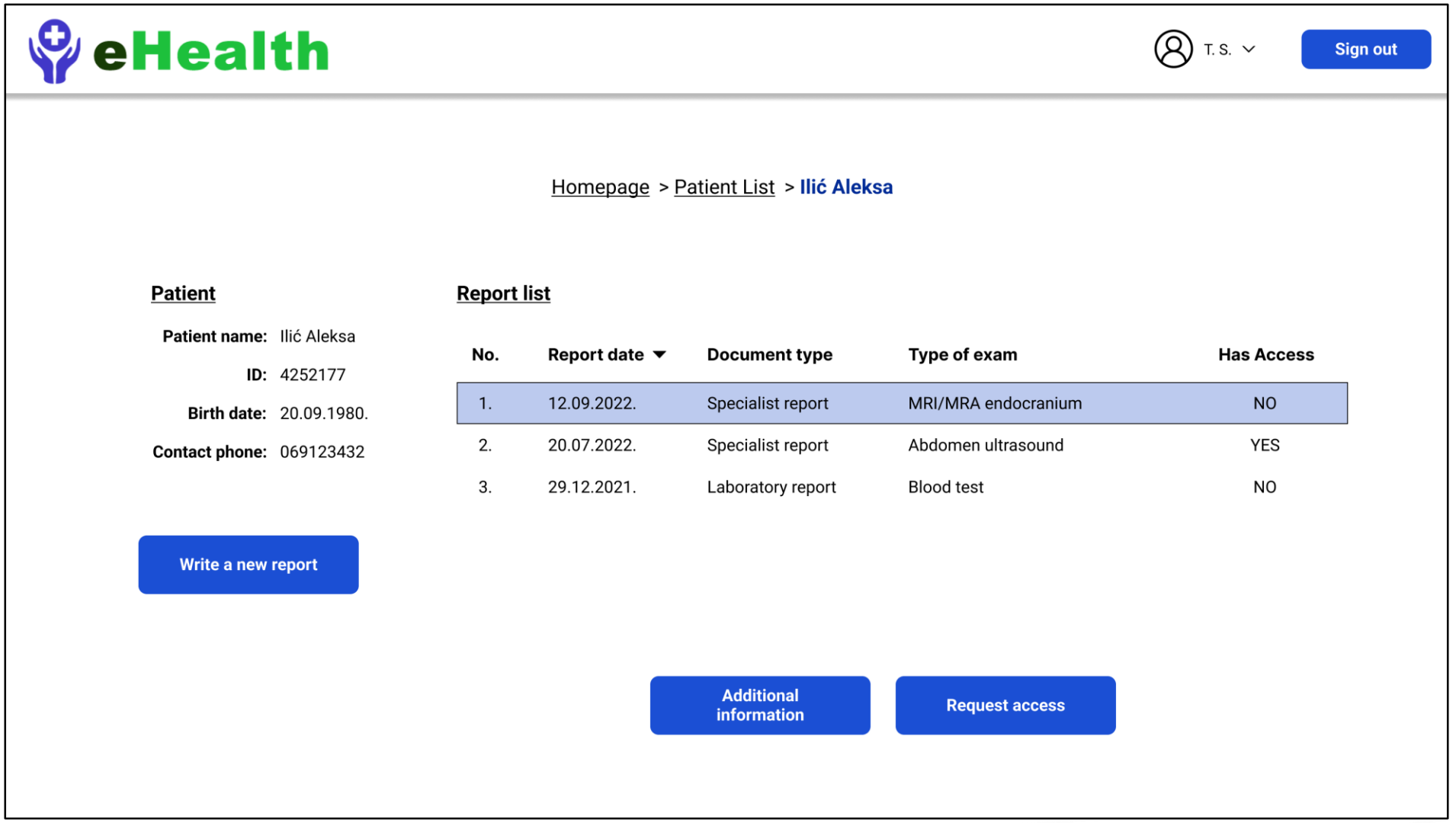
An authorized Ethereum account is required for use.


eHealth
T. S.
Sign out
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Patient
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ID: 4252177
Birth date: 20.09.1980.
Contact phone: 069123432
Report list
No. | Report date | Document type | Type of exam | Has Access
1. | 12.09.2022. | Specialist report | MRI/MRA endocranium | NO
2. | 20.07.2022. | Specialist report | Abdomen ultrasound | YES
3. | 29.12.2021. | Laboratory report | Blood test | NO
Write a new report
Additional information
Request access

