Post-Regularization

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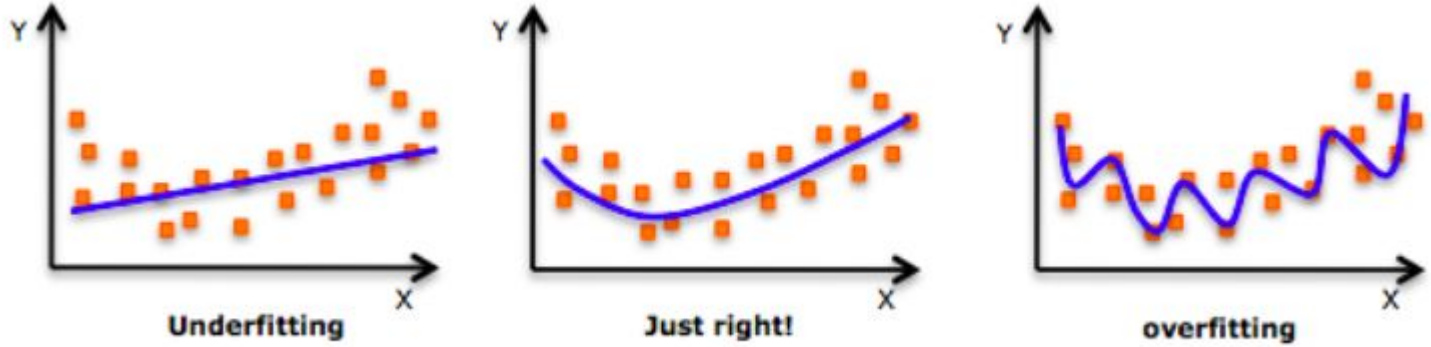
Supervisor: Dr. Sadeghi

Regularization



Regularization techniques

Explicit methods:

- L1 & L2 regularization

Implicit methods:

- Ensembling
- Data augmentation and synthesis
- Early stopping
- Dropout
- Batchnorm
- Constraints on the model (E.g, CNNs)
- ...

Why post-regularization

- To fix an over-fit model without retraining from scratch
- To speed up hyperparameter finding
- To easily change regularization intensity according to our needs
- To take another step towards general AI !

Types of post-regularization

- Modified training (Model dependent)
  - Controlling the regularization parameter in inference
- Regular training
  - Starting the regularization process after some iterations (Model dependent)
  - Model agnostic post-training regularization
  - Post-training manipulation of the model (Model dependent)

Some have done it...

A hand-full of Post-Regularization inspired works exist in various fields:

- Imposing orthogonality
- Using ensemble models
- Continual Learning
- Curriculum learning
- Self-distillation
- Robustness techniques
- Dropout
- Pruning
- Quantization
- Optimization methods
- Test-time augmentations
- ...

However, most of them do not have my perspective...

Obtaining Adjustable Regularization for Free via Iterate Averaging

Search... Expand

Origin paper

Obtaining Adjustable Regularization for Free via Iterate Averaging

Jingfeng Wu, Vladimir Braverman, Lin F. Yang 2020

Which Algorithmic Choices Matter at Which Batch Sizes? Insights From a Noisy Quadratic...

Guodong Zhang, Lala Li, Zachary Nado, James... 2019

An Empirical Study of Large-Batch Stochastic Gradient Descent with Structured Covariance...

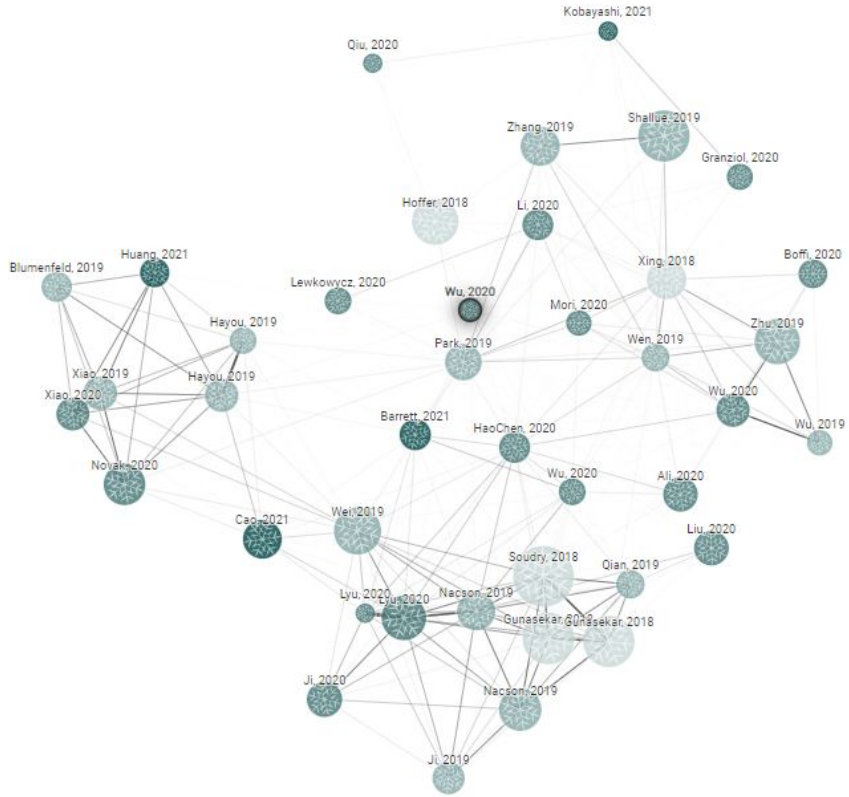
Yeming Wen, Kevin Luk, M. Gazeau, Guodong... 2019

Mean-field Behaviour of Neural Tangent Kernel for Deep Neural Networks

Soufiane Hayou, A. Doucet, J. Rousseau 2019

Lexicographic and Depth-Sensitive Margins in Homogeneous and Non-Homogeneous Deep...

