



Visual Exploration of Relationships and Structure in Low-Dimensional Embeddings

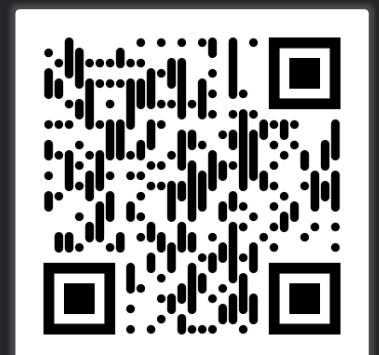
Klaus Eckelt, Andreas Hinterreiter, Patrick Adelberger, Conny Walchshofer,
Vaishali Dhanoa, Christina Humer, Moritz Heckmann, Christian A. Steinparz, Marc Streit

✉ klaus.eckelt@jku.at

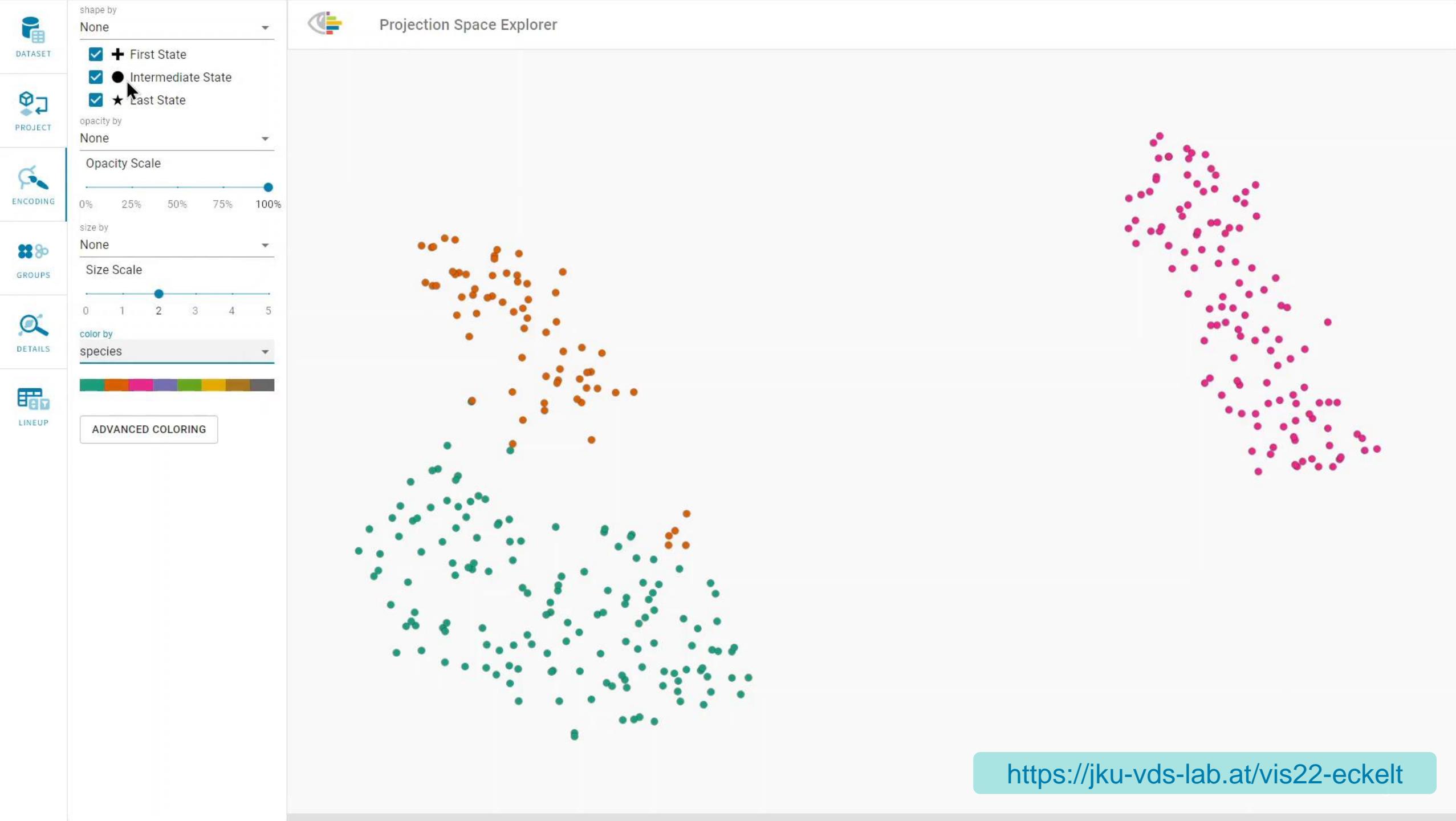
🐦 [@klaus_lml](https://twitter.com/klaus_lml)

