



Система визуальной аналитики выявления неявных связей

Выполнил

Соколов Иван Дмитриевич
(НИЯУ МИФИ)

Научный руководитель

Антонов Евгений Вячеславович
(ЛИТ ОИЯИ)

2024

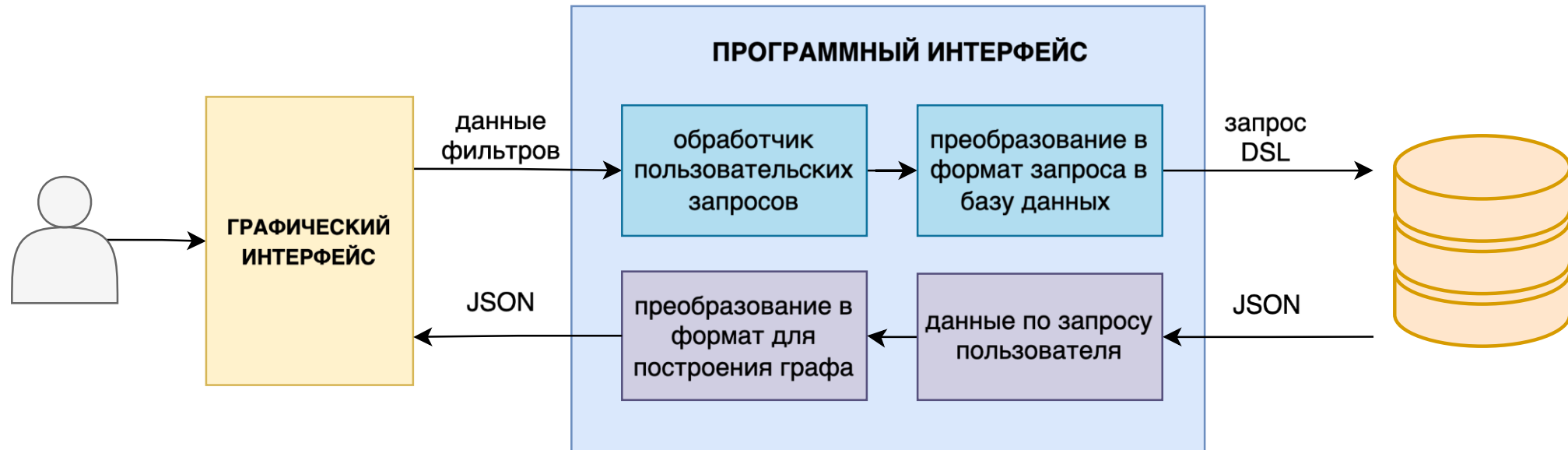
Цель

Проектирование и реализация системы визуальной аналитики выявления связей

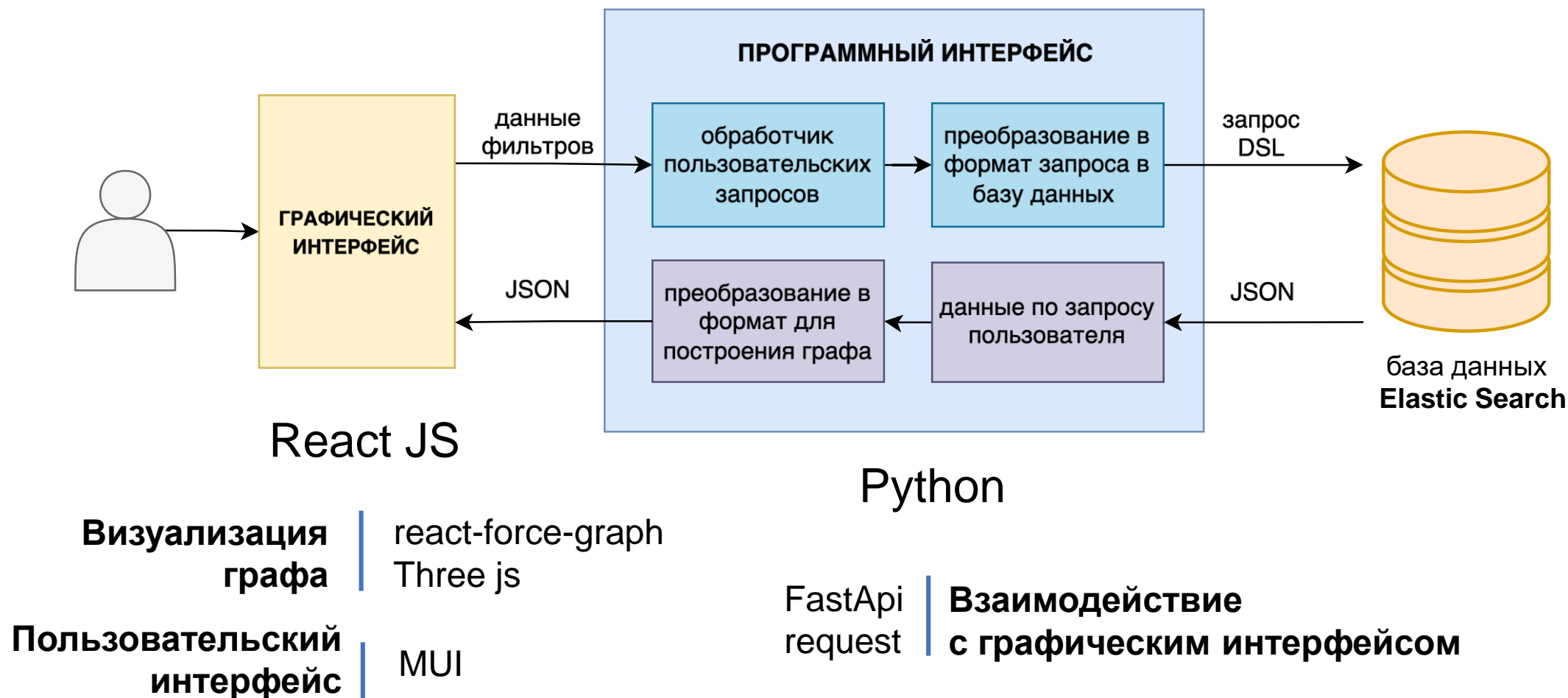
Задачи

- Определить набор функциональных возможностей и требований к разрабатываемой системе визуальной аналитики.
- Спроектировать архитектуру разрабатываемой системы
- Определить структуру хранения данных и сформировать тестовый набор данных.
- Разработать прототип системы визуальной аналитики и провести тестирование на заданном наборе данных.

Архитектура системы визуальной аналитики



Архитектура системы визуальной аналитики



Набор данных

Исходный набор данных

```
1 {
2   "_index": "nuclear_non_proliferation_test",
3   "_id": "XwF5jIwB7XQHj4JAmH20",
4   "_version": 5,
5   "_score": 0,
6   "_ignored": [
7     "abstract.keyword"
8   ],
9   "_source": {
10    "eid": "2-s2.0-84883234703",
11    "title": "A comparison of the deformation, flow, and failure of two tungsten
12    heavy alloys",
13    "doi": null,
14    "scopus_link": "https://www.scopus.com/inward/record.uri?eid=2-s2.0-84883234703&
15    partnerID=406md5=d1144cfc703f6368de977348dcb888fa",
16    "abstract": "Ballistic tests were conducted with sub-scale long rod penetrators
17    of two different processing conditions of the same tungsten heavy alloy. The
