Data-efficient deep learning

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Research Scientist, RKR Capital
Women in Data Science Zurich 2018

Learning with limited labeled data

Data augmentation

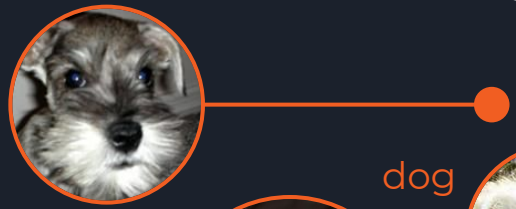
Active learning

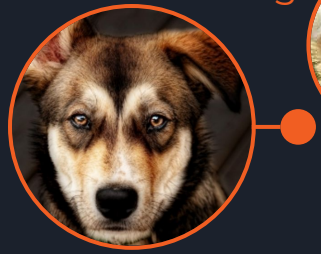
Semi-supervised learning

Transfer learning

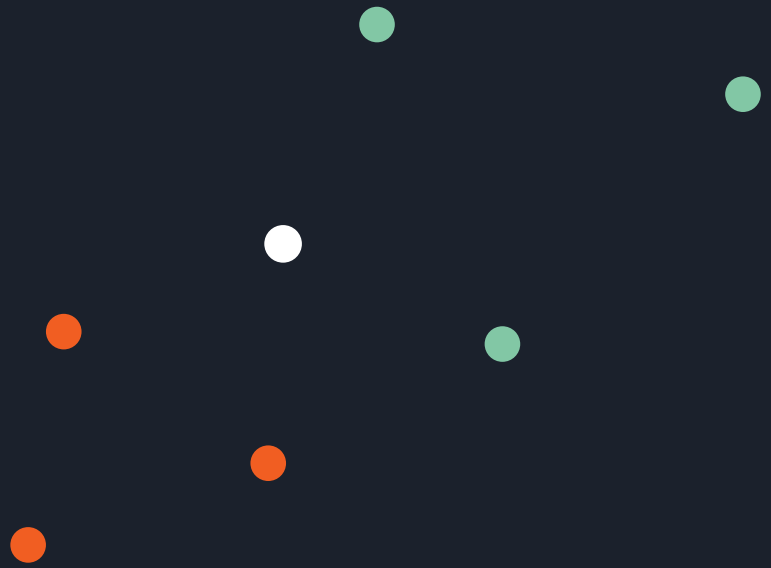
Multi-task learning

Cat or dog?

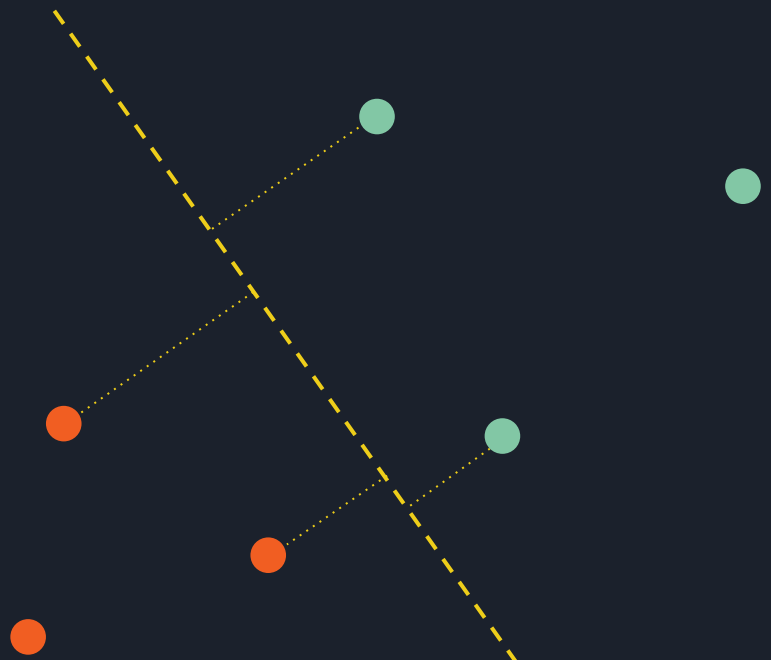




Can we label the white dot?