Mor Shpigel Nacson, Suriya Gunasekar, J. Lee,... 2019



Snow On

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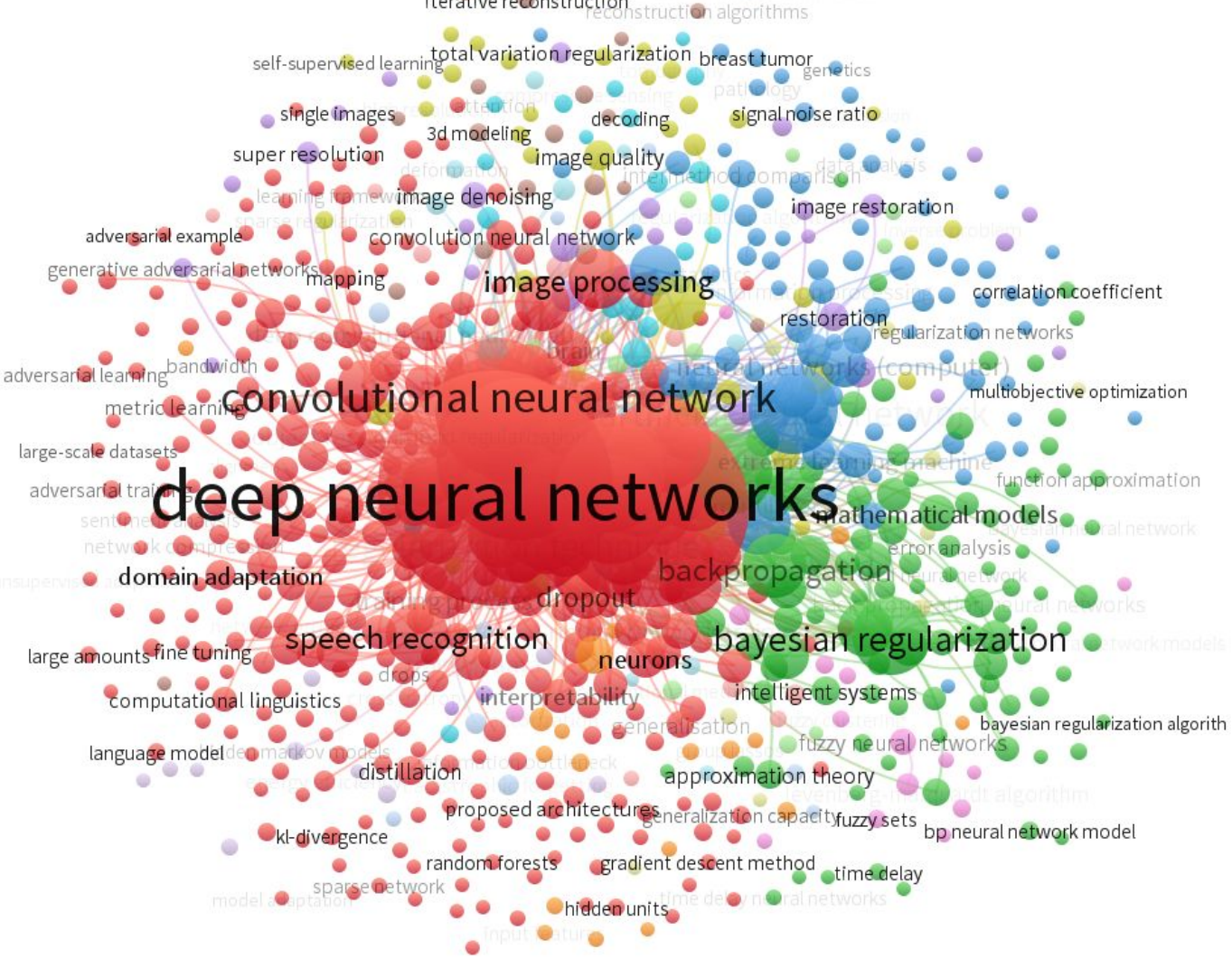
First Search (scopus)

8,543 document results

(TITLE-ABS-KEY ({Regularization}) AND TITLE-ABS-KEY ({machine learning} OR "neural networks" OR "deep neural networks"))