18    liquid-phase sintered composite of 90% tungsten-9% nickel-1% cobalt (by weight)
19    was tested in its lowstrength, as-sintered and heat-treated condition, and in a
20    high-strength, 50% cold-worked (by swaging) and aged condition. Small, but
21    consistent, differences in the ballistic performances of the two lots of
22    penetrators were observed in depth of penetration tests in thick armor steel
23    targets and in limit velocity determinations against finite thickness steel
24    targets. Metallographic examinations were conducted on the residual penetrators
25    recovered from sectioned steel targets. Using the tungsten particles in the
26    nickel alloy matrices of these residual penetrator materials as embedded strain
27    gauges, the strain distributions, deformation gradients, and flow and failure
28    behaviors of these two tungsten heavy alloy lots were examined. Correlations
29    were sought between the flow and failure behaviors of these two lots and their
30    ballistic performances.",
31    "keywords": null,
32    "indexed_keyword": [
33      "Ballistics",
34      "Nickel alloys",
35      "Refractory materials",
36      "Sintering",
37      "Tungsten",
38      "Tungsten alloys",
39      "Ballistic performance",
40      "Deformation gradients",
41      "Depth of penetration tests",
42      "Failure behaviors",
43      "Metallographic examination",
44      "Processing condition".
45    ]
46  }
47 }
```