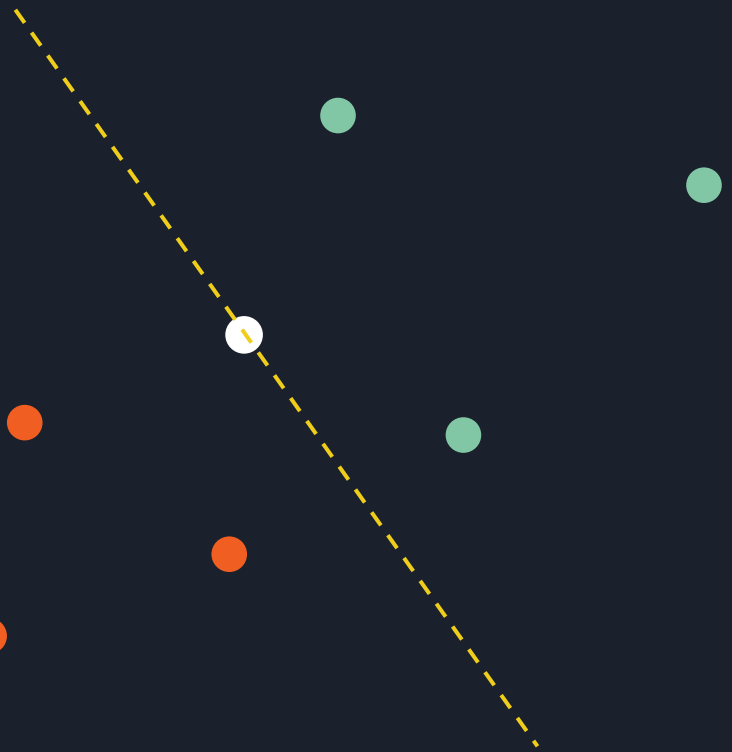


Decision boundary?

