

# Data Visualization

## A new module for BEXIS 2

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# Motivation

Visualization is a

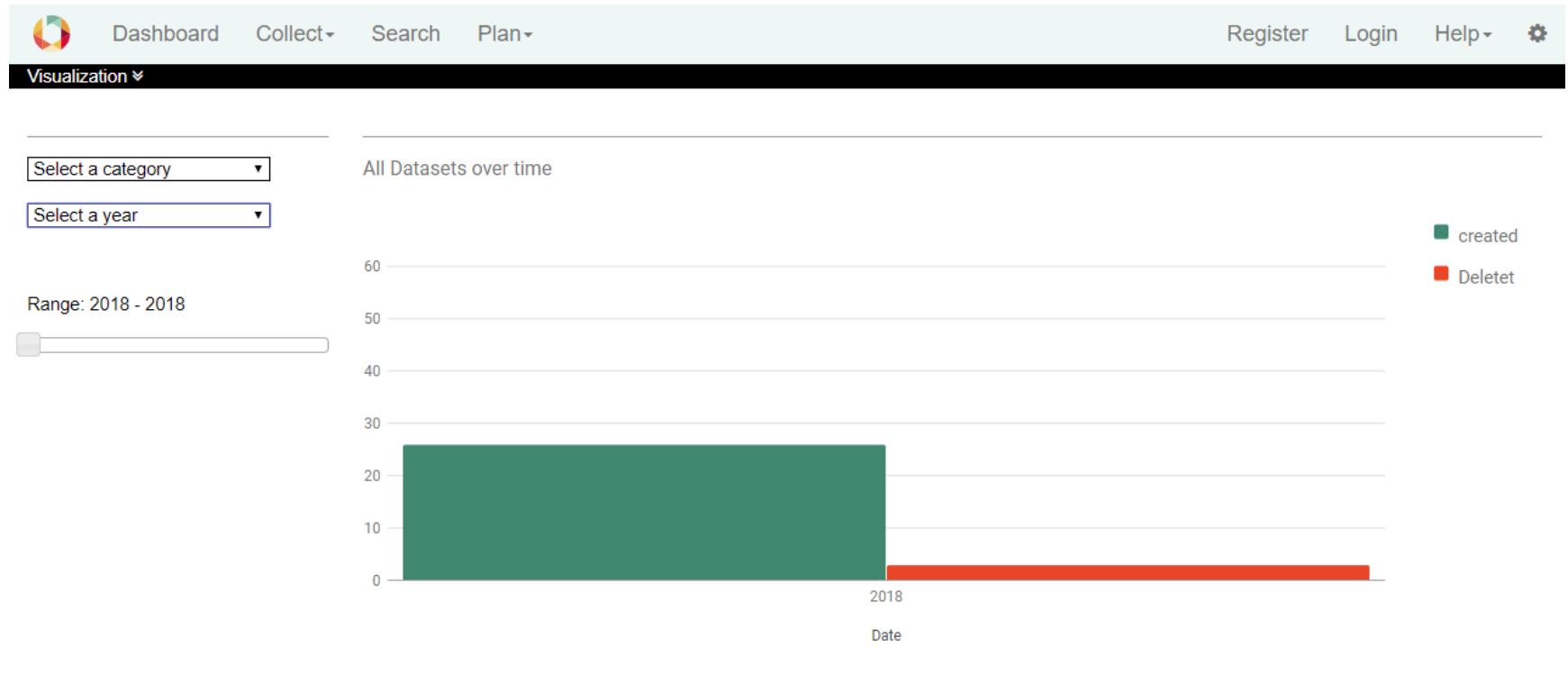
- common way to represent data
- easy comprehensible form
- feature of BEXIS 2
- Visualization for BEXIS2 is the theme of the project work in my master program

# Outline

- Current Version
  - **Visualization for administrator**
- Technical part
  - **Implementation the Visualization Module**
- Future works
  - **Visualization for scientists**