Пример файла
статьи Scopus

26 403

статей собрано

Преобразованный набор

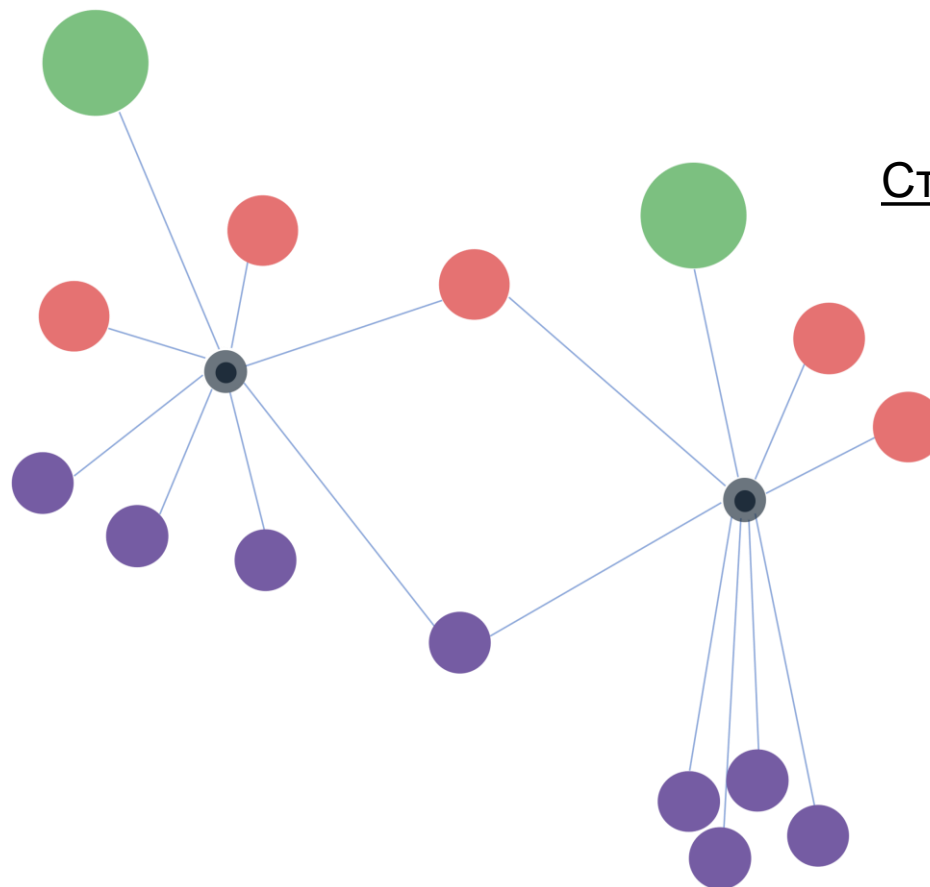
```
1 {
2   "nodes": [
3     {
4       "id": "2-s2.0-85054238592",
5       "name": "Investigation of Balling Characteristics of Mixture of
6       "color": "rgba(44, 62, 80, 0.7)",
7       "init_color": "rgba(44, 62, 80, 0.7)",
8       "val": 1,
9       "group": "article",
10      "highlited": 0.4
11    },
12    {
13      "id": "Nigeria",
14      "name": "Nigeria",
15      "color": "rgb(229, 115, 115)",
16      "init_color": "rgb(229, 115, 115)",
17      "val": 35,
18      "group": "country"
19    },
20  ],
21  "links": [
22    {
23      "source": "2-s2.0-85058331970",
24      "target": "China",
25      "color": "rgb(229, 115, 115)",
26      "init_color": "rgb(229, 115, 115)",
27      "width": 1
28    },
29    {
30      "source": "2-s2.0-85058331970",
31      "target": "Nigeria",
32      "color": "rgb(229, 115, 115)",
33      "init_color": "rgb(229, 115, 115)",
34      "width": 1
35    },
36  ],
37 }
```