deep neural networks
convolutional neural network
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backpropagation
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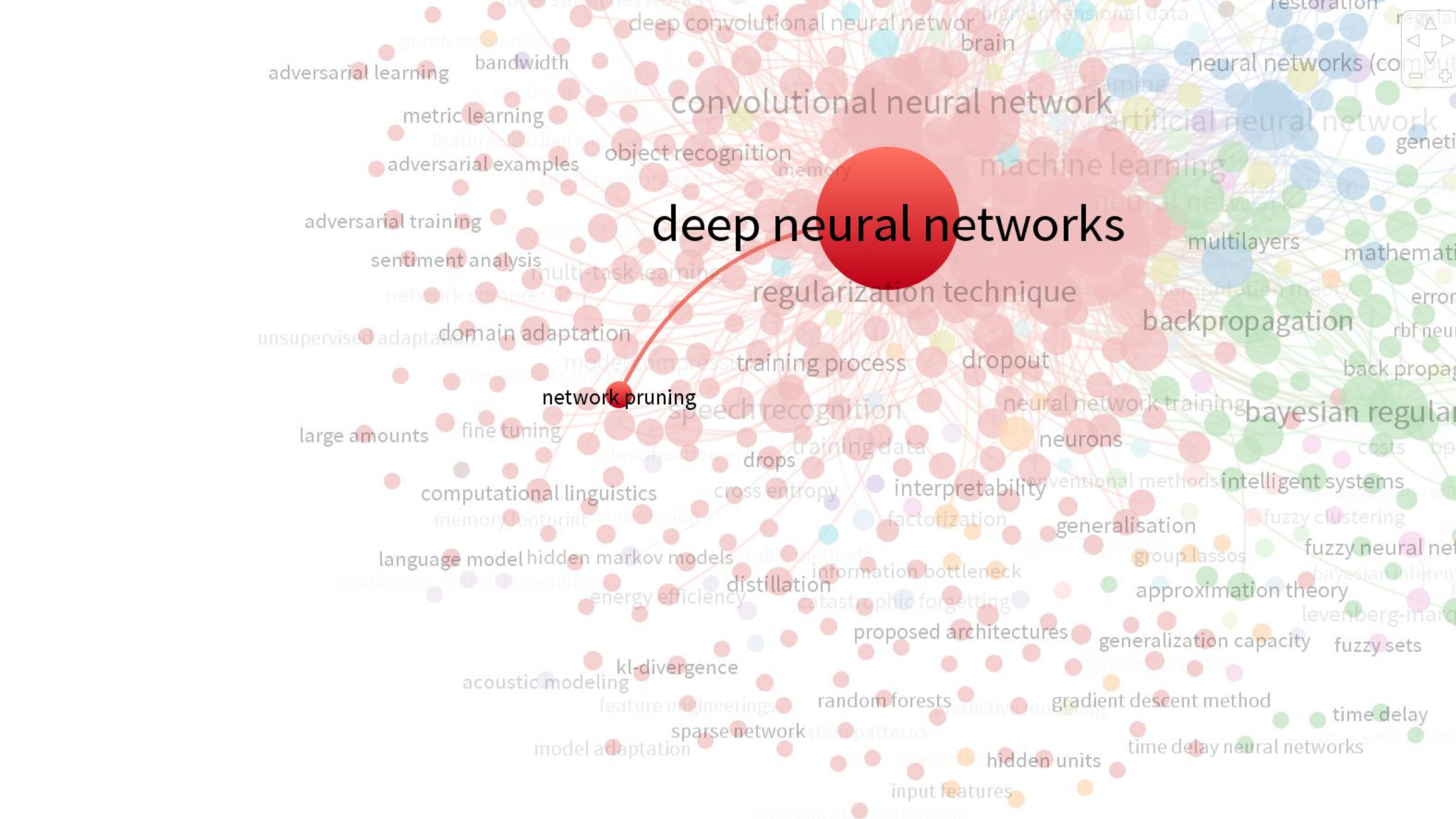
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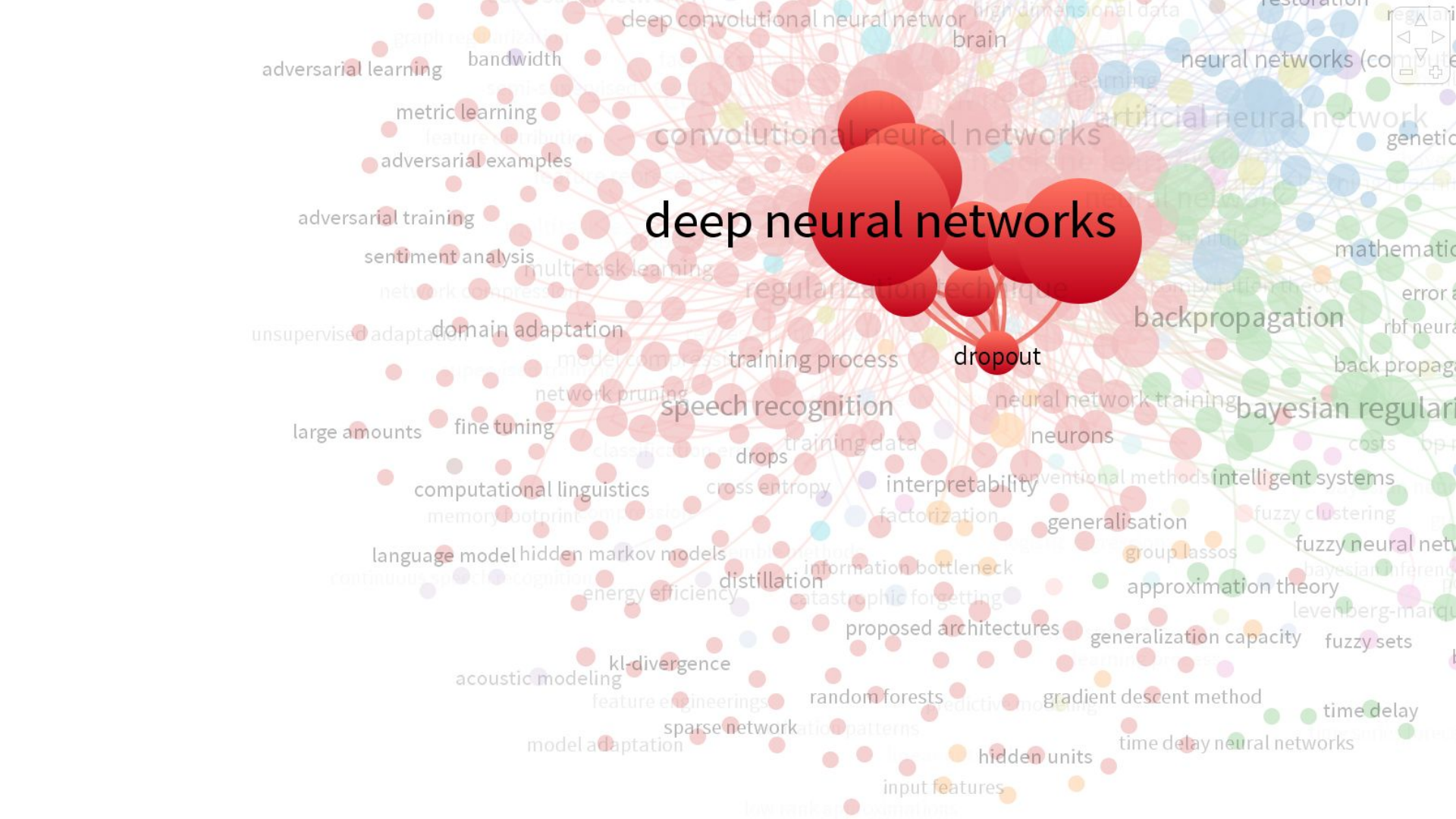