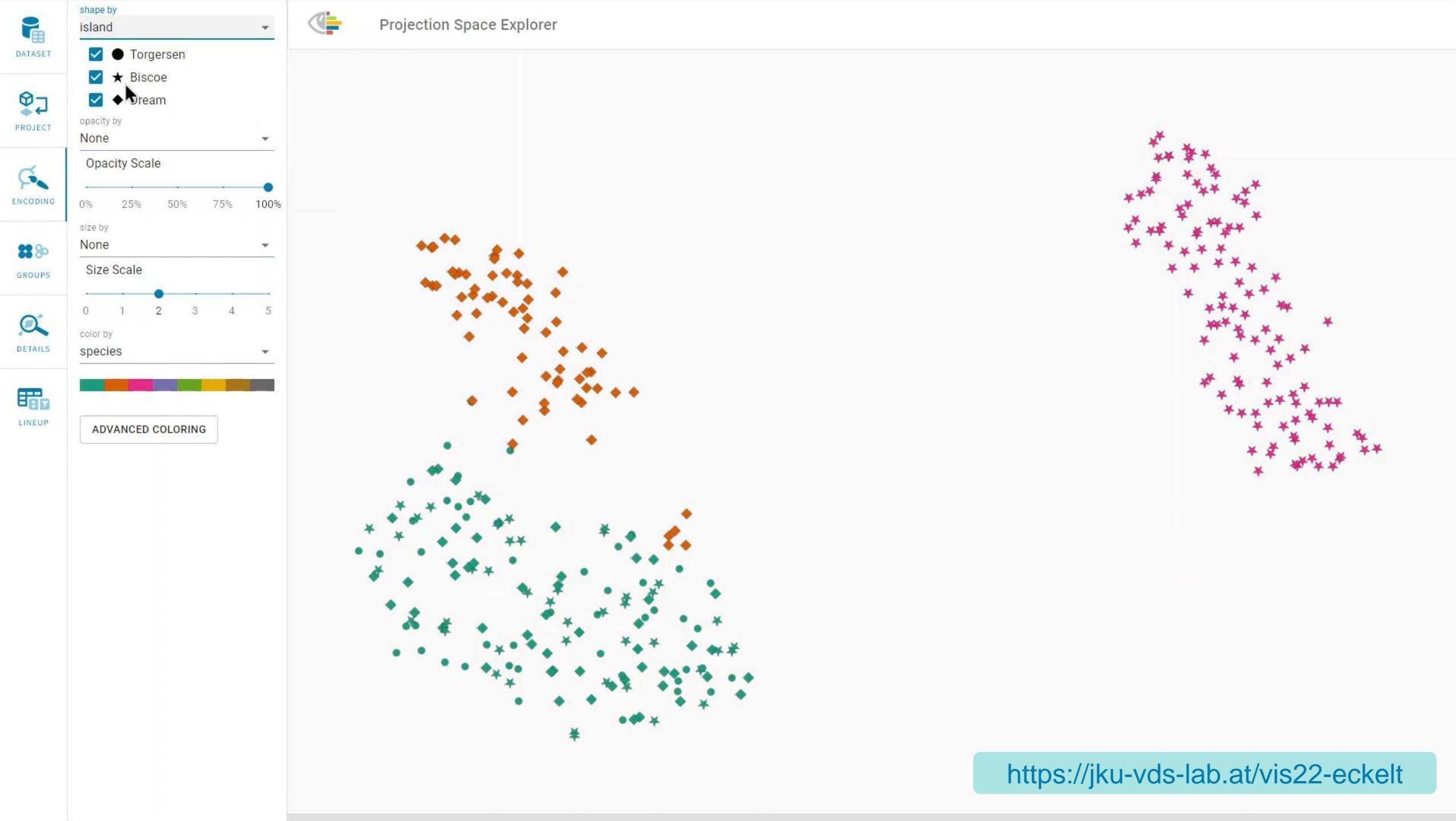


<https://jku-vds-lab.at/vis22-eckelt>





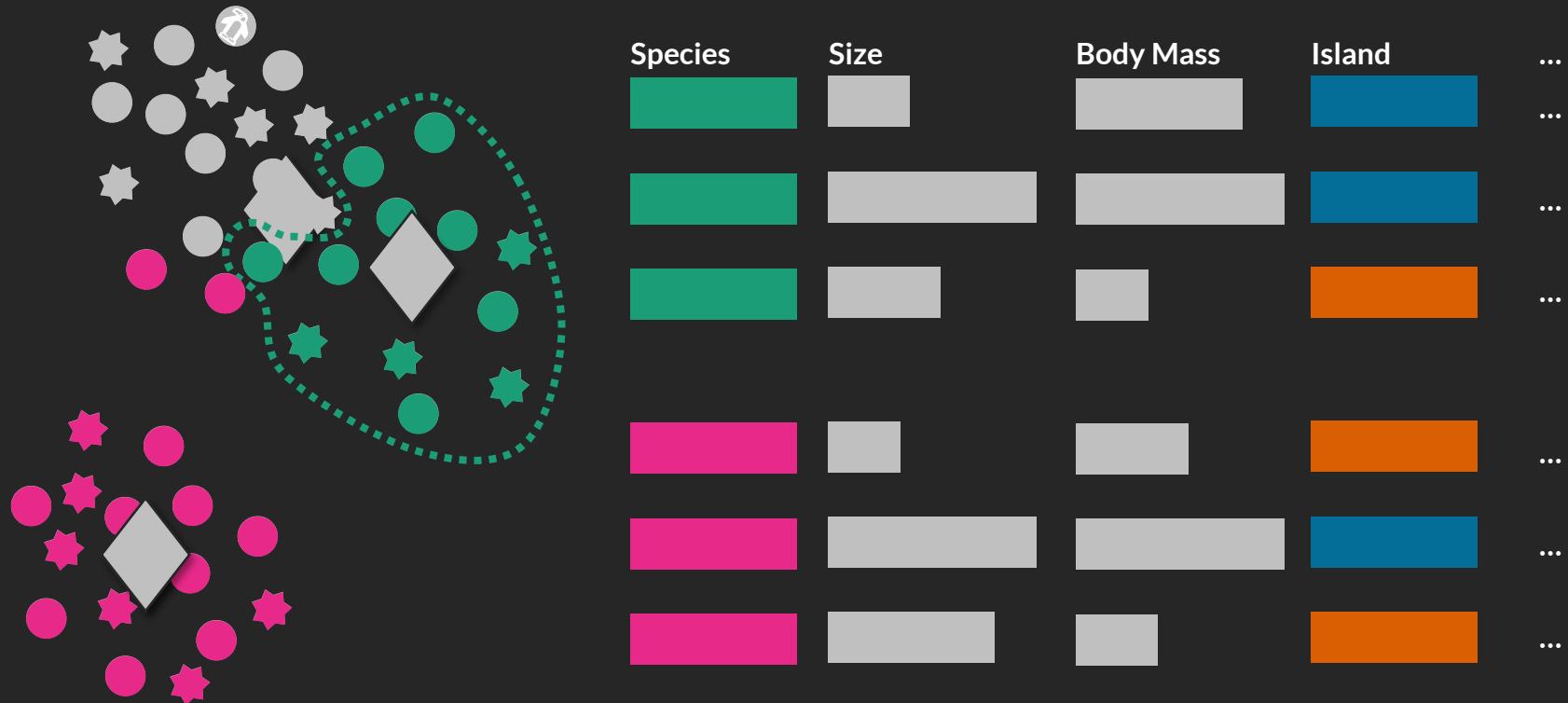




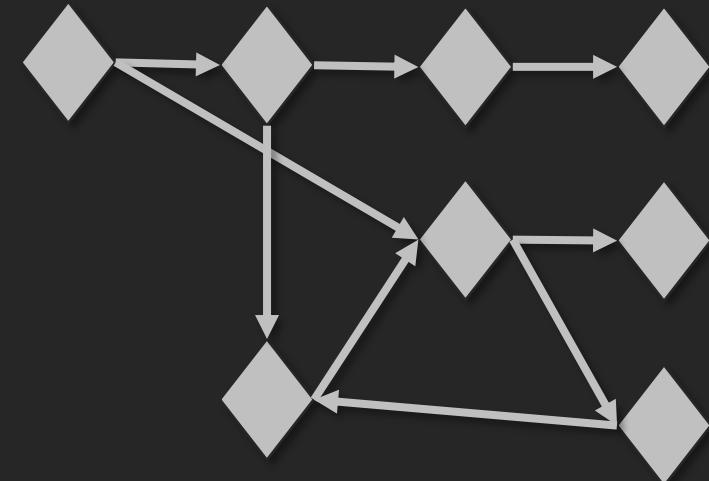
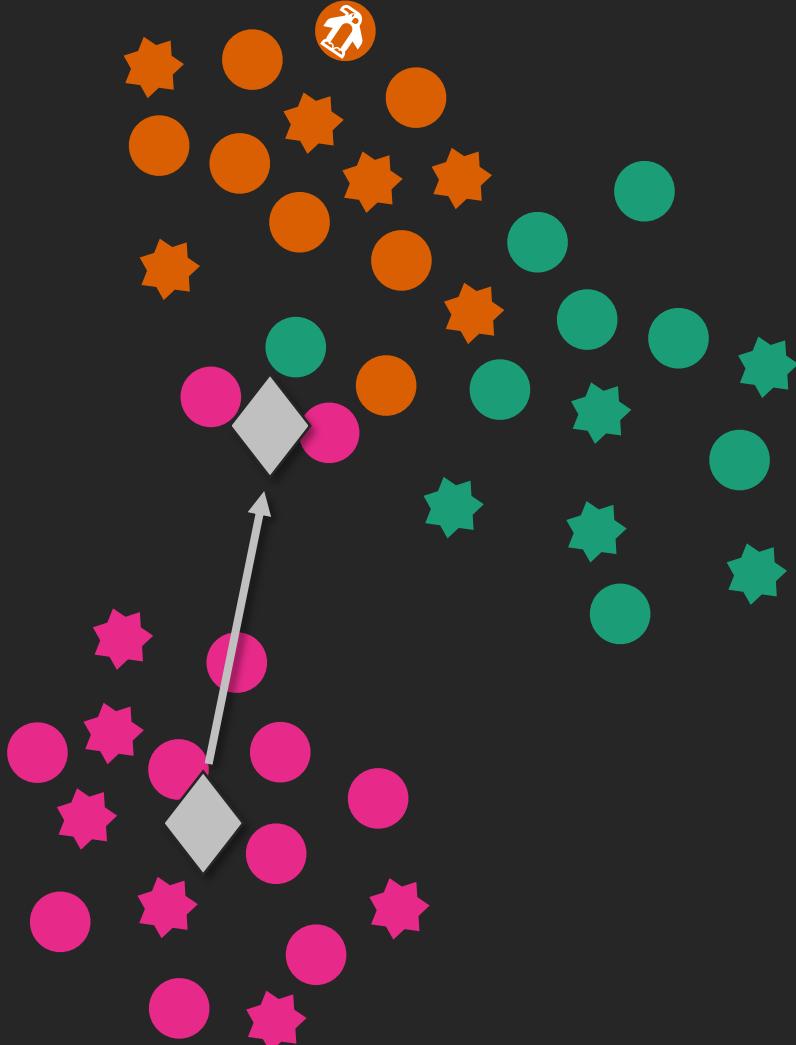