Пример данных
для графа

Граф

Пример графа

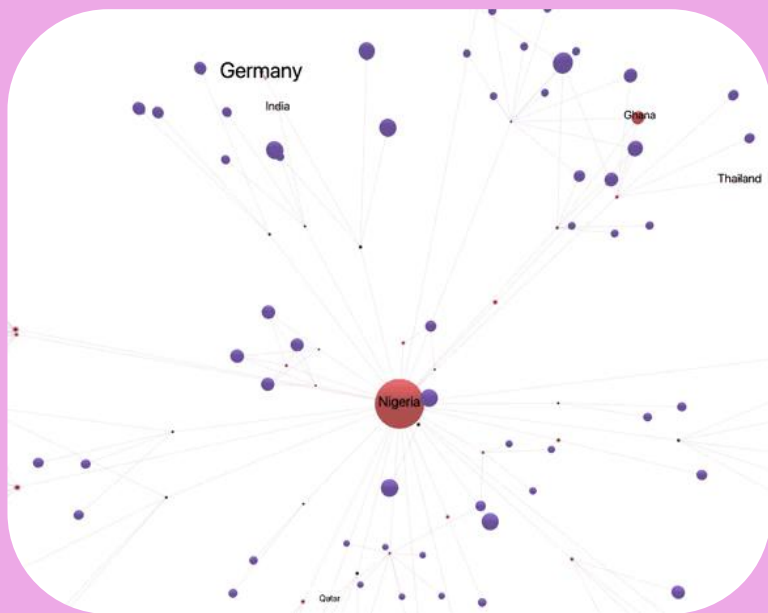
- Непостоянные члены СБ ООН
- Постоянные члены СБ ООН
- Авторы
- Статьи