# Current Version

# Current Version



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# Current Version

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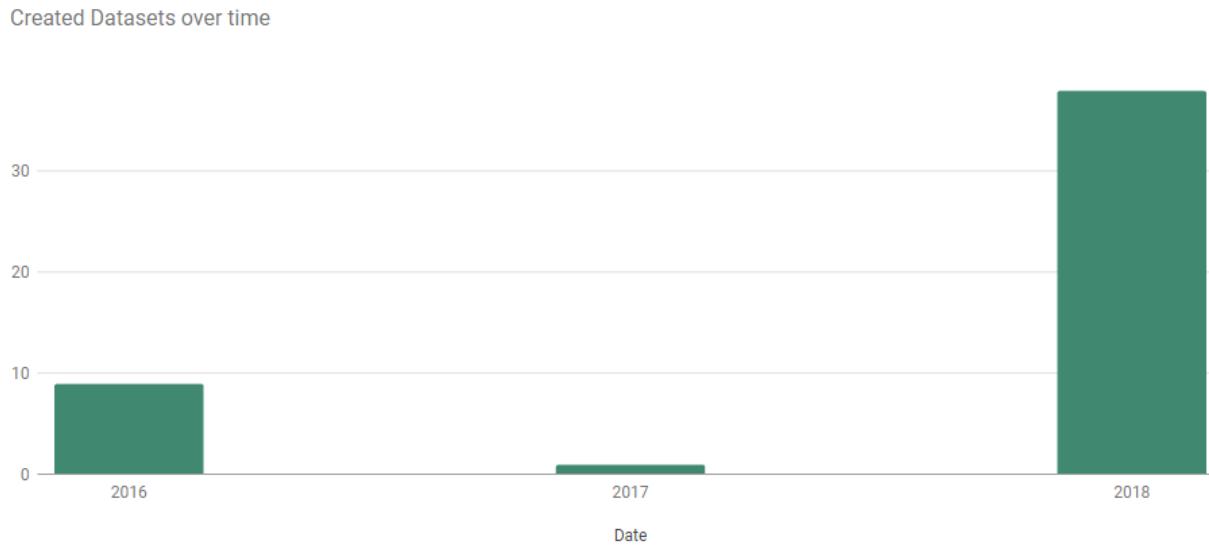
Visualization ▾

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Created Datasets ▾

- Select a category
- System Activities
- Created Datasets**
- Deleted Datasets

Range: 2016 - 2018



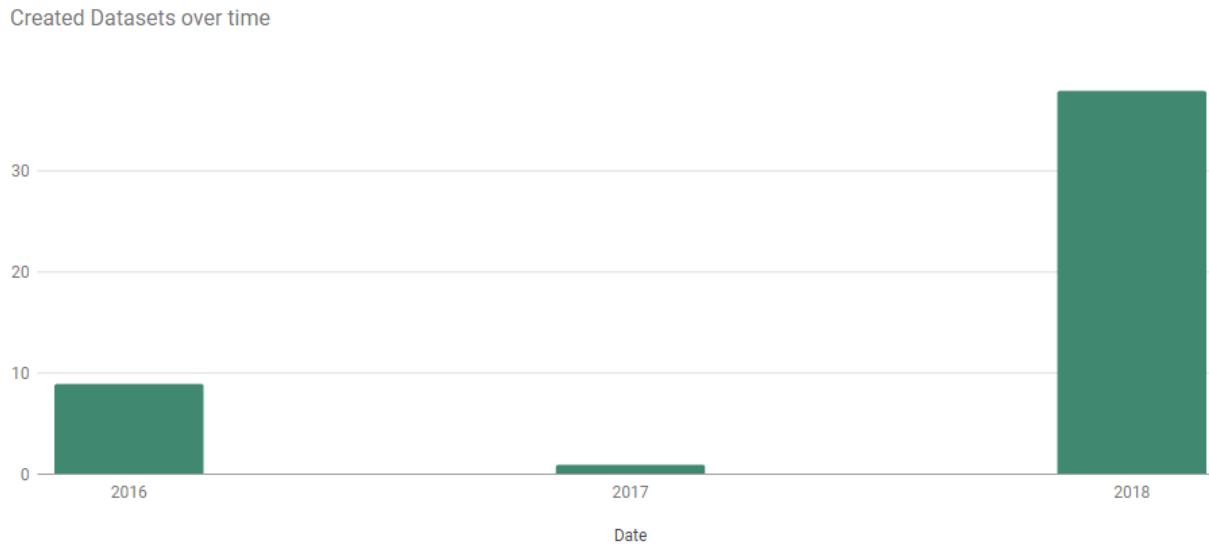
The chart displays the number of created datasets per year. In 2016, there were approximately 8 datasets. In 2017, there was 1 dataset. In 2018, there were approximately 30 datasets.