Defining Structure

- Single Items



Representing Relationships: Group→Group

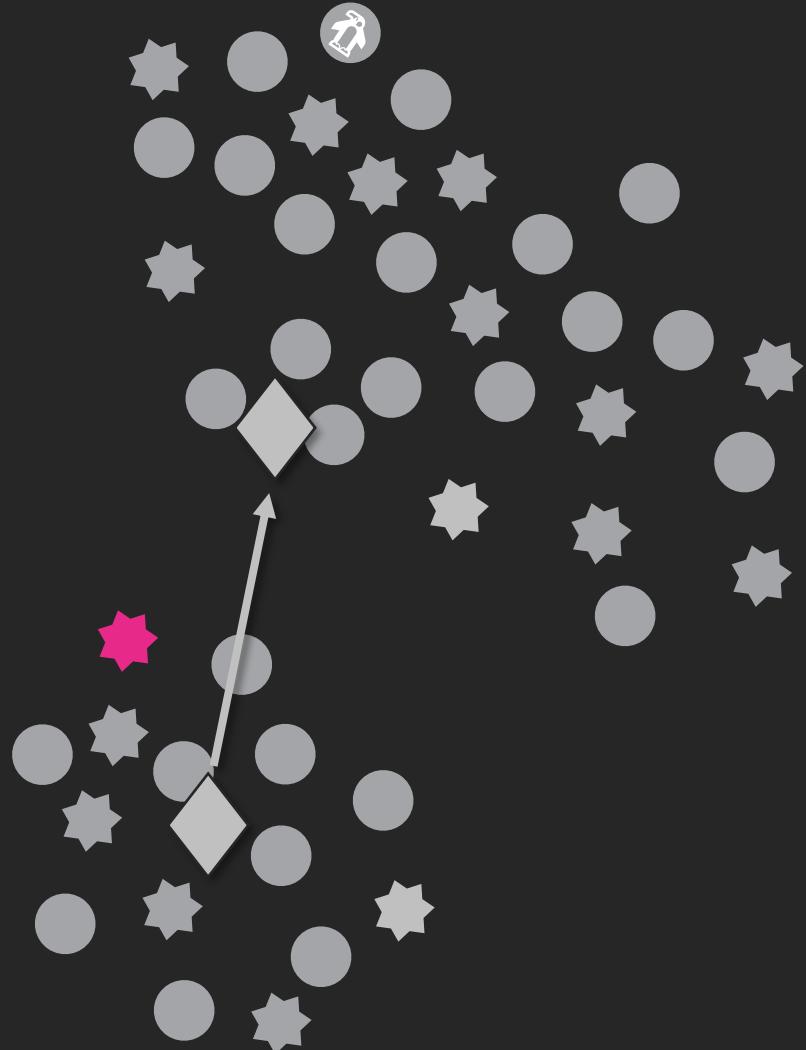


- Hierarchies
- Graphs

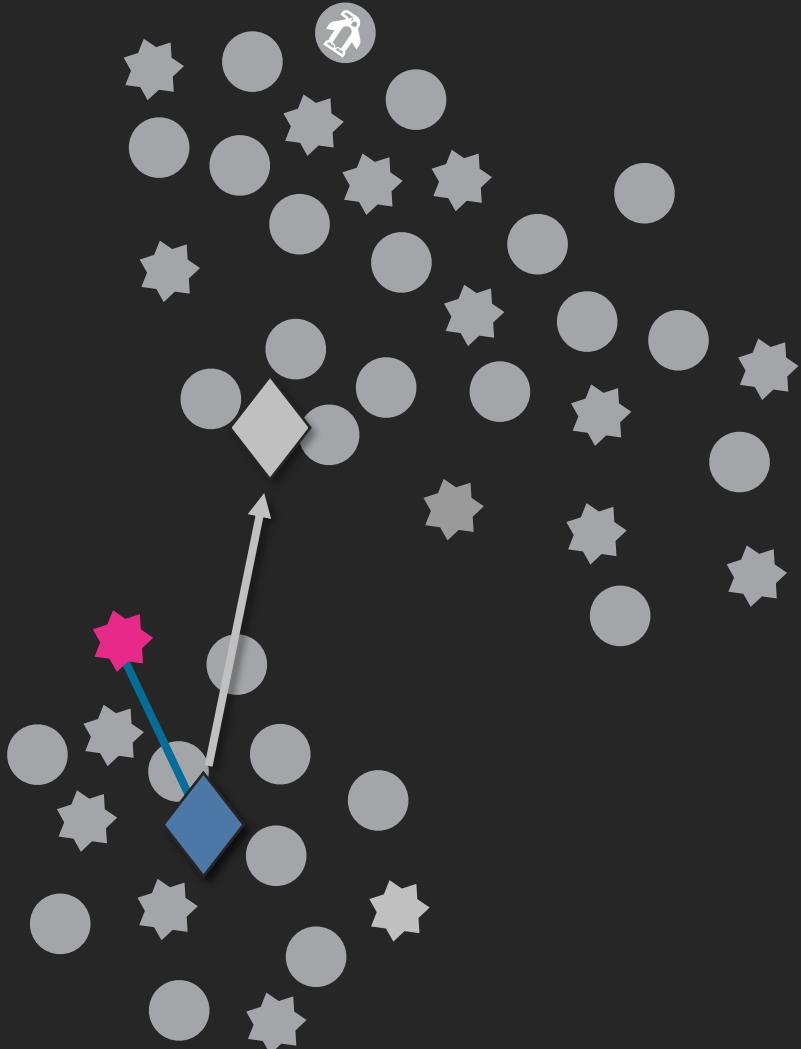
Representing Relationships: Item→Group



Representing Relationships: Item→Group



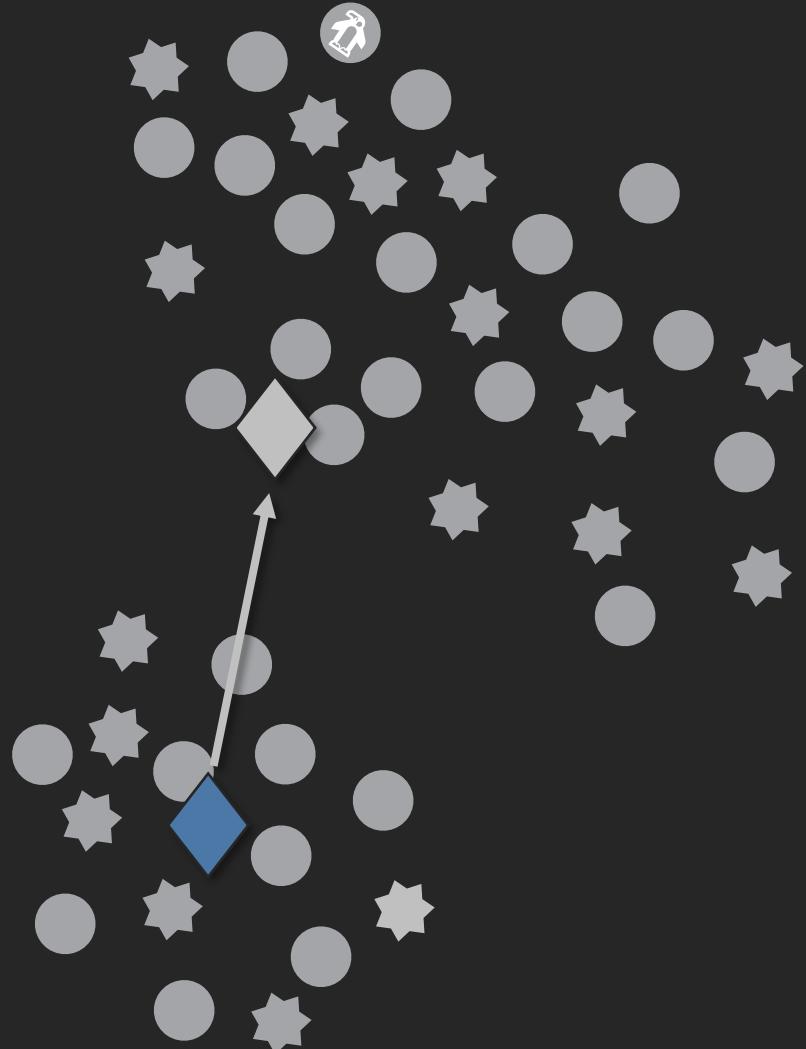
Representing Relationships: Item→Group



Selected points are connected with their groups' centroids.

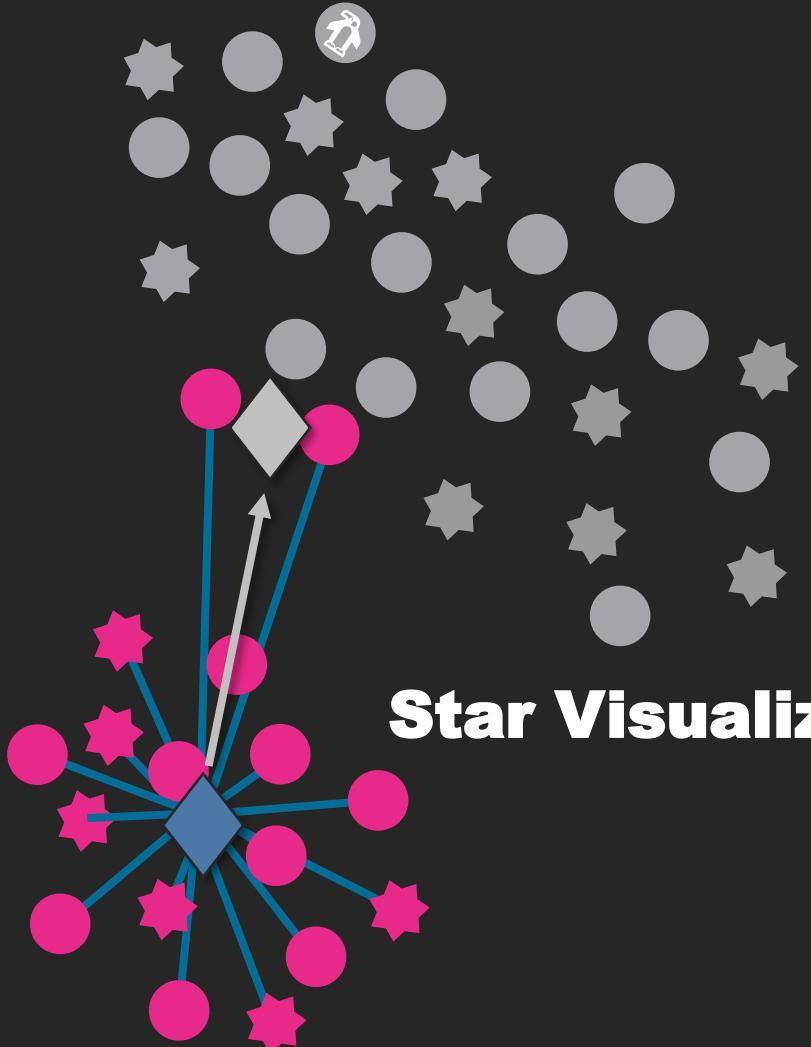
Representing Relationships:

Group→Item

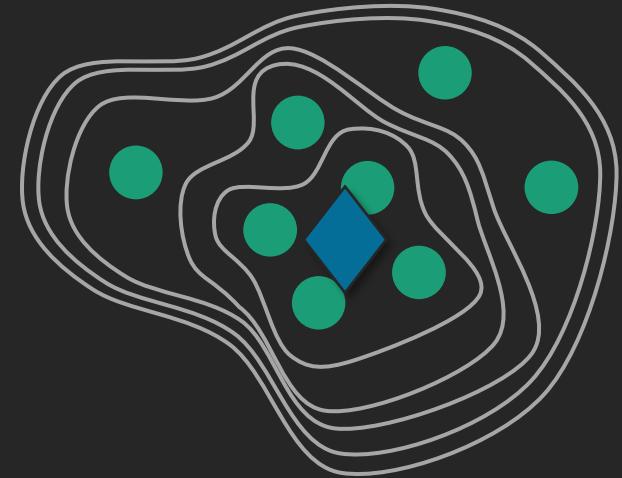


Representing Relationships:

Group→Item



Star Visualization



Contour Plot

Selected 0 out of 39237 items



Projection Space Explorer

Dataset

External Summary

CLEAR SELECTION

SUMMARY ATTRIBUTES

Hover Position

North East

Select Points in the Embedding
Space to show a Summary
Visualization.

Encoding

Groups

Details

Lineup



Selected 0 out of 39237 items



Projection Space Explorer

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SUMMARY ATTRIBUTES

Hover Position

North East

Select Points in the Embedding Space to show a Summary Visualization.



Selected 0 out of 39237 items



DATASET

External Summary

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Select Points in the Embedding Space to show a Summary Visualization.