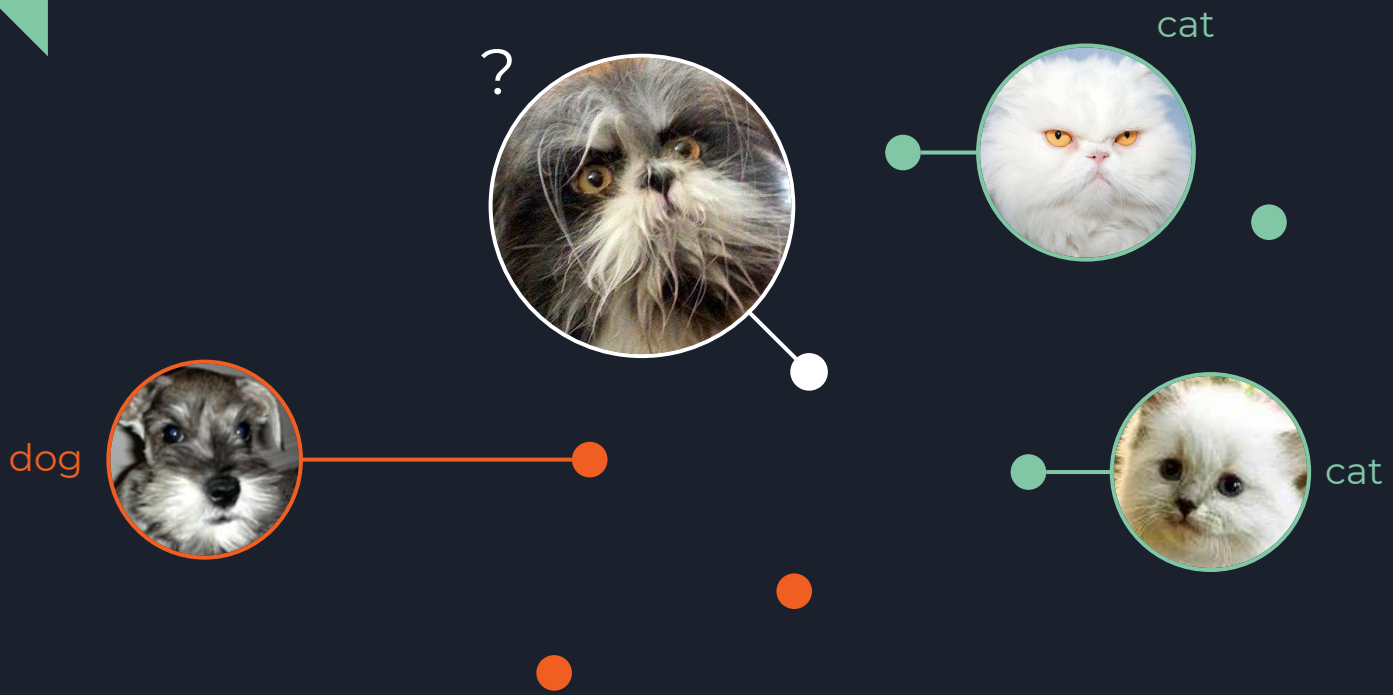


Decision boundary?

