

Antibids - Antibiotics Big Data System

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Abstract: Development of decision support clinical system AntiBidS (Antibiotics Big Data System) that will serve to the collection, processing and analysis Big medical data from various sources, to simplify the process of personalizing treatment, standardization of approaches for selecting schemes of antibiotic therapy, to collect the new trends in pharmaceutical products on the Internet. All of them will provide expansion of the social aspect in the work of medical staff and in the health and well-being of patients.

Keywords: Antibiotics, Big Data, System, personalizing treatment, patient, medical data.

Introduction

Proposal outline: development of decision support clinical system AntiBidS (Antibiotics Big Data System) that will serve to the collection, processing and analysis Big medical data from various sources, to simplify the process of personalizing treatment, standardization of approaches for selecting schemes of antibiotic therapy, to collect the new trends in pharmaceutical products on the Internet. All of them will provide expansion of the social aspect in the work of medical staff and in the health and well-being of patients.

Objectives

- Simplify and improve the process of personalization antibiotic treatment of patients;
- Collect information about medications from different pharmacies databases and automatically parse.
- To allow of doctor find needed medications without remembering all trade-marks and pharmacies groups.
- Automatically medical e-prescription creation.

Incoming information:

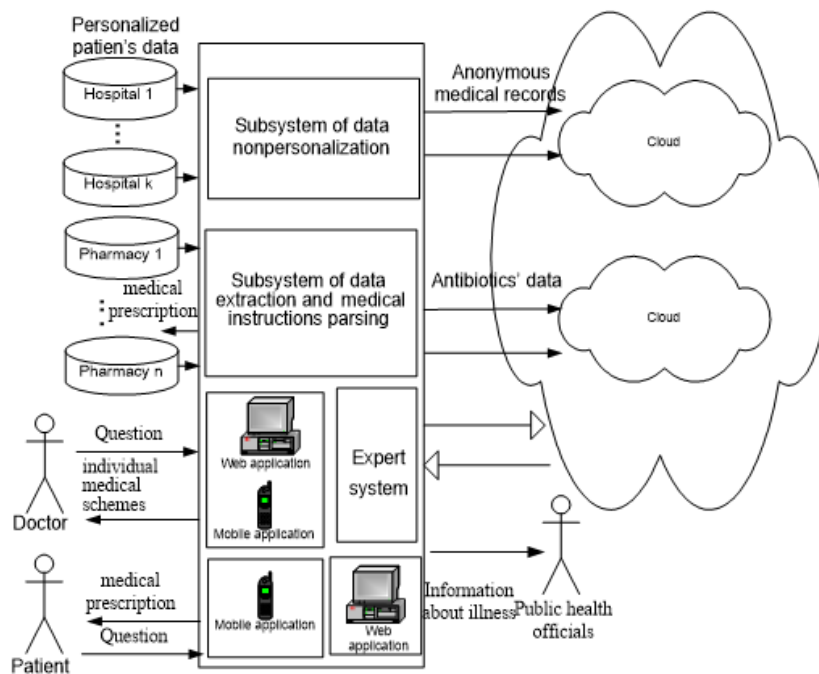
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- Information about the disease
- Patient information (medical record with diagnose)
- Instruction for medication

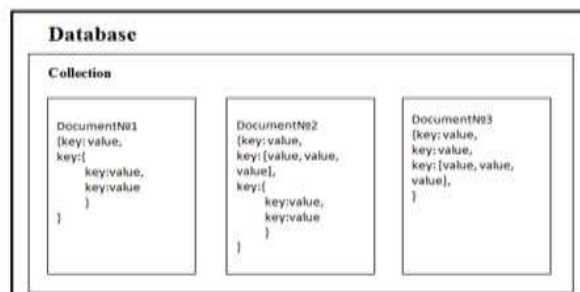
Data processing:

- Medical instruction parsing
- The medication (antibiotic) selection
- E-prescription creation