ENCODING

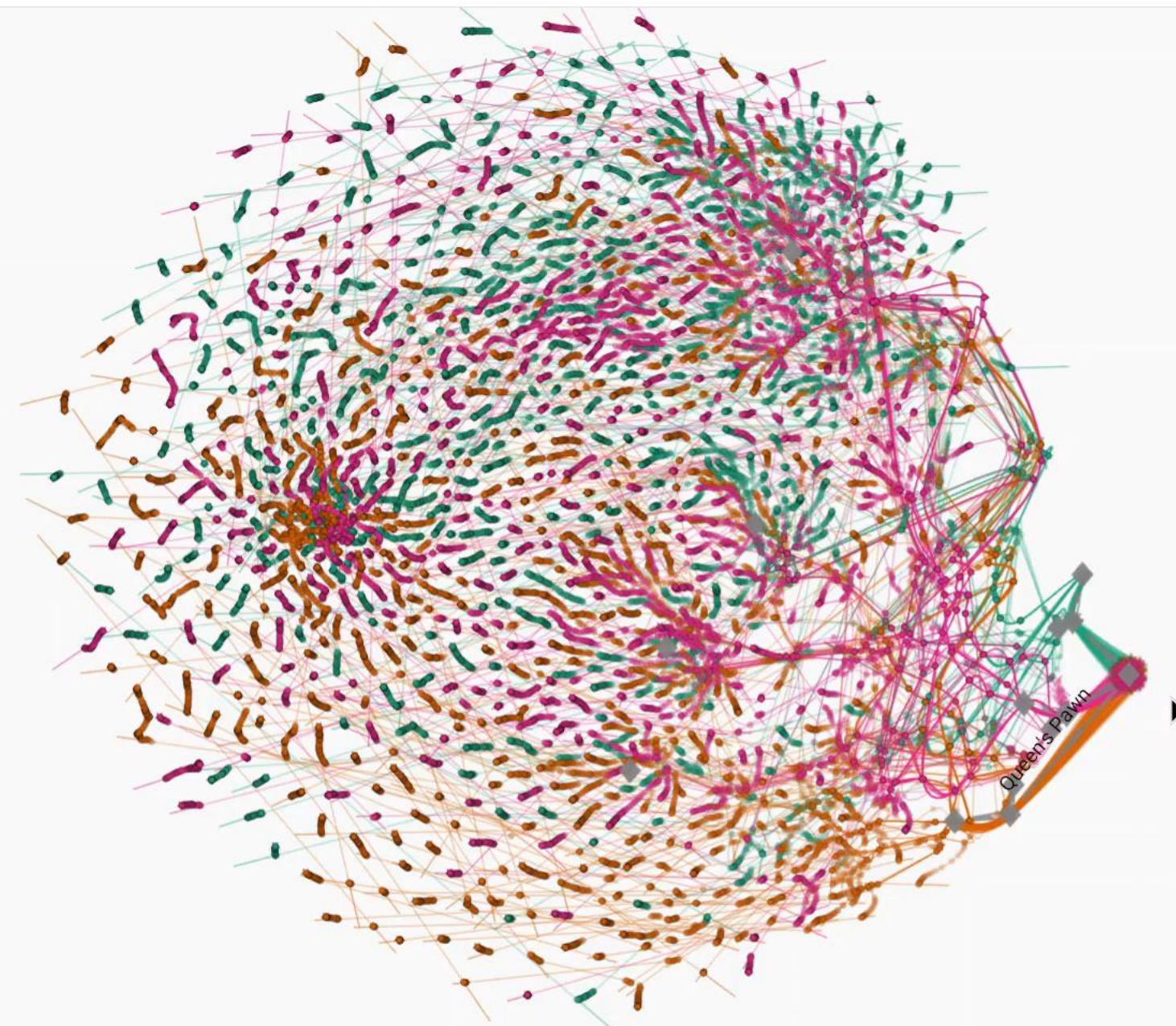
GROUPS

DETAILS

LINEUP



Projection Space Explorer





Projection Space Explorer

DATASET



PROJECT



ENCODING



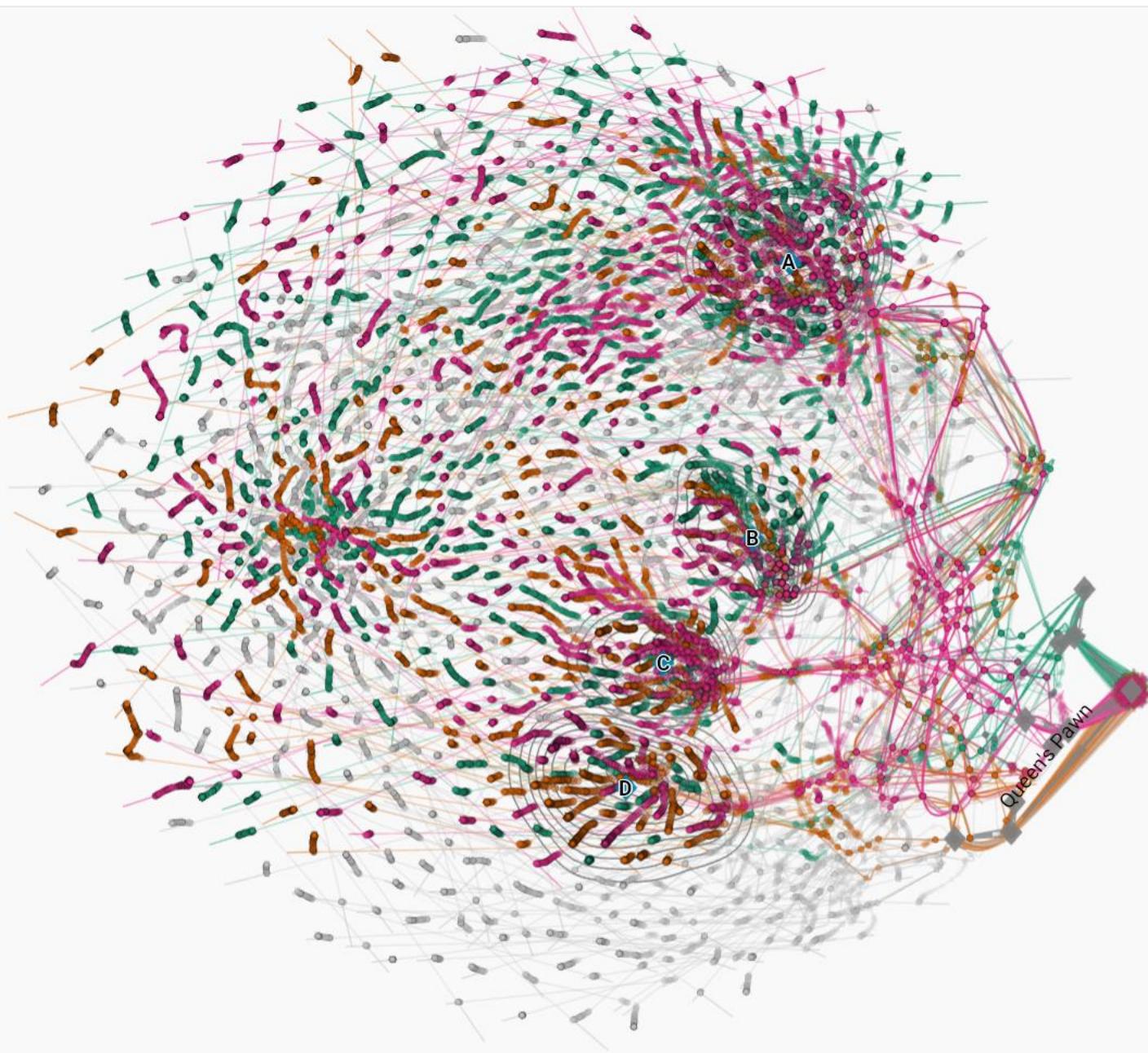
GROUPS



DETAILS



LINEUP



Comparison



Summary

A

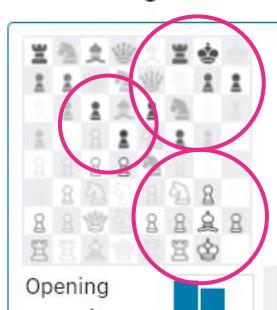
Difference
Filter Threshold

0 0.25 0.5 0.75 1

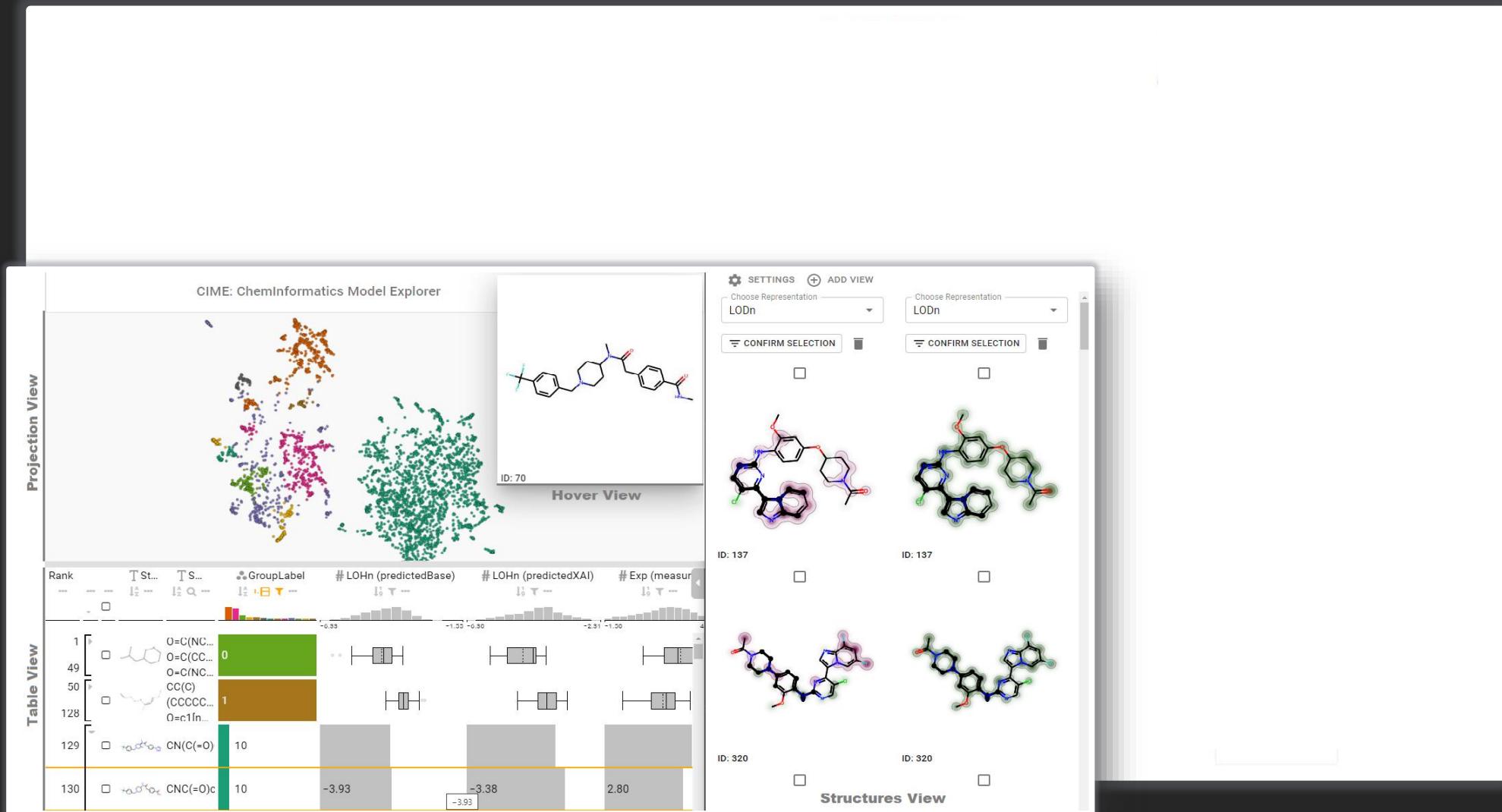
B

Opening
-100% 0% 100% English

C

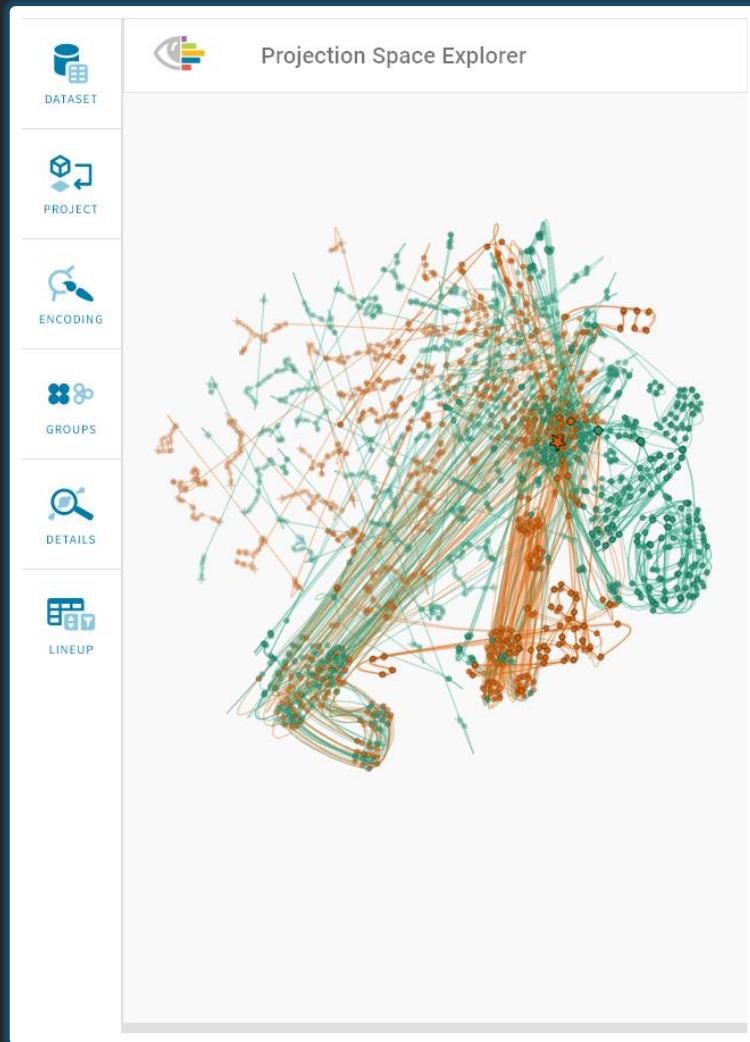
Opening
-100% 0% 100% Zukertort Queen's...

Summary and Difference Visualizations



Humer, C., Heberle, H., Montanari, F. et al. Cheminformatics Model Explorer (CIME):