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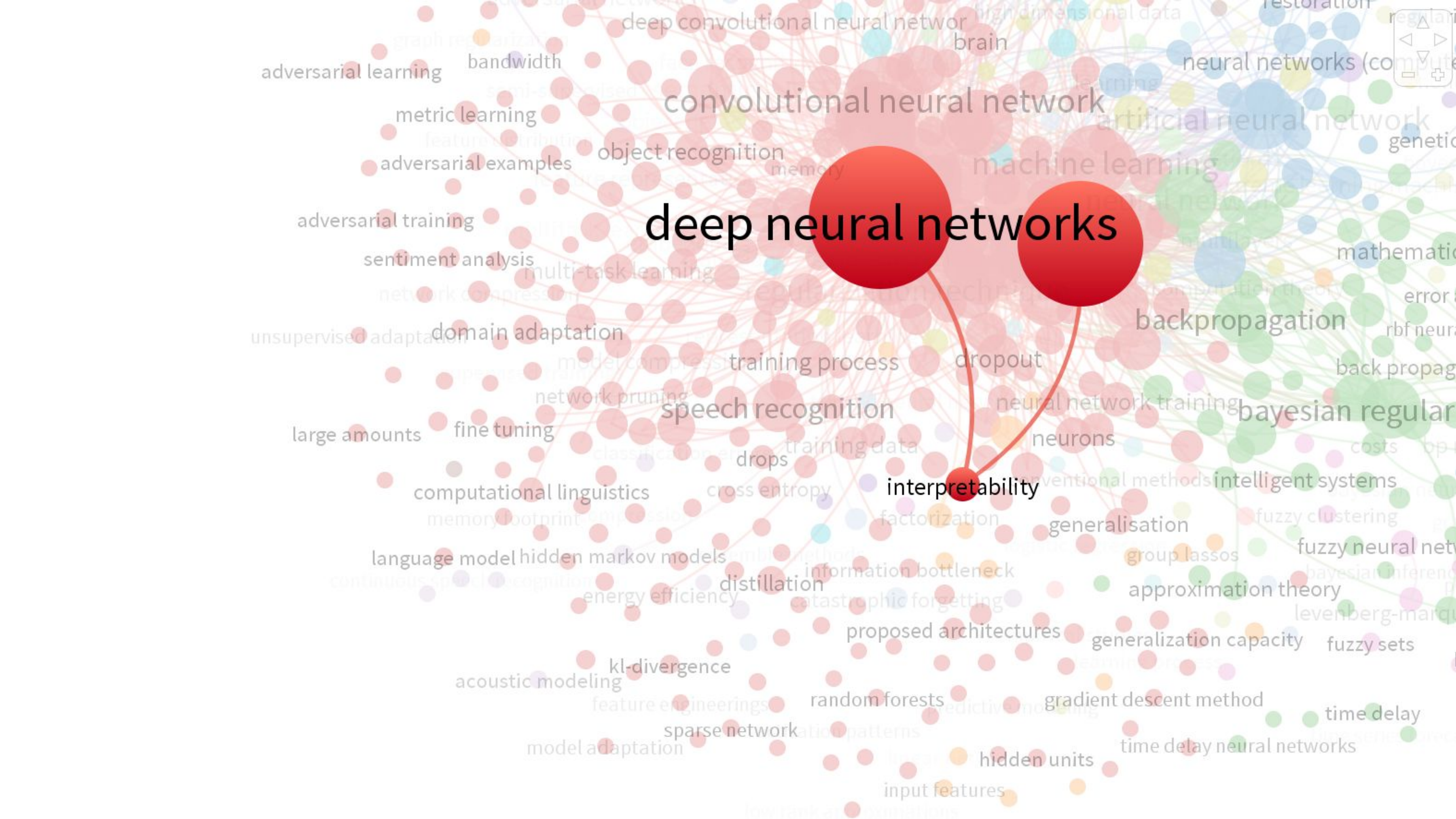
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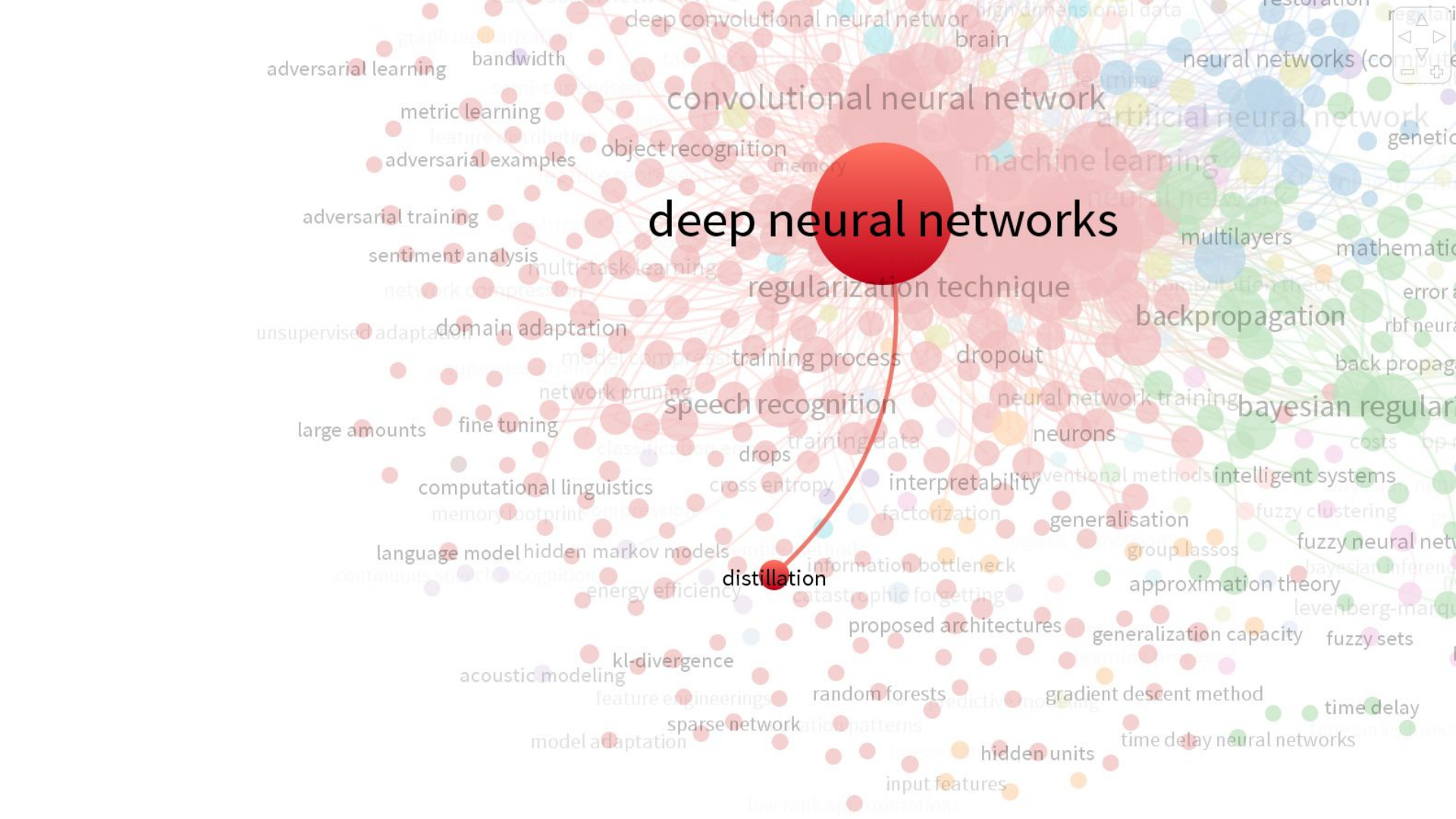
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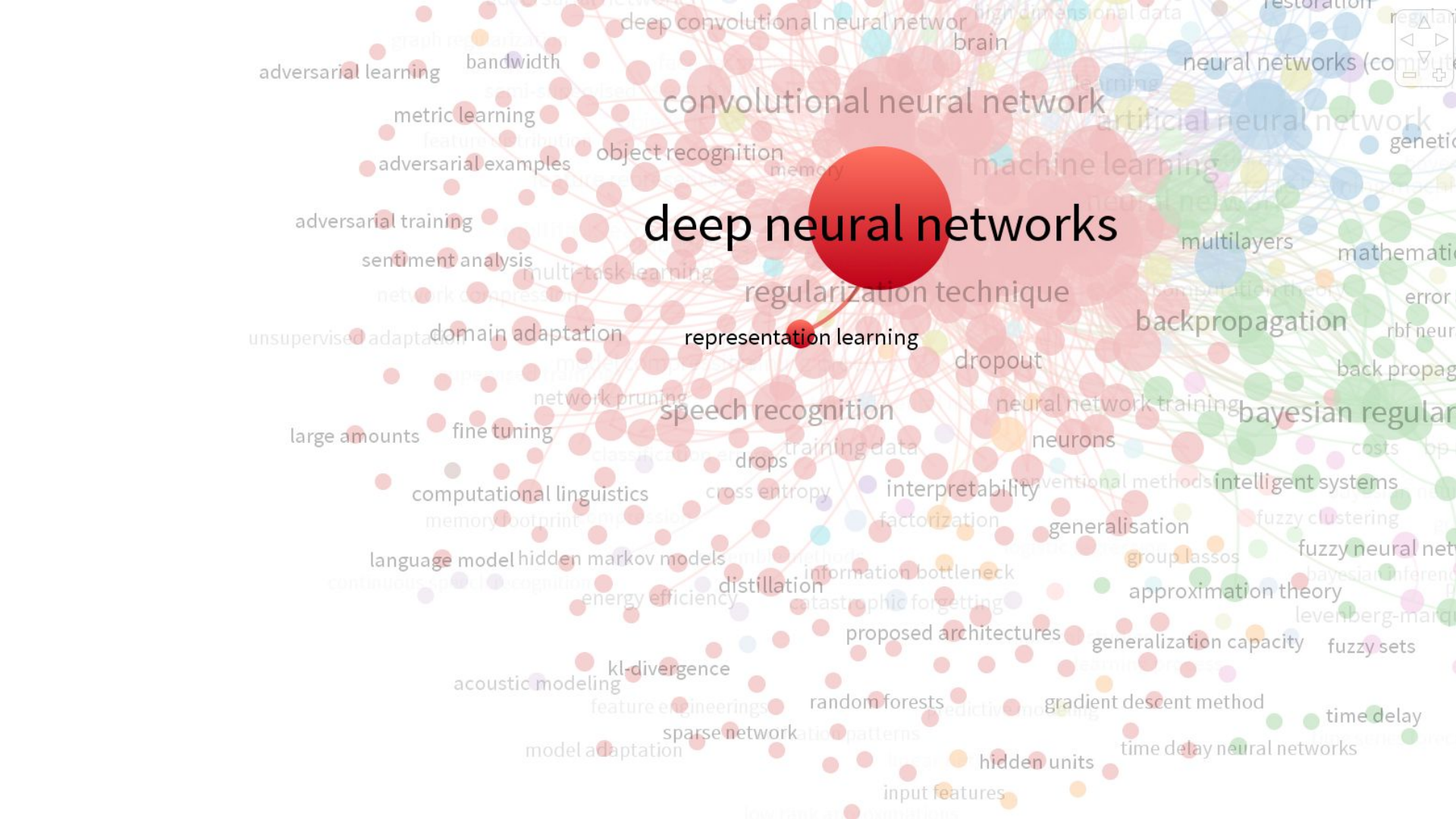
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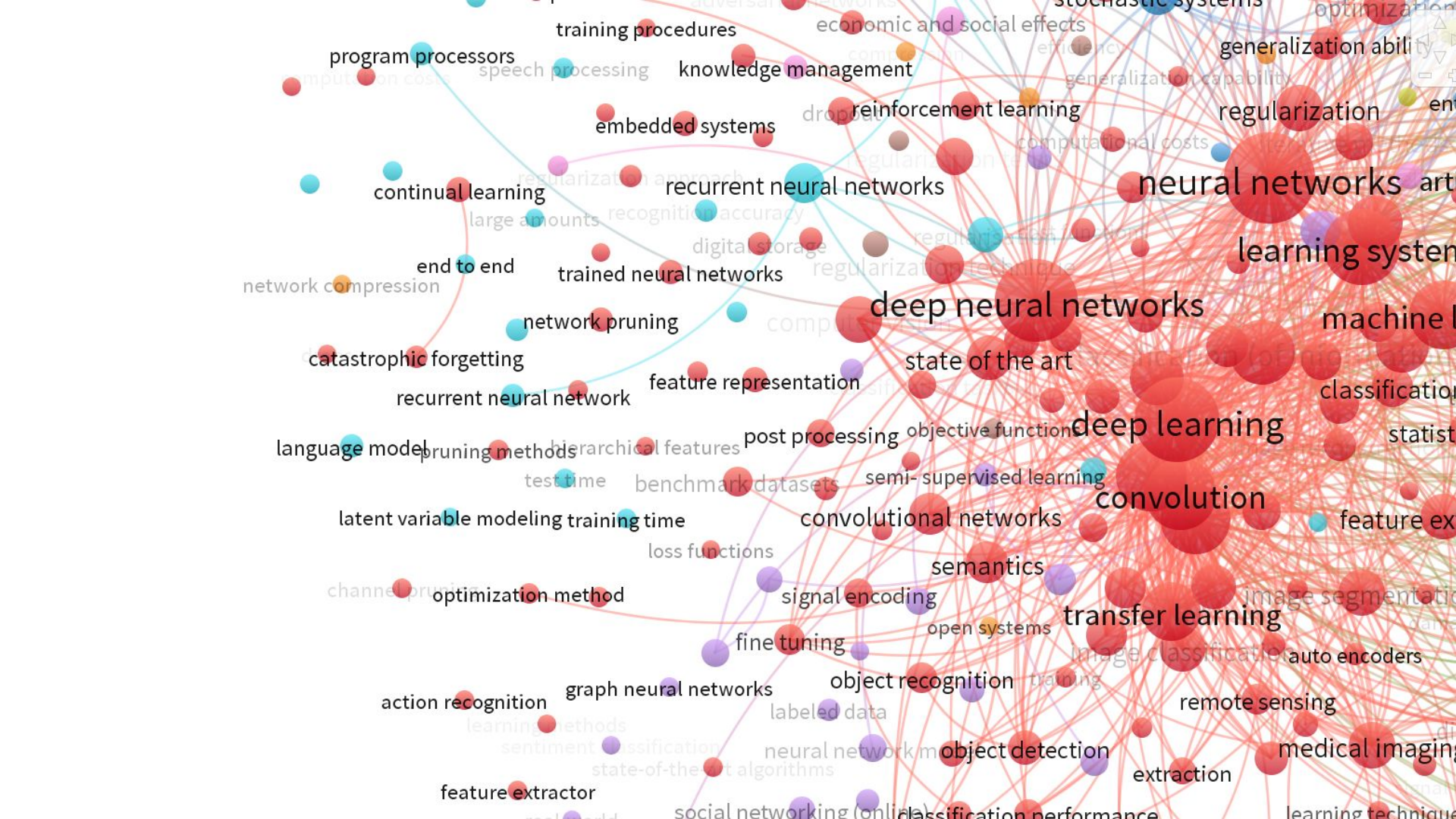
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objective function
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benchmark datasets
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training time
convolutional networks
feature ex
loss functions
semantics
optimization method
signal encoding
image segmentation
transfer learning
open systems
fine tuning
auto encoders
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graph neural networks
action recognition
remote sensing
labeled data
object detection
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feature extractor
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classification performance