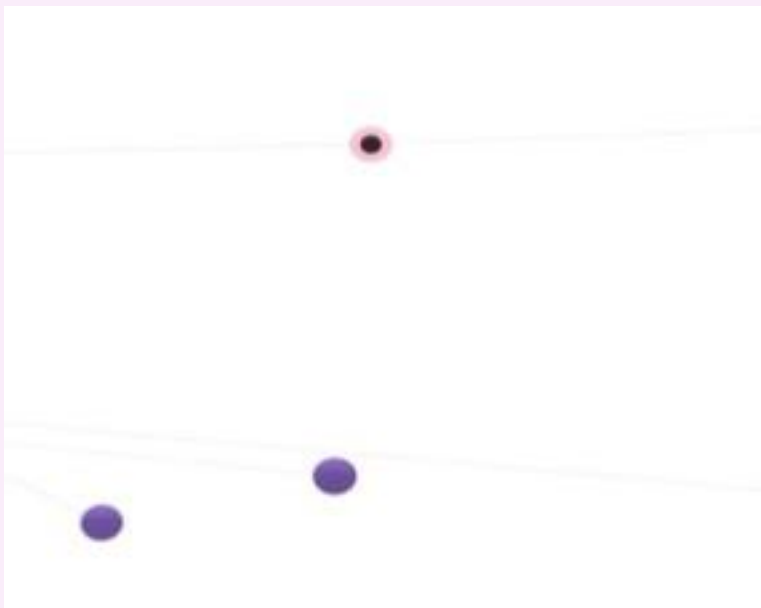
Взвешенный
Направленный

Страна ← Статья → Автор

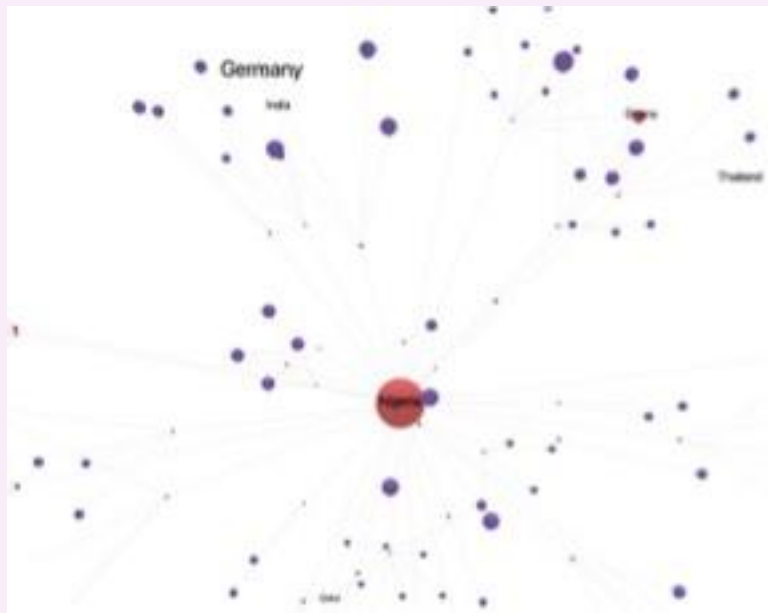
Набор функциональных возможностей



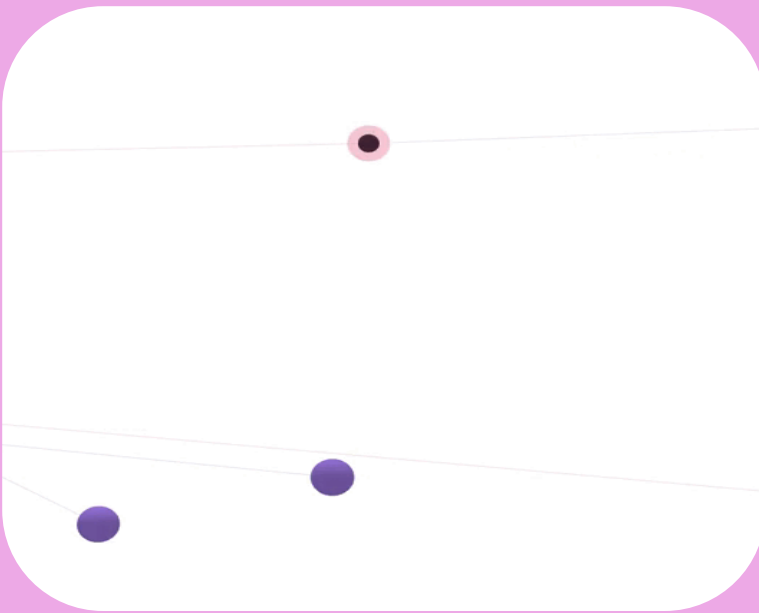
Выделение узла



Набор функциональных возможностей



Выделение узла



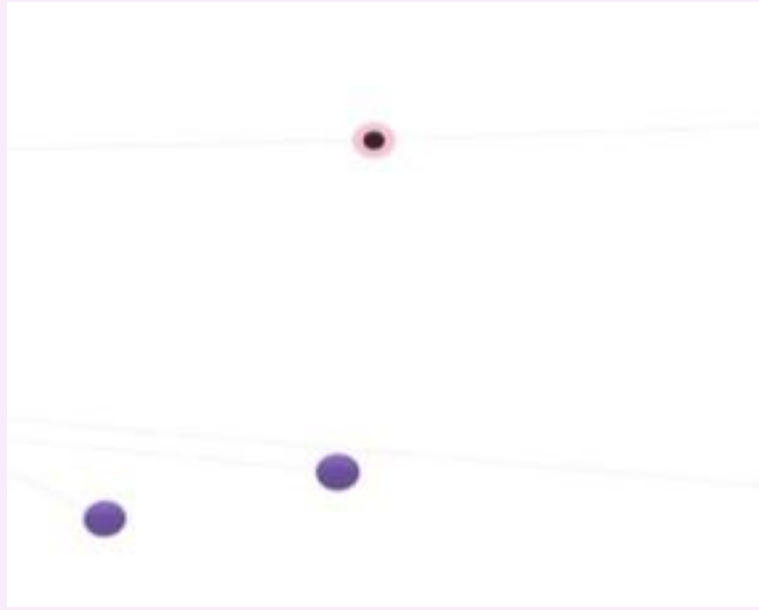
Сфера



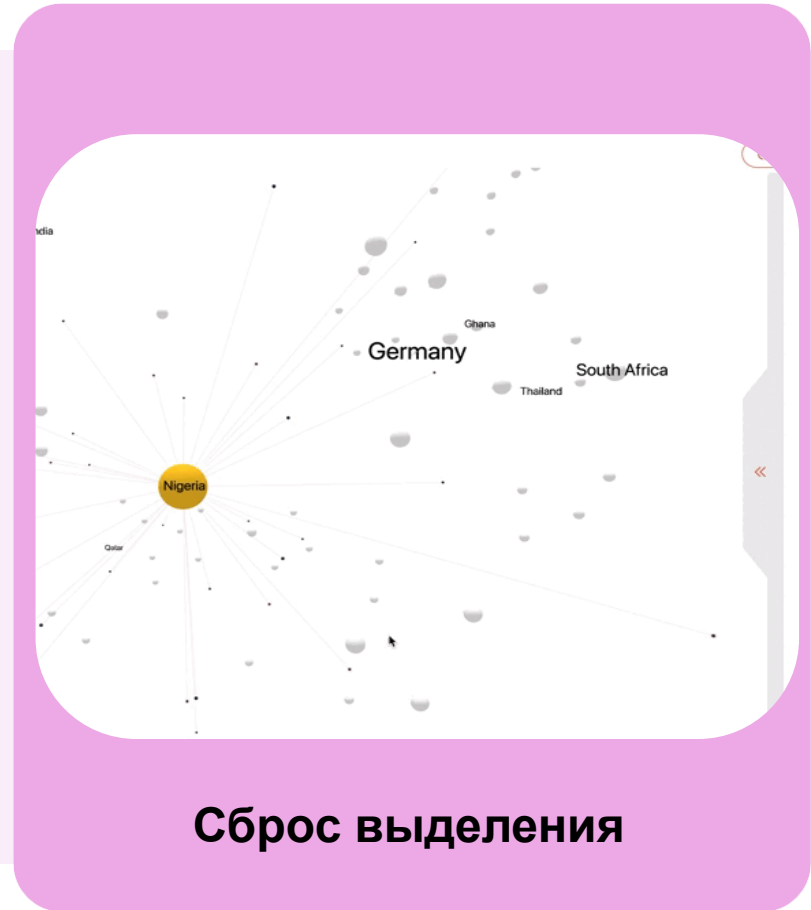
Набор функциональных возможностей



Выделение узла



Сфера



Сброс выделения

Интерфейс системы

Блок фильтрации

The screenshot shows a sidebar titled "Filters" with the following sections:

- Country:** Includes a dropdown menu, two active filters for "Spain" and "Germany", and a "Choose country" dropdown.
- Year:** Includes a "From:" field with "2024" and a "To:" field with "2024", both with calendar icons and a close button.
- Area:** Includes a dropdown menu, two active filters for "Spain" and "Germany", and a "Choose country" dropdown.
- Key Words:** Includes a text input field with the placeholder "Enter keywords separated by commas".

At the bottom of the sidebar are two buttons: "Apply +" and "Reset filters" with a circular arrow icon.

Фильтр: **Страны**

Фильтр: **Год**

Фильтр: **Направление**

Фильтр: **Ключевые слова**

Блок информации

The screenshot shows a panel titled "Node Information" with the following details:

- Node id:** 2-s2.0-11144228442
- Author's name:** Levi Ackermann
- Affiliation:** Survey Corps

At the bottom of the panel is a red button labeled "View abstract".



Filters

Choose countries

YYYY

YYYY

Choose areas

Key word

Enter keywords separated by
semicolon

Apply +

Reset graph



Node Information



Результаты работы

- Разработана архитектура системы
- Определен набор функциональных возможностей
- Разработан прототип системы

Спасибо за внимание