exploratory analysis of chemical model explanations. J Cheminform 14, 21 (2022).

Online Tool



Overview

A screenshot of the project overview page for 'Projection Space Explorer'. It features the JKU Visual Data Science Lab logo at the top. Below it is a large heading 'Projection Space Explorer' with a subtext explaining its purpose: 'The Projection Space Explorer visualization prototype is an interactive approach for the exploration and formation of structural relationships in embeddings of high-dimensional data.' Three buttons are present: 'Start Application' (blue), 'Datasets' (orange), and 'Video' (red). A preview image of the application interface shows a network visualization. At the bottom, a section titled 'How it works' includes a small diagram of a 3D coordinate system.

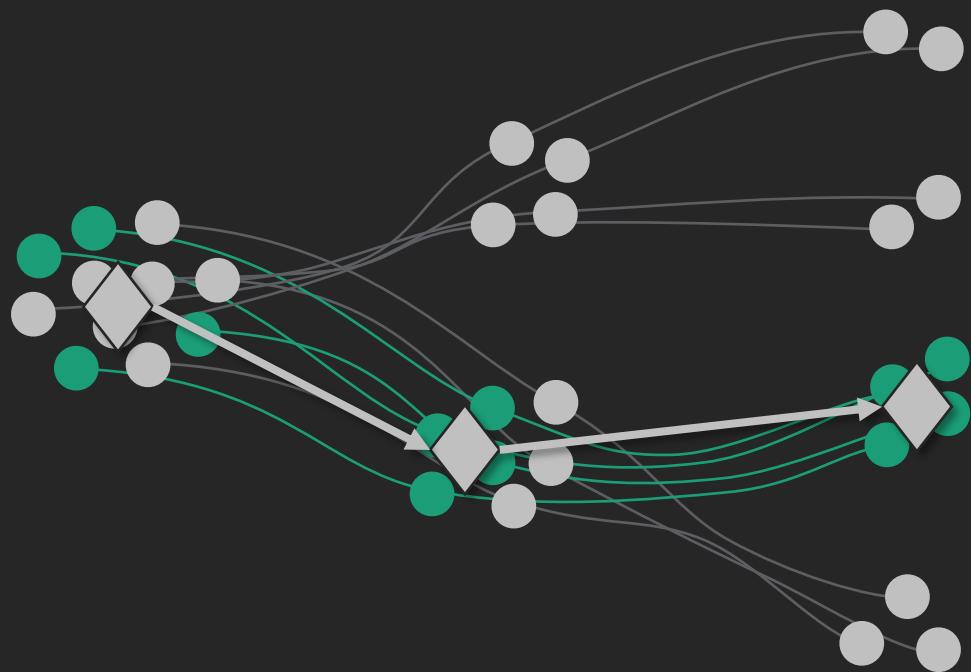
Library

A screenshot of the GitHub repository page for 'jkuvds-lab / projection-space-explorer'. The page shows basic repository information: 'jkuvds-lab' owner, 'projection-space-explorer' name, 'Public' status, 'BSD-3-Clause license', 32 stars, 0 forks, 9 issues, 8 pull requests, 8 actions, and 1 project. A 'develop' branch dropdown and a 'Contribute' button are visible. A commit history shows a recent update by Moritz Heckmann. The README.md file is linked, followed by a 'Controls' section with instructions for using the tool.