Second search

2,539 document results

(TITLE-ABS-KEY (
"regularization" OR "post-regularization" OR "generalization" OR "robustness" OR "robust" OR "adversarial" OR "iterate averaging" OR "slimming" OR "augmentation" OR "pruning" OR "quantization" OR "compression" OR "dropout" OR "distillation" OR "orthogonal" OR {double descent} OR "grokking" OR "curriculum" OR {continual learning} OR {catastrophic forgetting} OR "overfit" OR "over-fit")

AND TITLE-ABS-KEY (
"machine learning" OR "neural networks" OR "deep neural networks")

AND TITLE-ABS-KEY (
"post-training" OR "test-time" OR "post-learning" OR "adjustable" OR "disentangled" OR "post-processing" OR "retraining" OR "fine-tuning" OR {after training} OR {after learning}))

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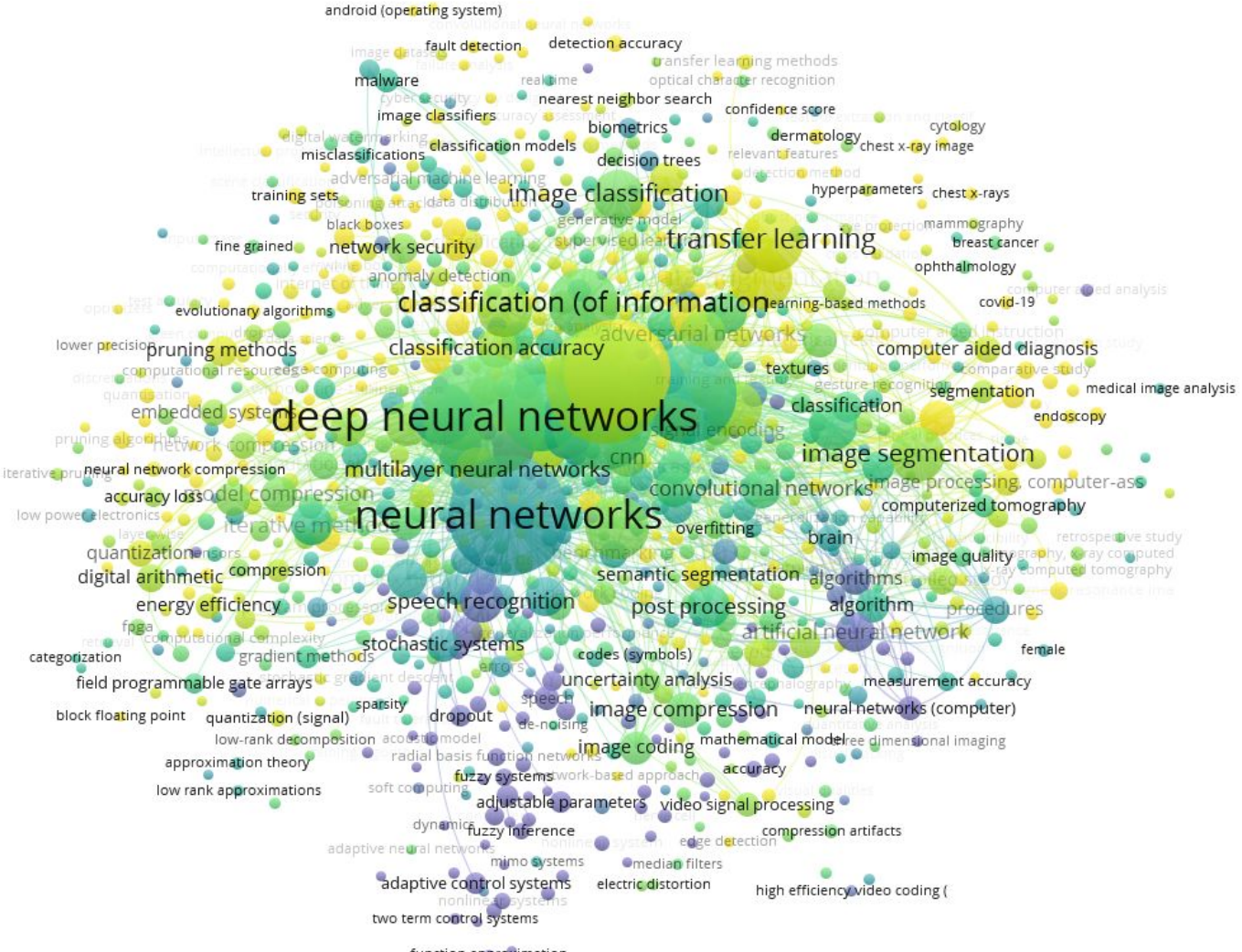
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malware
nearest neighbor search
confidence score
image classifiers
biometrics
dermatology
cytology
misclassifications
classification models
chest x-ray image
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dropout
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low-rank decomposition
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image coding
approximation theory
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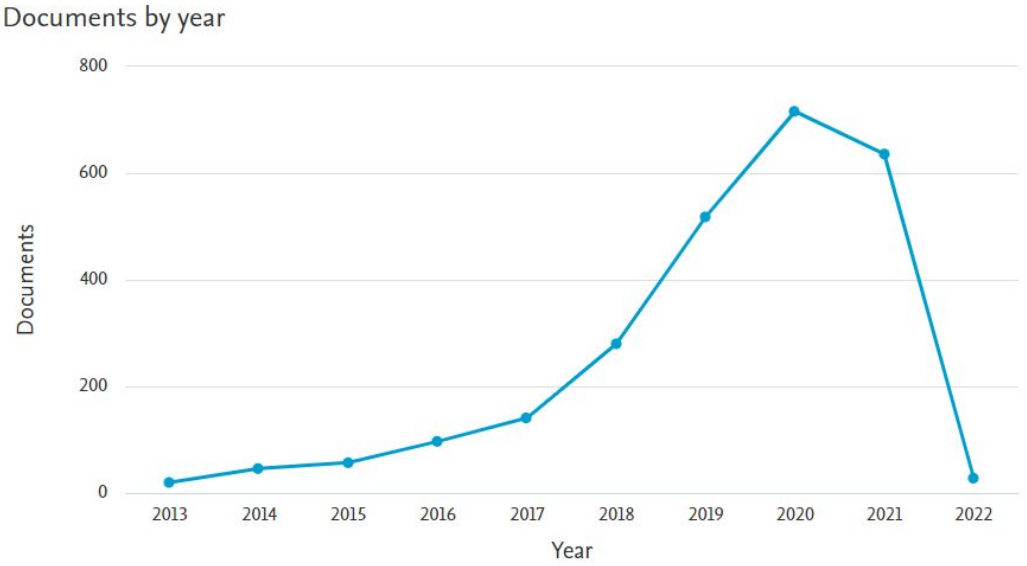
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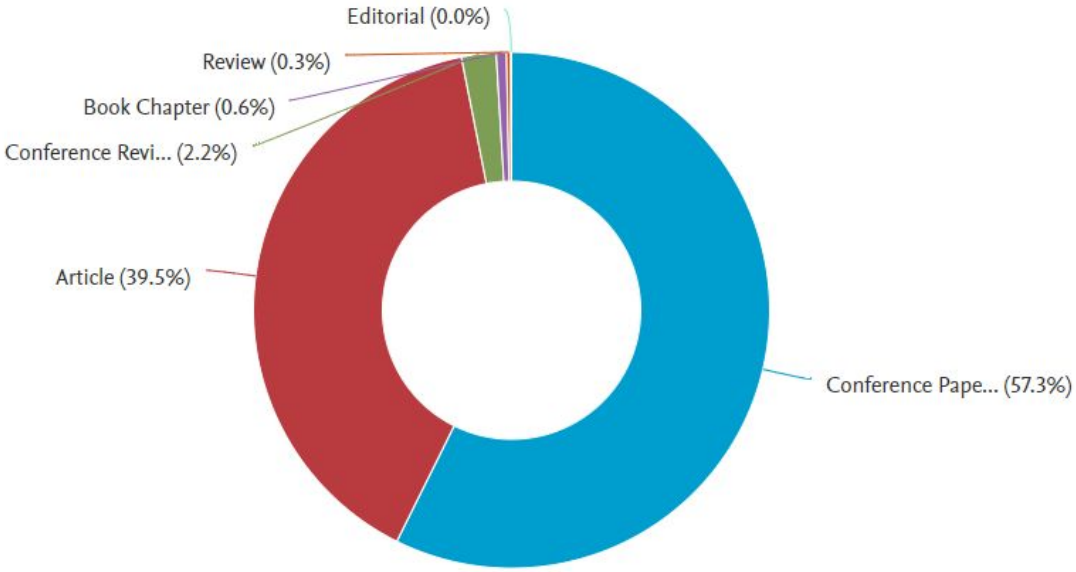
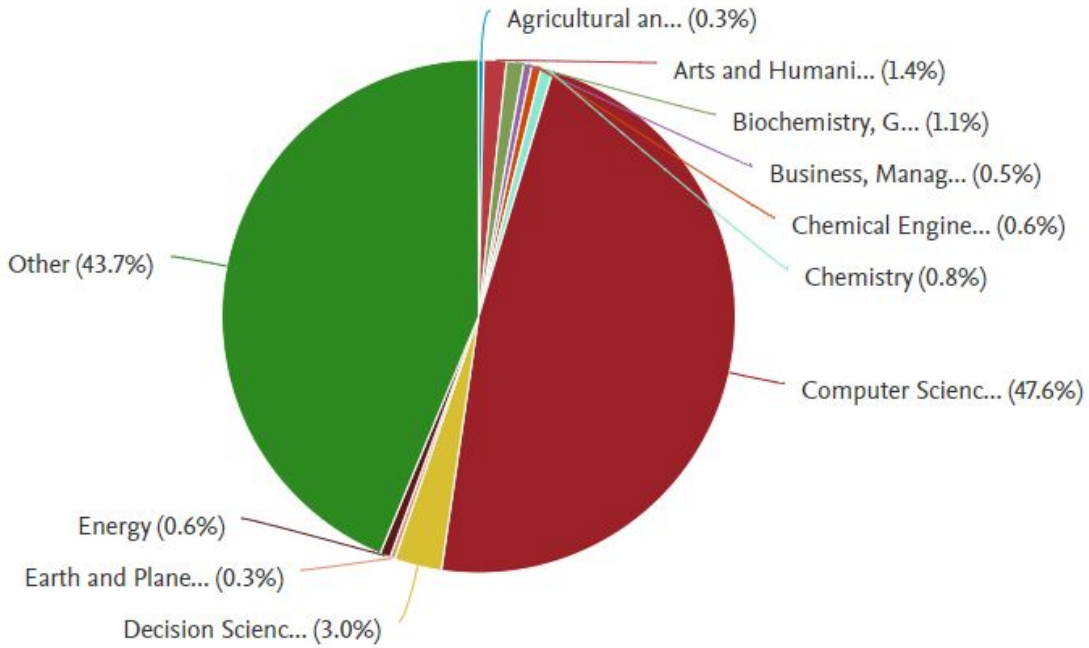
Documents by type



