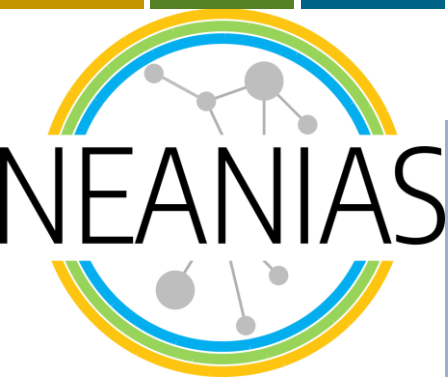


NEANIAS space webinar series:
Latent Space Explorer

Unsupervised Data Pattern Discovery on the Cloud

Giuseppe Vizzari and Thomas Cecconello
University of Milano-Bicocca



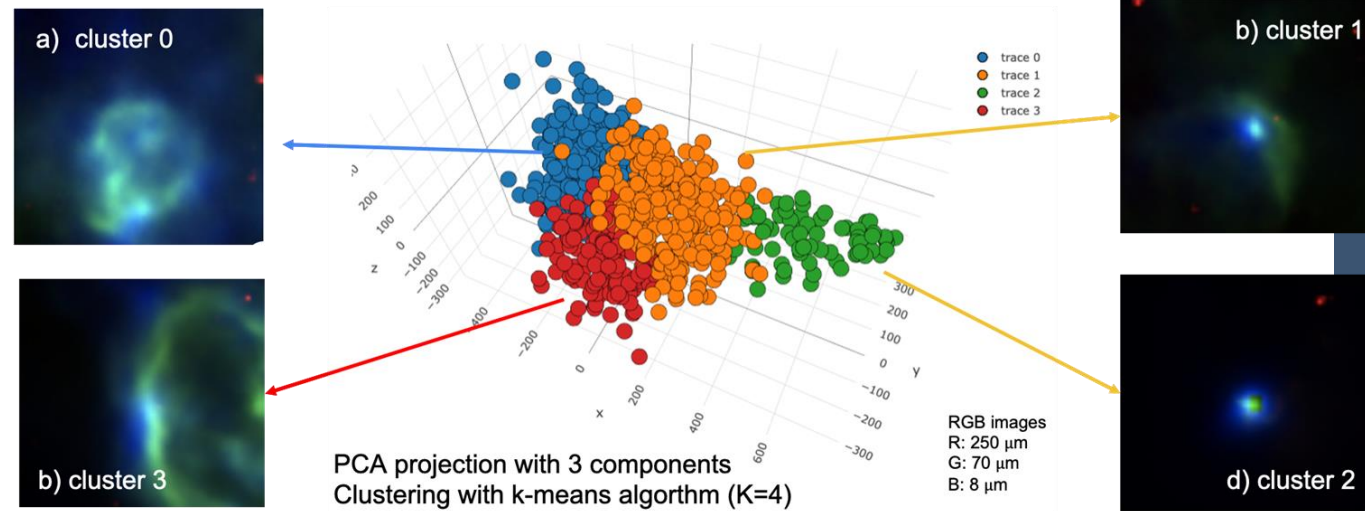
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Service goals and functionalities

- Discovery of new knowledge by analysing emerging patterns in datasets of multi-spectral images
 - Let unsupervised machine learning extract features for you
 - Present results in a visual way, in the form of a 2D or 3D latent space map
 - Leverage expert knowledge to analyse the output, interpret and analyse it to evaluate the emerging patterns and, in case, formalize new classification schemes and knowledge

- Explore the dataset through the “lenses” of the latent space
 - Find potential outliers and duplicates
 - Evaluate potential misclassifications
 - Detect pre-processing issues

- Evaluate your RL models
 - Find bias(es)
 - Perform feature analysis



Demo



Welcome to Latent Space Explorer

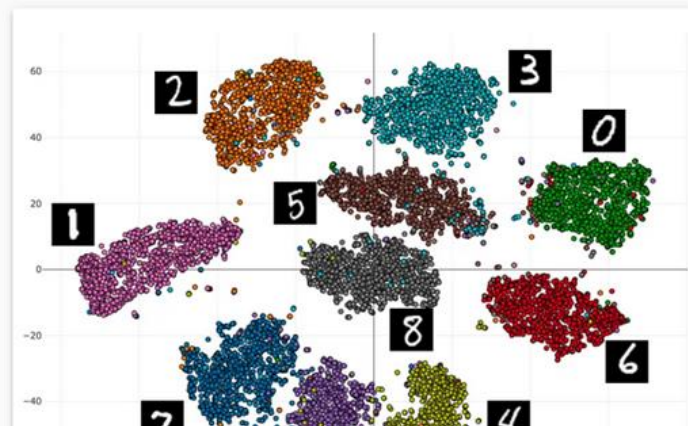
Latent Space Explorer (LSE) support analysis of image datasets via unsupervised machine learning methods. It allows to extract a compact representation from data by representation learning models (e.g. autoencoders). The information extracted can be then visualized using the projector. The latter allows visualizing the data in a 2D or 3D space in an interactive fashion. The system then allows performing clustering algorithms to detect potentially relevant ways to group data and to support the definition of novel classification schemes.

You could find an overview of the service in the [intro video](#)

In order to use the tool please follow the [documentation](#)

If you want to play with the projector on some demo experiments you will find those on your experiment page

[GO TO EXPERIMENTS PAGE](#)



MNIST

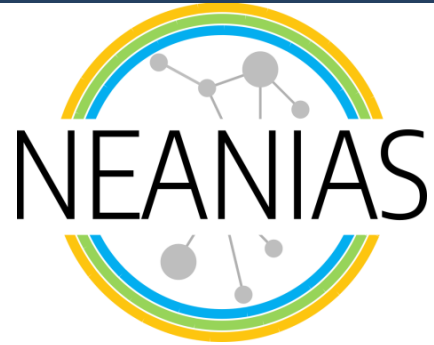
MNIST is a classic dataset for image classification. It consists of 28x28 grayscale images of handwritten digits. Analysing the dataset using the latent space explorer allows to have a structured overview of the content of the dataset. Clustering methods like dbscan could help to detect outliers and clean the dataset. The analysis could help to understand what the neural network learn from the data and correct hidden bias.

References:

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- Castellano, G., & Vessio, G. (2022). Understanding Art with AI: Our Research Experience. *AIxIA 2021 Discussion Papers, co-located with the the 20th International Conference of the Italian Association for Artificial Intelligence (AIxIA2021)*, CEUR Workshop Proceedings vol. 3078, pp. 92-98
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- Upcoming submission to SoftwareX journal

Resources links:

- <https://lse.neanias.eu>
- <https://gitlab.neanias.eu/s3-service/latent-space-explorer/generator>



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Questions?

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