<https://jku-vds-lab.at/pse>

Ongoing & Future Work

Automated Analysis and Storytelling



Comparison by Attribute Combinations

Eckelt et al., Kokiri:
**Random-Forest-Based
Comparison and
Characterization of Cohorts**
IEEE VIS Workshop on
Visualization in Biomedical AI

<https://jku-vds-lab.at/kokiri>

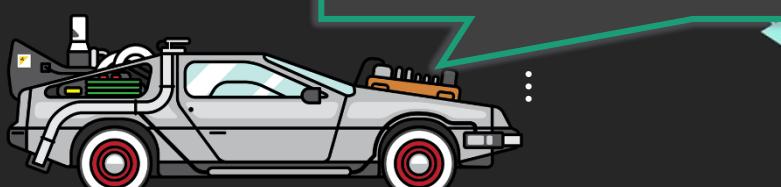
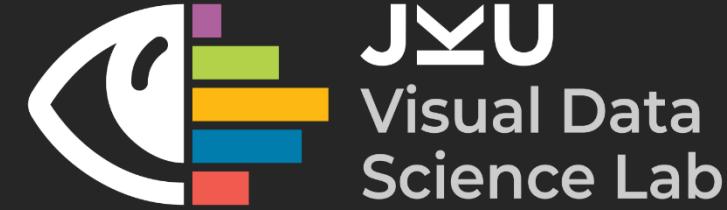


Image source: <https://www.youtube.com/watch?v=ZVR2Way4nwQ>

Image source: Jobi Gutierrez

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Boehringer
Ingelheim



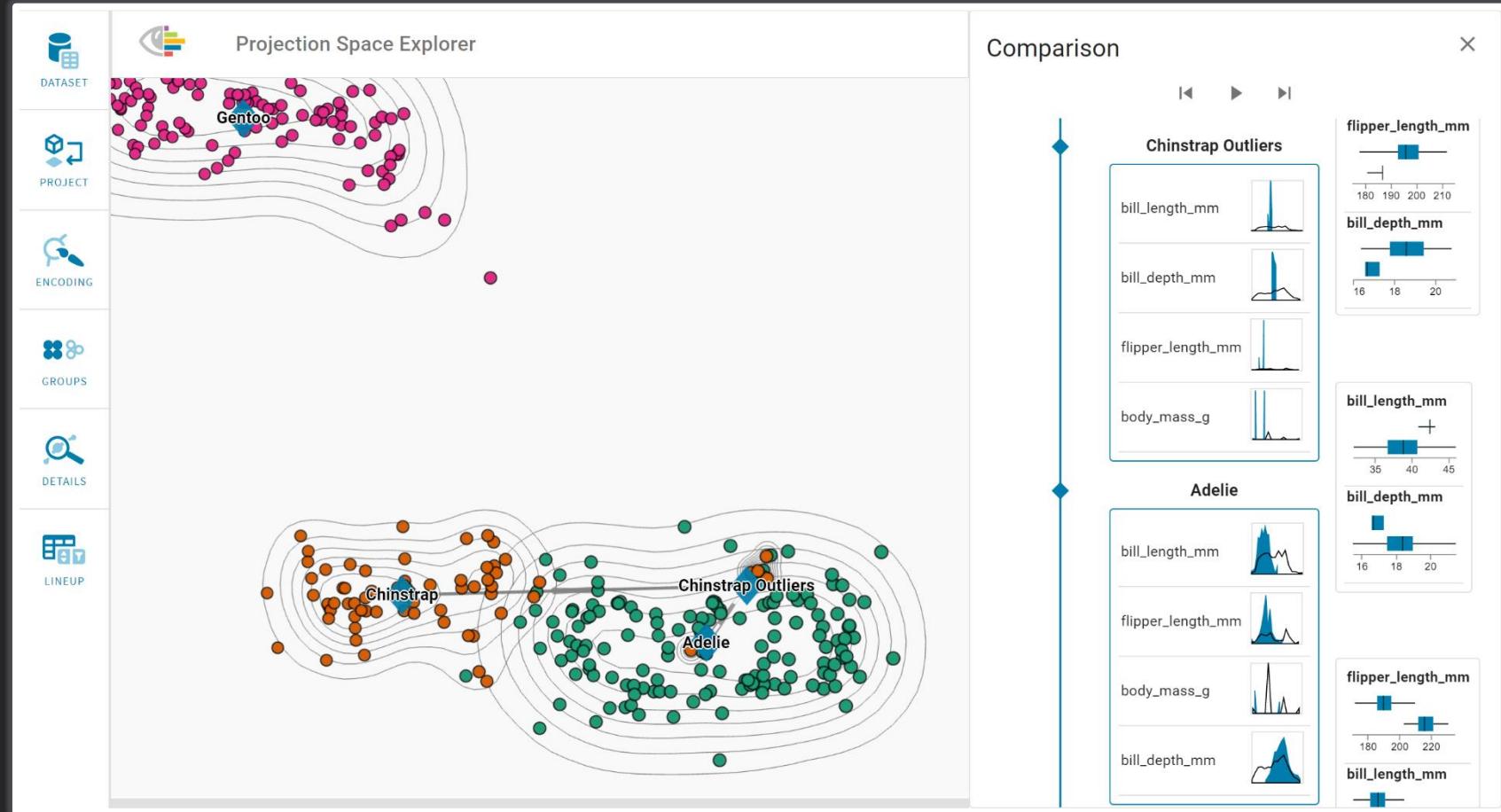
Pro²Future



FFG

Der Wissenschaftsfonds.

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<https://jku-vds-lab.at/vis22-eckelt>

Klaus Eckelt

 klaus.eckelt@jku.at
 [@klaus_lml](https://twitter.com/klaus_lml)