The technical approach

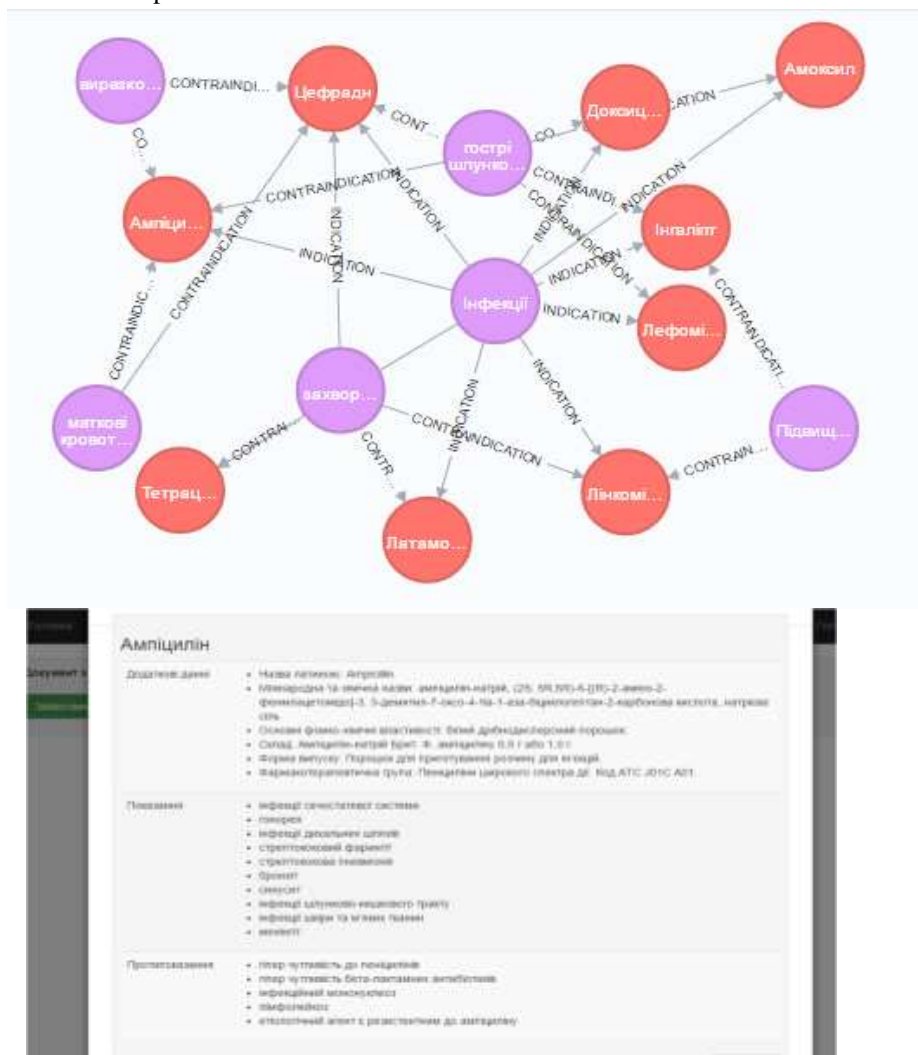


Phase 1. To collect medication instructions



- Indication
- Contraindication
- allergic reaction
- active substance
- dosage
- diseases