eHealth

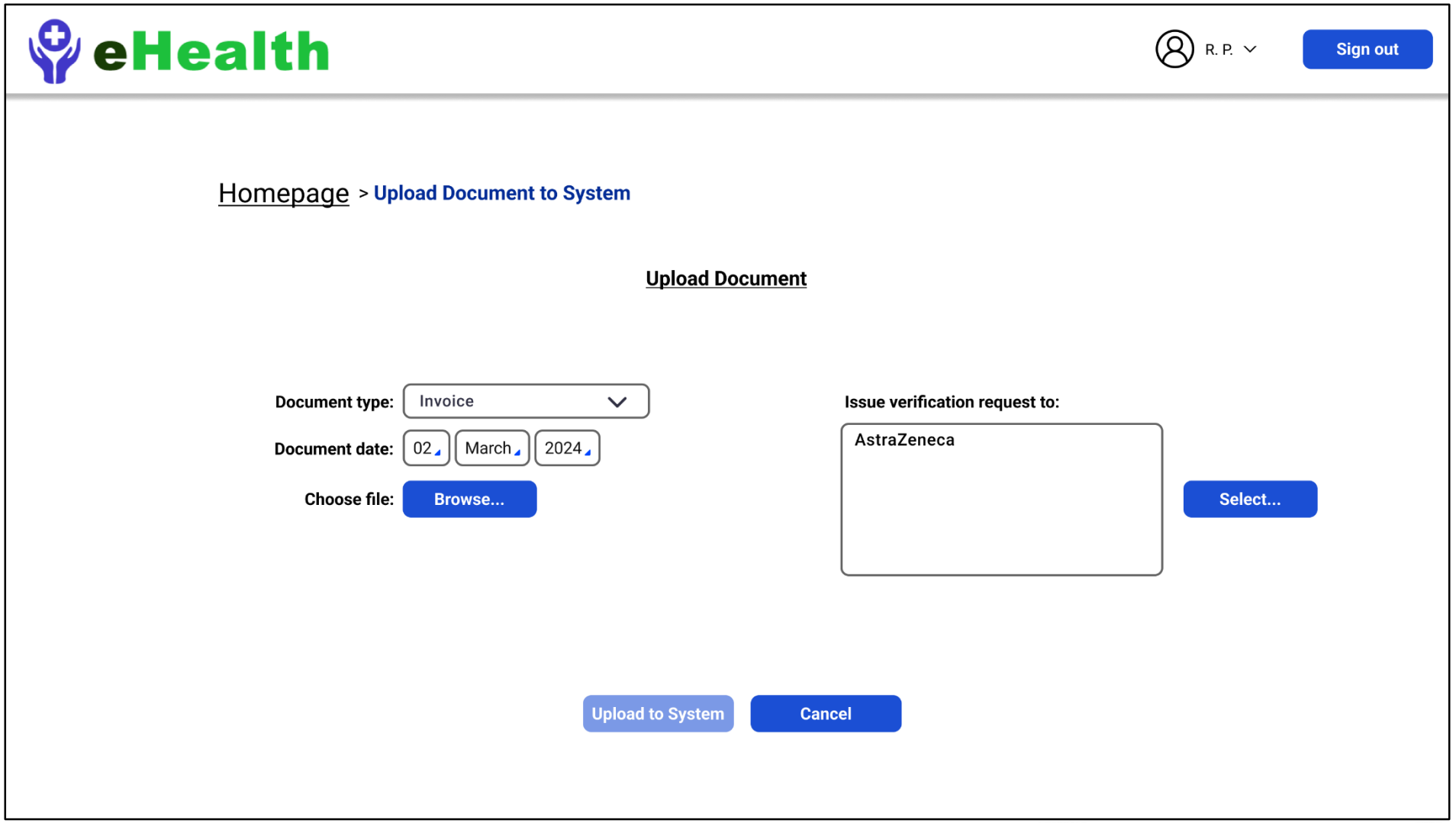
R. P.

Sign out

Homepage

Upload Document to System

Authorize Document


eHealth
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Sign out
Homepage > Upload Document to System
Upload Document
Document type:
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March
2024
Choose file:
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Select...
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Implementation

- Proposed system was implemented in a test environment in Students Policlinic of University of Novi Sad, Serbia.
- The process of practical application of software solutions was carried out through the following stages:
  - I Initiation phase,
  - II Stabilization phase,
  - III Phase of functional application.

Evaluation

- The evaluation process of the proposed model was carried out through two phases:
  - evaluation of the implemented solution,
  - identification of key factors that influence the implementation process.
- Analysis of the evaluation data highlighted some key motivational factors for the adoption of blockchain technology in the healthcare sector, such as:
  - Anticipated effort,
  - Potential social influence,
  - Economical factors,
  - Anticipated execution.
- In the further work and follow-up research, attention should be paid precisely to these constructs.

Conclusion

- The proposed model and its software implementation have shown that improved security of both health and business data, which is generated and shared between healthcare ecosystem participants, can be achieved by using blockchain technology.

- Promotional strategy for the implementation of blockchain technology in the healthcare sector of the Republic of Serbia can be based on:
  - focusing on security and transparency that blockchain provides as the main benefits of investing in the development of healthcare applications based on this technology,
  - highlighting the impact that blockchain technology has on increasing the quality of services and their provisioning in the healthcare ecosystem.

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Thank you!

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