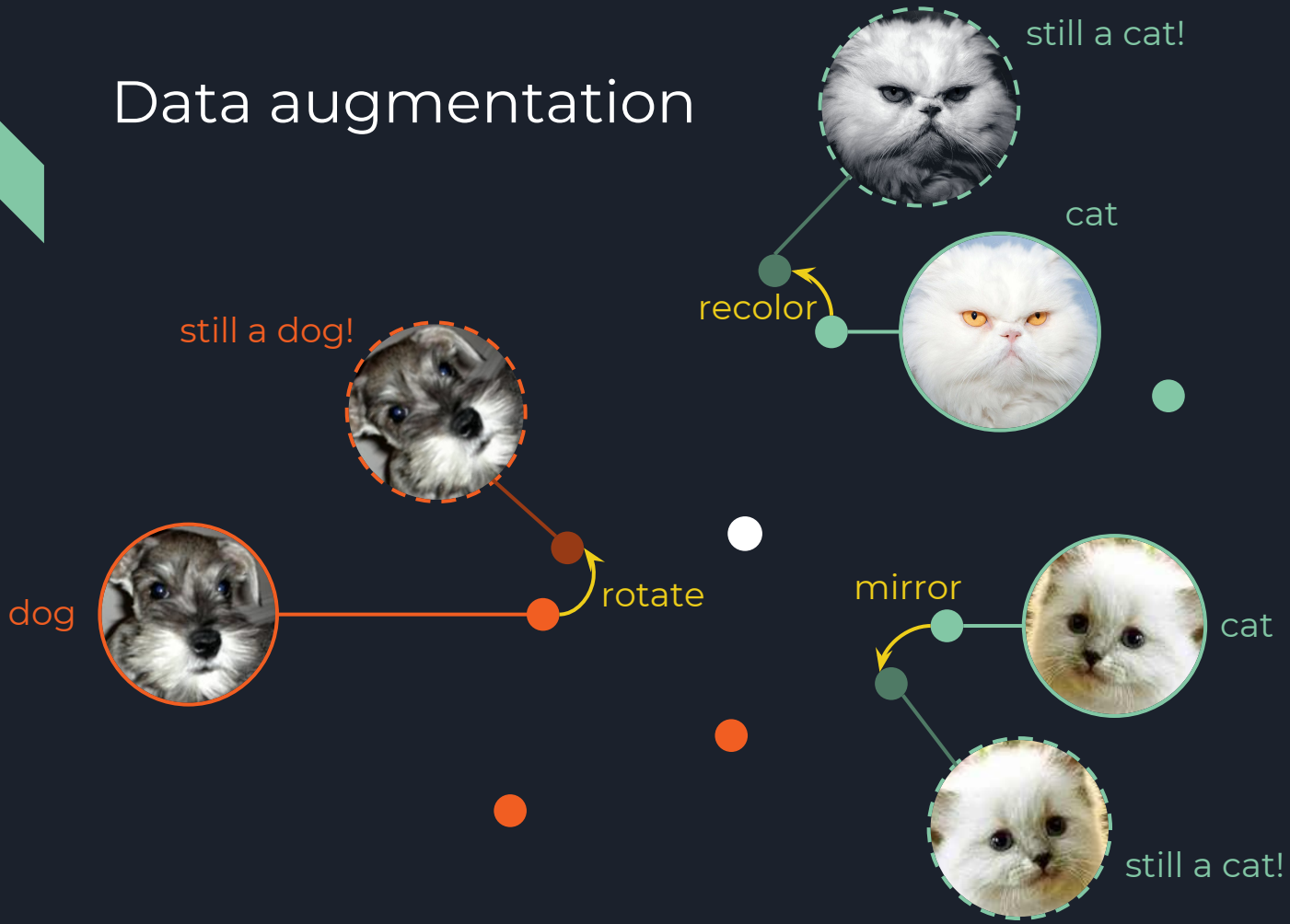
Oh no!