Documents by subject area



Documents by author

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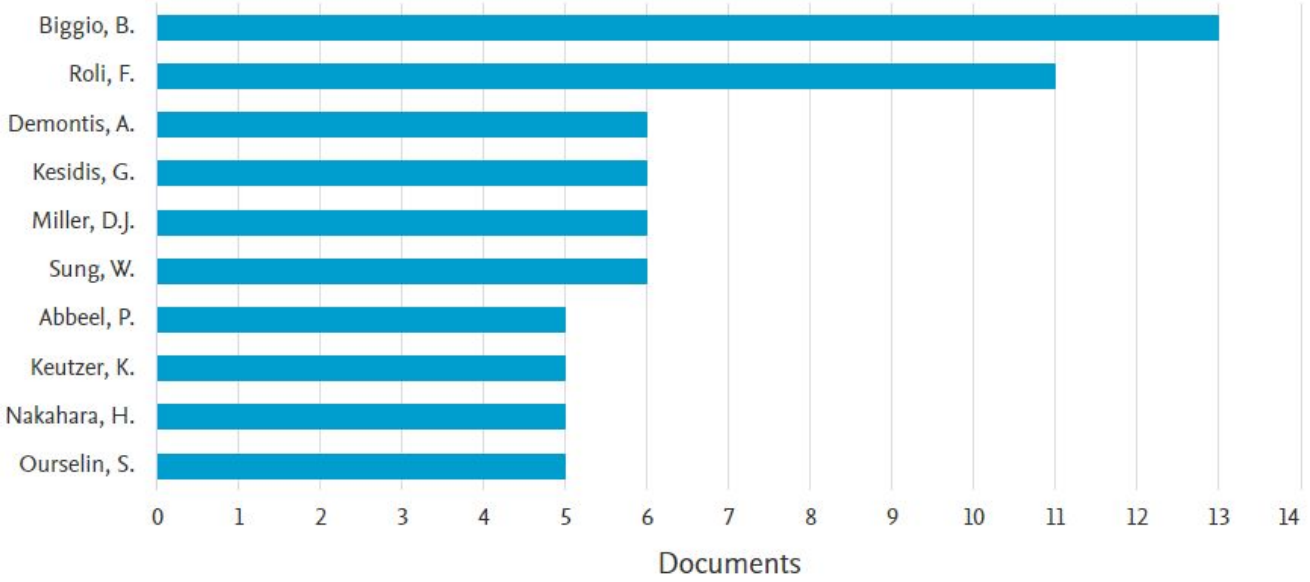

Thank you.