Graph and document-oriented database combination





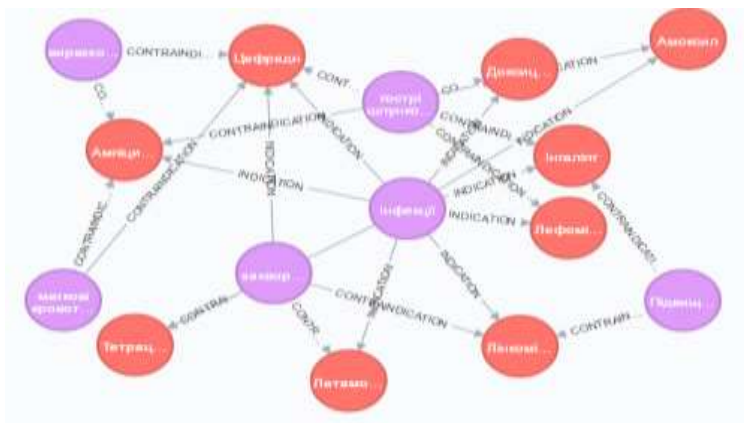
Use existing pattern

indication
 contraindication
 allergic reaction
 active substance
 dosage
 diseases



Create pattern

```
<Text>:= {<Text_block>}
<Text_block>:= <Pragmatic_mark> "." <List>
<List>:= <Semantic_block> | ["," <List>]
<Pragmatic_mark>:= <Bold> | <Italic> | <Underlined> |
<Centrifuged> |
<Color> | <capital letters>
<Semantic_block>:= <Word> | ["," <Semantic_block>]
```