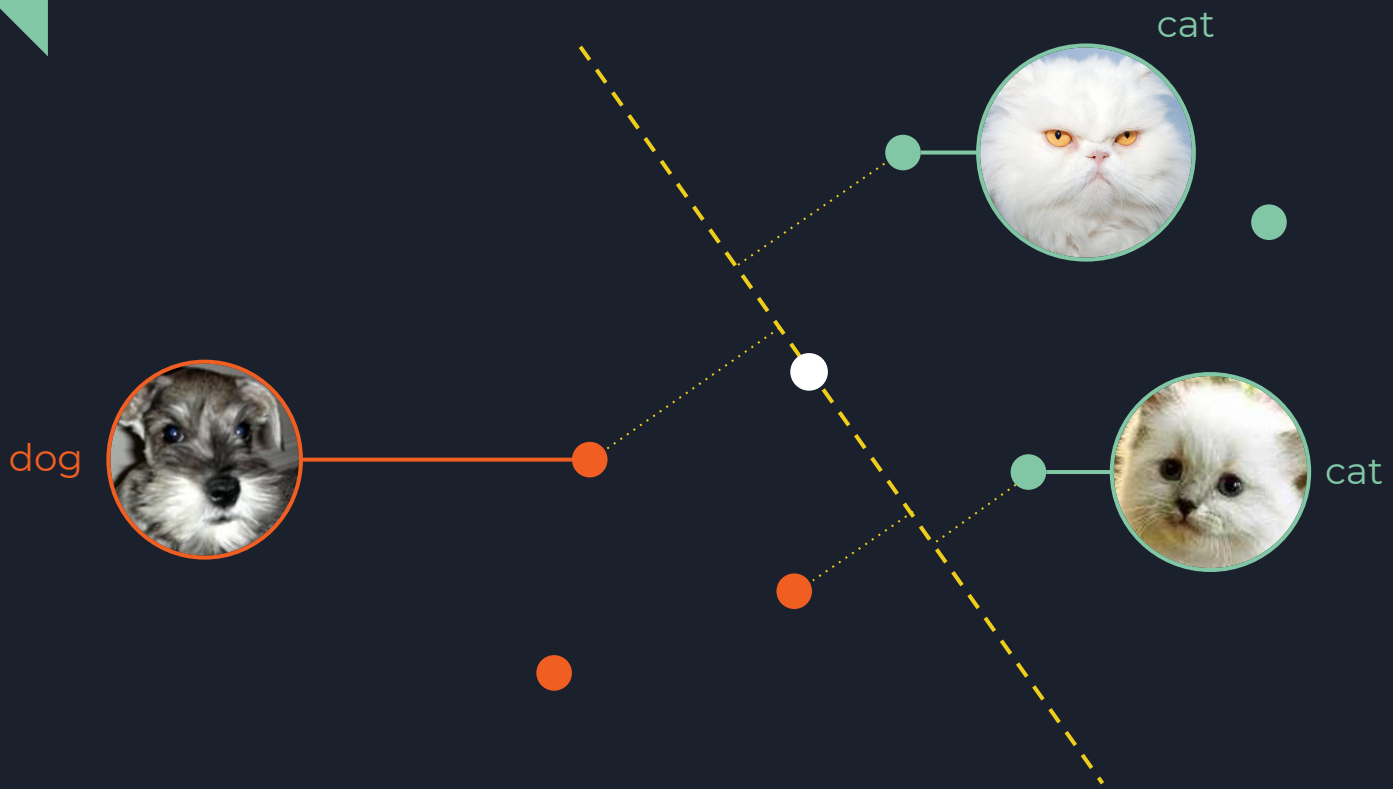
Cat or dog?