| Date | Created Datasets |
|------|------------------|
| 2016 | ~8               |
| 2017 | 1                |
| 2018 | ~30              |

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Created Datasets over time

Range: 2016 - 2018



The chart displays the number of created datasets per year. In 2016, there were approximately 8 datasets. In 2017, there was 1 dataset. In 2018, there were approximately 30 datasets.

| Date | Created Datasets |
|------|------------------|
| 2016 | ~8               |
| 2017 | 1                |
| 2018 | ~30              |

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# Current Version

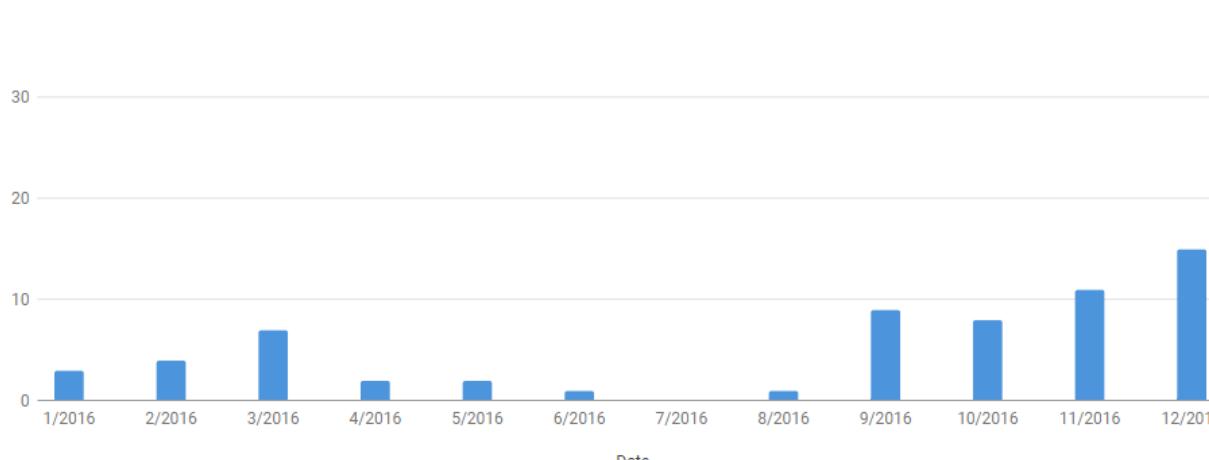
Dashboard   Collect▼   Search   Plan▼   Register   Login   Help▼   