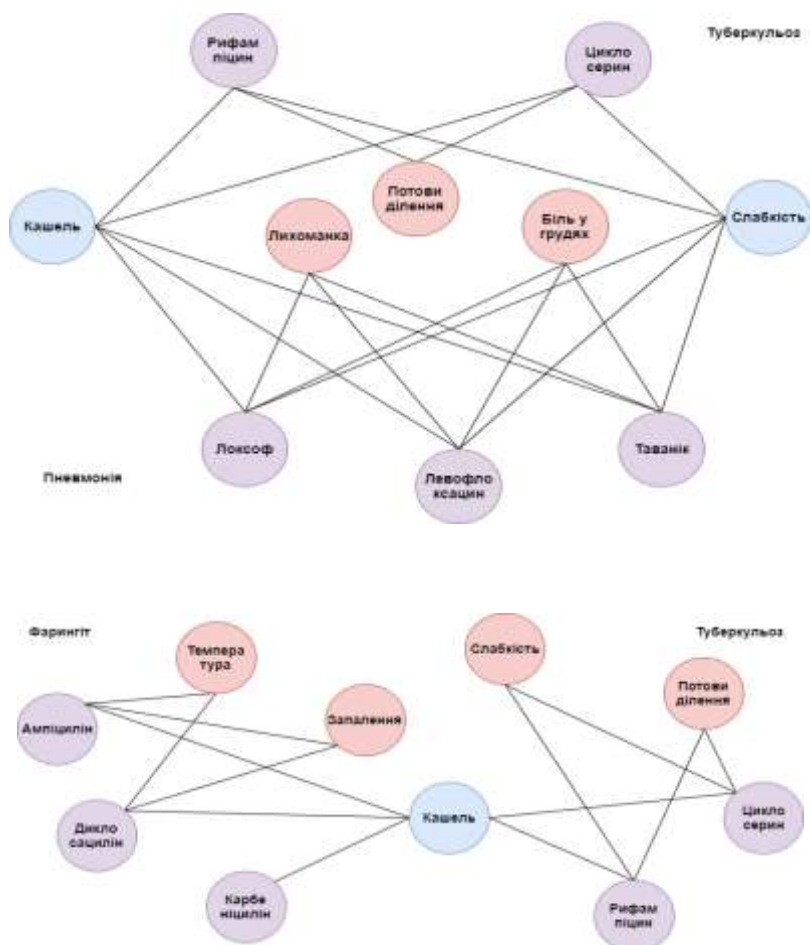


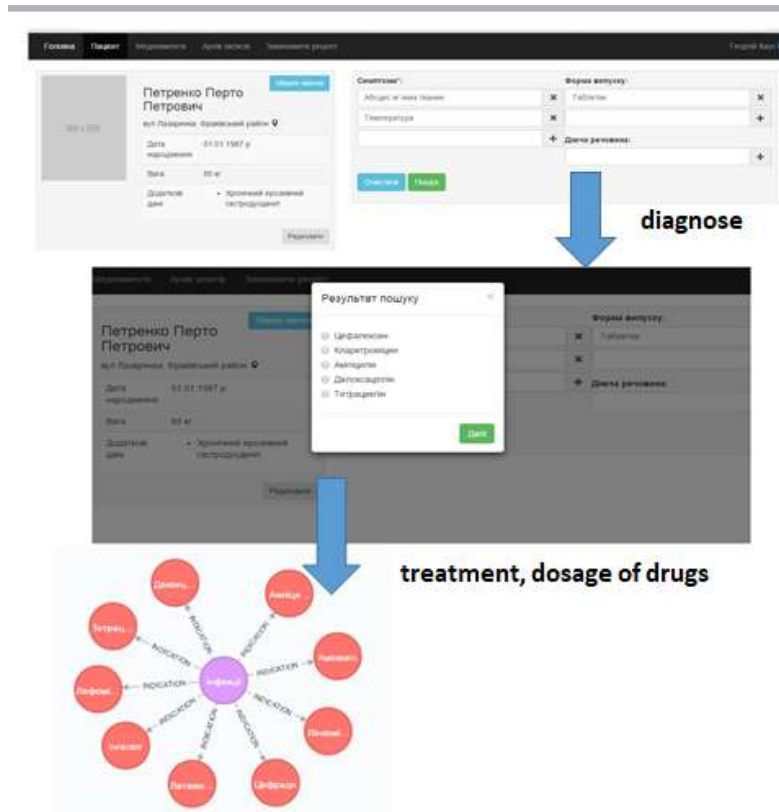
```
CREATE (Ampicilin:Antibiotic {title: Ампіцилін, latin_title: Ampicilin,
release_form: 'Tablets 500 000 IU',application_method:'Inside of 400,000 -
500,000 IU 2-3 times a day for 10-12 days'})
CREATE (Candidiasis:Disease {name: Candidiasis gastrointestinal tract'})
CREATE (SkinLesions:Disease {name: Lesion of skin'})
CREATE (MucosalLesions:Disease {name: Mucosal lesions'})
CREATE (Liver:Disease {name: Liver illness'})
CREATE (Stomach:Disease {name: Acute gastrointestinal diseases'})
CREATE (Ulcer:Disease {name: Gastric ulcer and duodenal ulcer'})
CREATE (UteineBleeding:Disease {name: Uterine bleeding'})
CREATE
  (Candidiasis)-[:INDICATION]->(Ampicilin),
  (SkinLesions)-[:INDICATION]->(Ampicilin),
```

(MucosalLesions)-[:INDICATION]->(Ampicilin),
 (Liver)-[:CONTRAINDICATION]->(Ampicilin),
 (Stomach)-[:CONTRAINDICATION]->(Ampicilin),
 (Ulcer)-[:CONTRAINDICATION]->(Ampicilin),
 (UteineBleeding)-[:CONTRAINDICATION]->(Ampicilin)

Phase 2. Medication selection.

An example of a parallel connection of graphs for a system of work with instructions for medical products