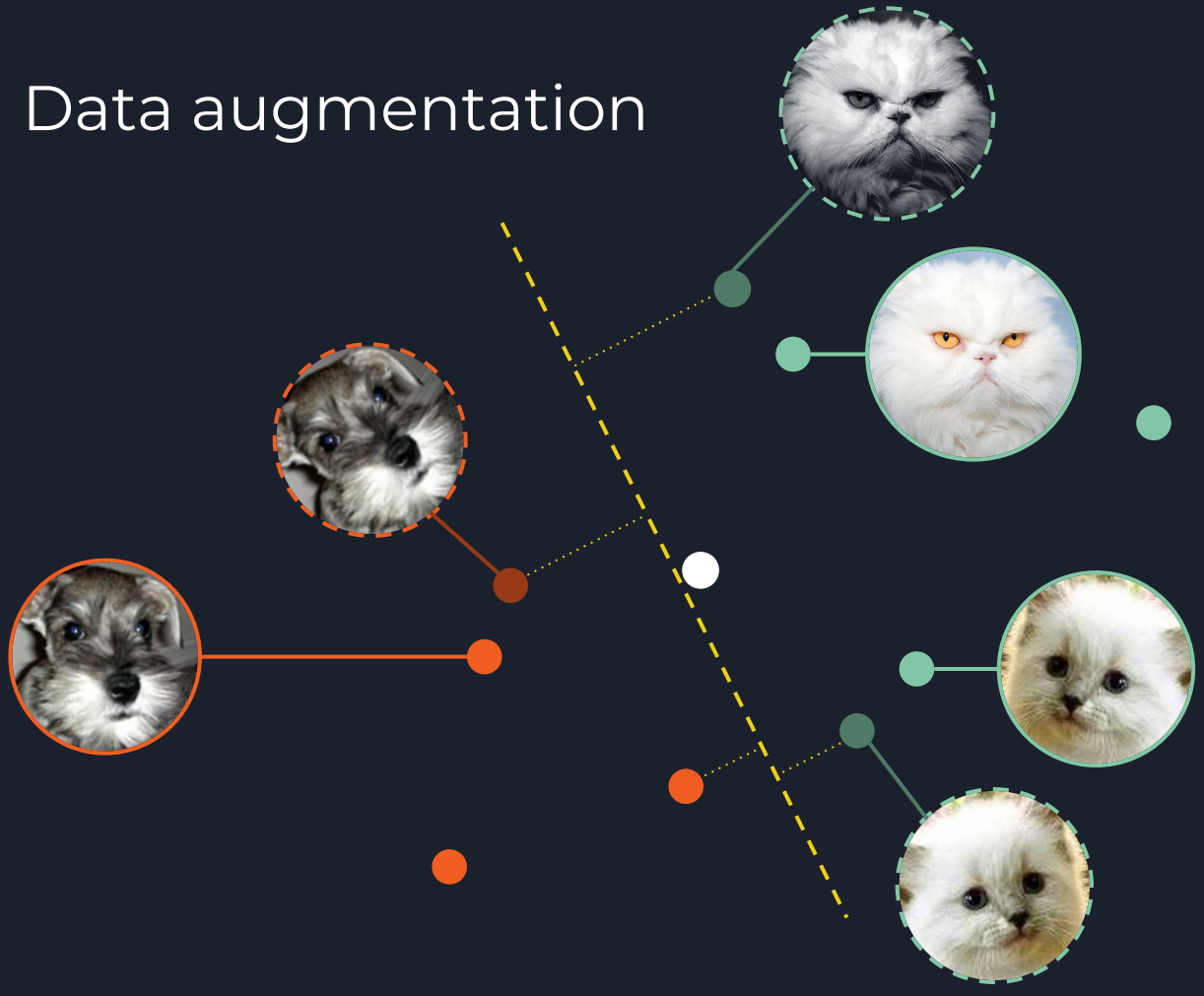
Data augmentation



Data augmentation



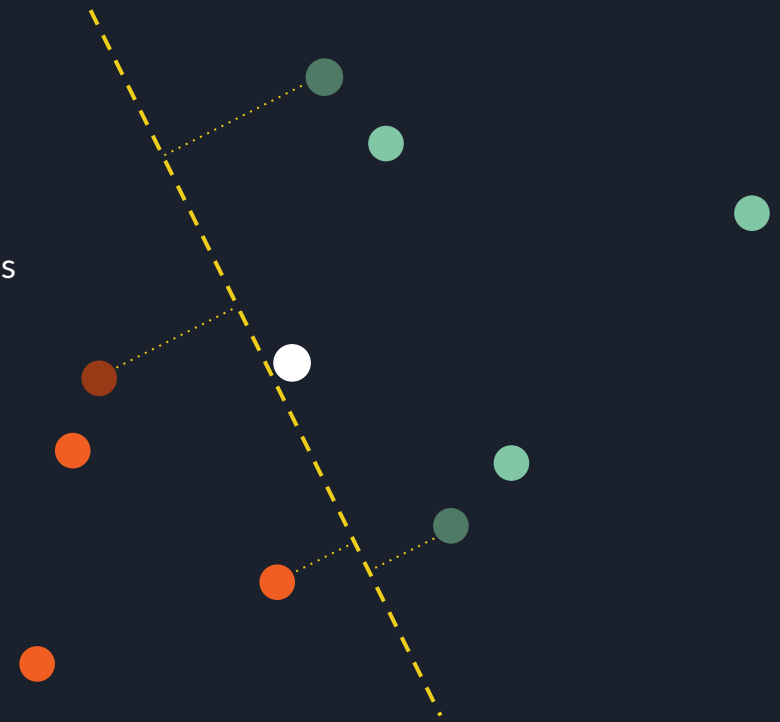
Data augmentation



Data augmentation

Need to know **meaningful** invariances!