Visualization ▾

System Activities ▾

System Activities in 2016

2016 ▾  
Select a year  
2016  
2017  
2018



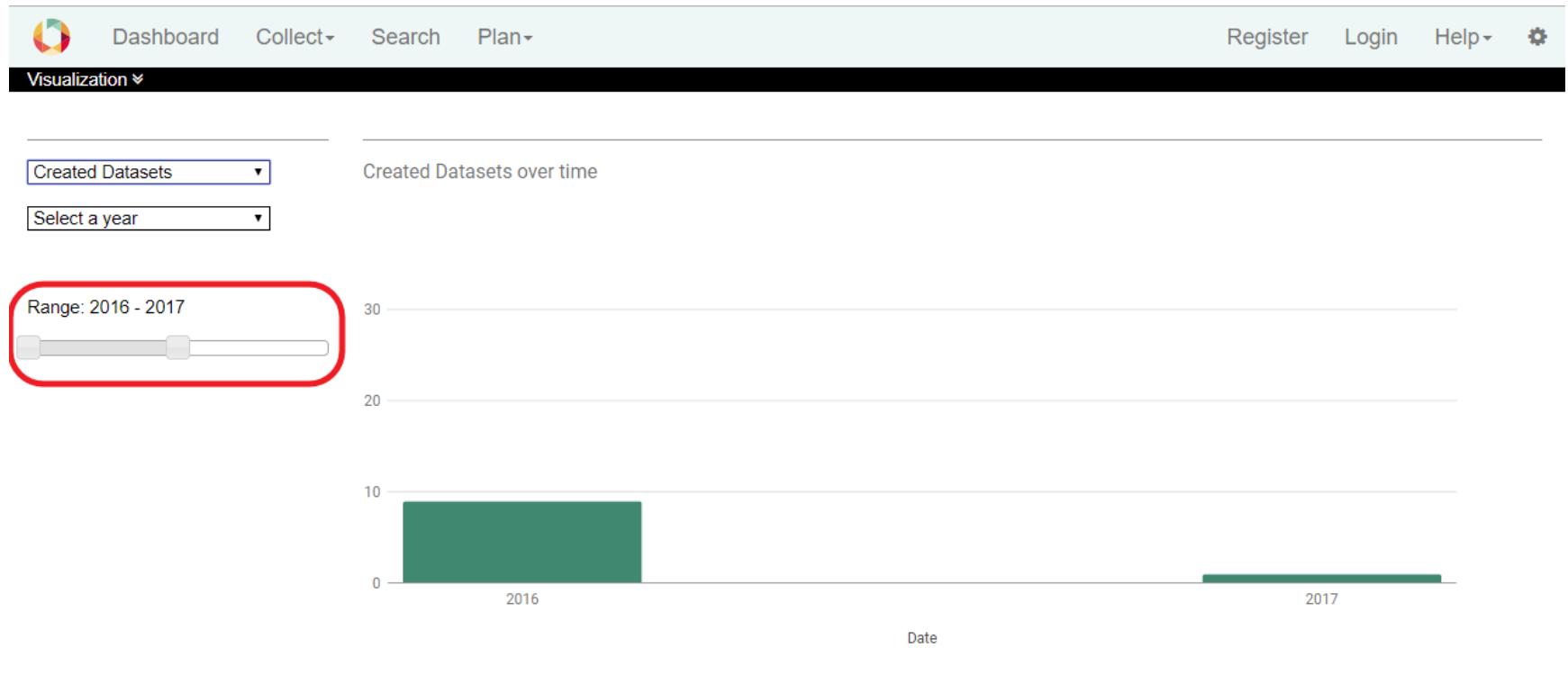
A bar chart titled "System Activities in 2016" showing the number of activities per month. The y-axis ranges from 0 to 30. The x-axis shows months from 1/2016 to 12/2016. The data is as follows:

| Date    | Activities |
|---------|------------|
| 1/2016  | 3          |
| 2/2016  | 4          |
| 3/2016  | 7          |
| 4/2016  | 2          |
| 5/2016  | 2          |
| 6/2016  | 1          |
| 7/2016  | 0          |
| 8/2016  | 1          |
| 9/2016  | 9          |
| 10/2016 | 8          |
| 11/2016 | 11         |
| 12/2016 | 15         |

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# Current Version



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# Module Implementation

# Module Implementation

- BEXIS Modularity
- Server side
  - Programming language C#
  - Model-View-Controller (MVC)
  - BEXIS API usage
- Client side
  - HTML 5 / JavaScript / JQuery
- Google Charts