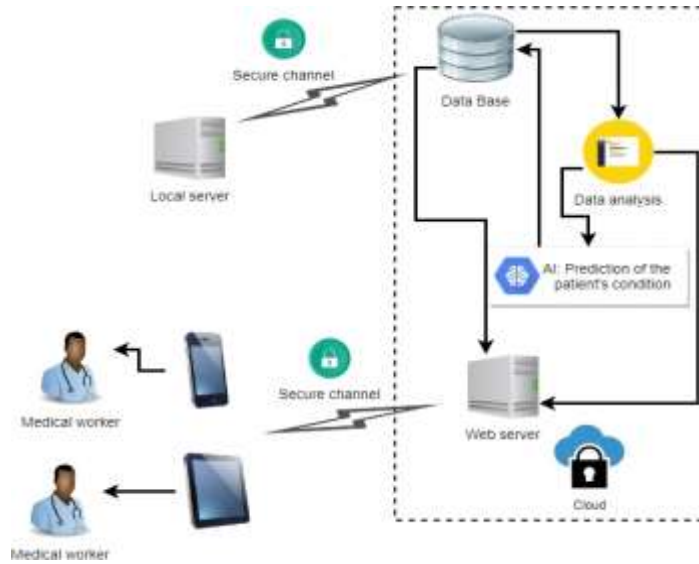




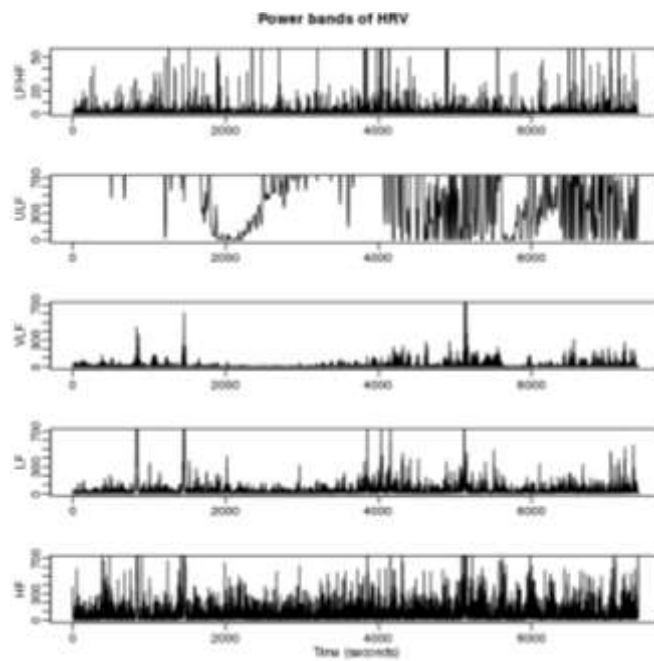
Phase 3. The patient data collection system



The system for processing medical data and predicting the patient's condition



The result of power bands of HRV plotting



Conclusions

- Raising awareness of physicians with new medicines allow decrease in time spent for searching for information about them.
- Improving the quality of medical treatment by personalizing treatment schemes. Analysing the efficiency of patient pathway management both at primary care level (prevention and early detection) and en route encompassing
- Ability to use the program not only to antibiotic therapy, but doctors can use for other fields that will increase the quality of medical care.
- Providing hospitals the proposed information system for the rational antibiotic therapy for diseases caused by different types of surgical infection.
- Analysis of treatment's results, according to which possible to determine the efficacy of using the therapeutic schemes and prognostication of next methods of treatments.
- The inclusion of large amounts of data into useful information for planning authorities in the field of public health and implementation approach "health in all policies".
- The intelligence coach increase patient's well-being.

References

1. Shakhovska N. Antibids - Antibiotics Big Data System. IREHI 2018. <http://ieee-rural-elderly-health.com/2018/wp-content/uploads/2018/12/IREHI-Programm-1.pdf>
2. Shakhovska N., Fedushko S., Greguš ml. M., Shvorob I., Syerova Yu. Development of Mobile System for Medical Recommendations. The 15th International Conference on Mobile Systems and Pervasive Computing (MobiSPC) August 19-21, 2019, Halifax, Canada. *Procedia Computer Science*. Volume 155, 2019, Pages 43-50. <https://doi.org/10.1016/j.procs.2019.08.010>
3. Fedushko S., Michal Gregus ml., Ustyianovych T. Medical card data imputation and patient psychological and behavioral profile construction. The 9th International Conference on Current and Future Trends of Information and Communication Technologies in Healthcare (ICTH 2019) November 4-7, 2019, Coimbra, Portugal *Procedia Computer Science*. Volume 160, 2019, Pages 354-361. <https://doi.org/10.1016/j.procs.2019.11.080>