# Google Charts or not Google Charts

|                    | Google Charts      | D3                 | D3Plus           | C3               |
|--------------------|--------------------|--------------------|------------------|------------------|
| Technology         | JavaScript library | JavaScript library | D3-based library | D3-based library |
| Free / Open Source | ✓                  | ✓                  | ✓                | ✓                |
| Data Input         | Array, JSON        | JSON, CSV, TSV     | JSON, CSV, TSV   | Array, JSON      |
| Data Output        | HTML, SVG          | HTML, SVG          | HTML, SVG        | HTML, SVG        |
| Rich Gallery       | ✓                  | ✓                  | ✓                | ✓                |
| Customization      | ✓                  | ✓                  | ✓                | ✓                |
| Last Update        | 23.02.2016         | 24.08.2018         | 21.08.2016       | 08.08.2018       |

# Future works

# Visualization ideas

- Metadata completion

The screenshot shows the BEXIS RC4 dataset management interface. At the top, there is a navigation bar with links for Dashboard, Collect, Search, Plan, and user information (nafiseh, Help, settings). Below the navigation bar, the title "BEXIS RC4 - Show Data : t4" is displayed. On the left, the dataset identifier "t4" is shown, along with the text "Dataset Id: 4, Version: 6". To the right of this, there is a pie chart indicating data completeness: approximately 75% is "Filled" (orange) and 25% is "Empty" (blue). A "Download" button is also present. Below the title, a navigation menu includes tabs for Metadata (which is selected), Primary Data, Data Structure, Dataset Permissions, Publish, and Attachments. Under the "Metadata" tab, there are buttons for Edit, Copy, and "show all fields". The main content area displays hierarchical metadata fields. The "Basic" section is expanded, showing a contact icon. The "Technical Contacts" section is expanded, showing a contact icon. The "Technical Contact (1)" section is expanded, showing two fields: "Name" (Nafiseh Navabpour) and "Address" (Jena Germany), each with an info icon.

# Visualization ideas

- Data completion/distribution

BExIS - Show Data : flower visitor interactions 2007 Schwäbische Alb

| Plot_ID | Plant_species        | Date                  | Sample_number | Order      | Family       | Species                 | Female | Male | Unsexed |
|---------|----------------------|-----------------------|---------------|------------|--------------|-------------------------|--------|------|---------|
| A23233  | Achillea millefolium | 7/11/2007 12:00:00 AM | 75            | Diptera    | Tachinidae   | Eriothrix rufomaculatus | 0      | 1    | 0       |
| A23233  | Cirsium arvense      | 7/11/2007 12:00:00 AM |               | Coleoptera | Nitidulidae  | Meligethes cf. aeneus   | 0      | 0    | 4       |
| A23233  | Cirsium arvense      | 7/11/2007             |               |            |              |                         | 0      | 0    | 1       |
| A23233  | Achillea millefolium | 7/11/2007             |               |            |              | Combomimus humilis      | 1      | 0    | 0       |
| A23233  | Trifolium pratense   | 7/11/2007             |               |            |              | Combomimus humilis      | 1      | 0    | 0       |
| A23233  | Ranunculus acris     | 7/11/2007             |               |            |              | Dioglossum pauxillum    | 0      | 0    | 1       |
| A23233  | Ranunculus acris     | 7/11/2007             |               |            |              |                         | 0      | 0    | 1       |
| A23233  | Ranunculus acris     | 7/11/2007             |               |            |              |                         | 0      | 0    | 0       |
| A23233  | Agrimonia eupatoria  | 7/11/2007 12:00:00 AM |               | Diptera    | Syrphidae    | Scaeva pyrastris        | 0      | 0    | 1       |
| A23233  | Achillea millefolium | 7/11/2007 12:00:00 AM |               | Diptera    | Syrphidae    | Eristalis tenax         | 0      | 0    | 1       |
| A23233  | Cirsium arvense      | 7/11/2007 12:00:00 AM |               | Diptera    | Anthomyiidae |                         | 1      | 0    | 0       |
| A23233  | Ranunculus acris     | 7/11/2007 12:00:00 AM | 78            | Diptera    |              |                         | 0      | 0    | 2       |

# Thank you for your attention!

## Contact:

Nafiseh.Navabpour@uni-jena.de

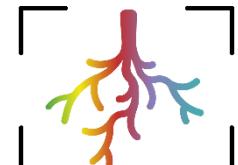
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