→ Tricky for many domains



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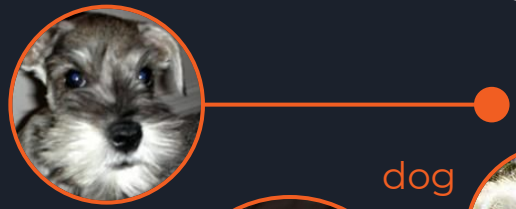
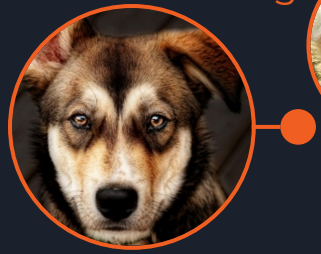
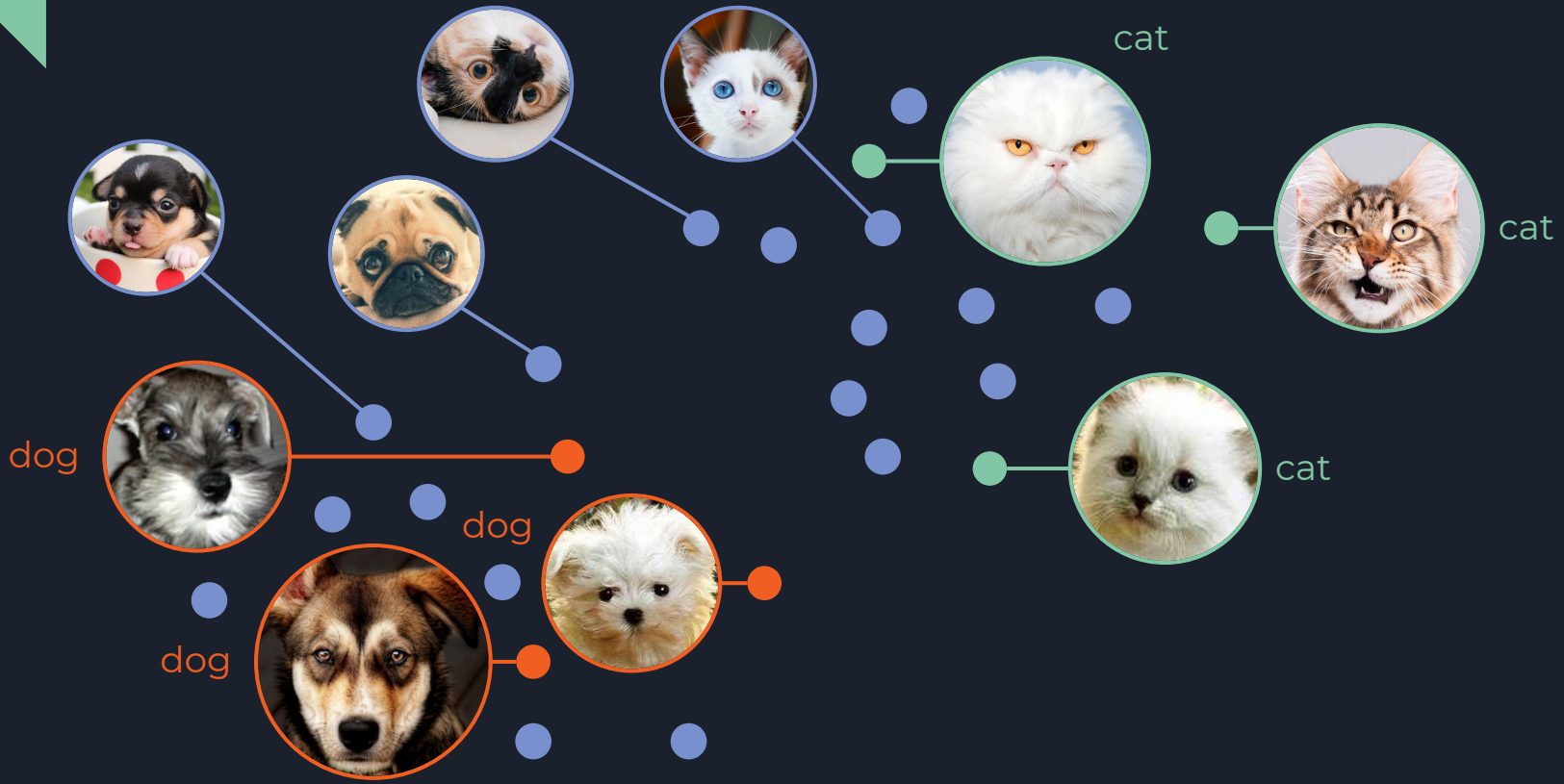
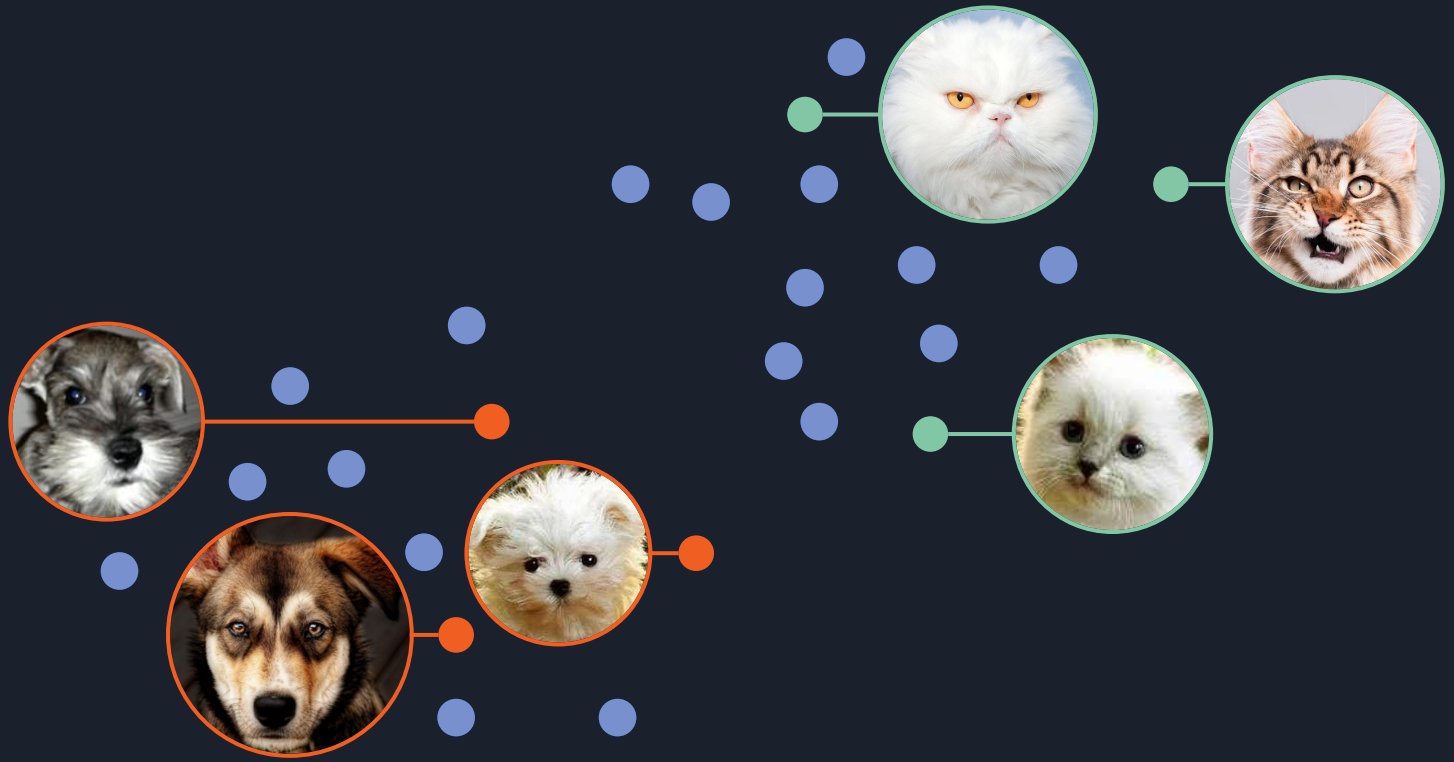




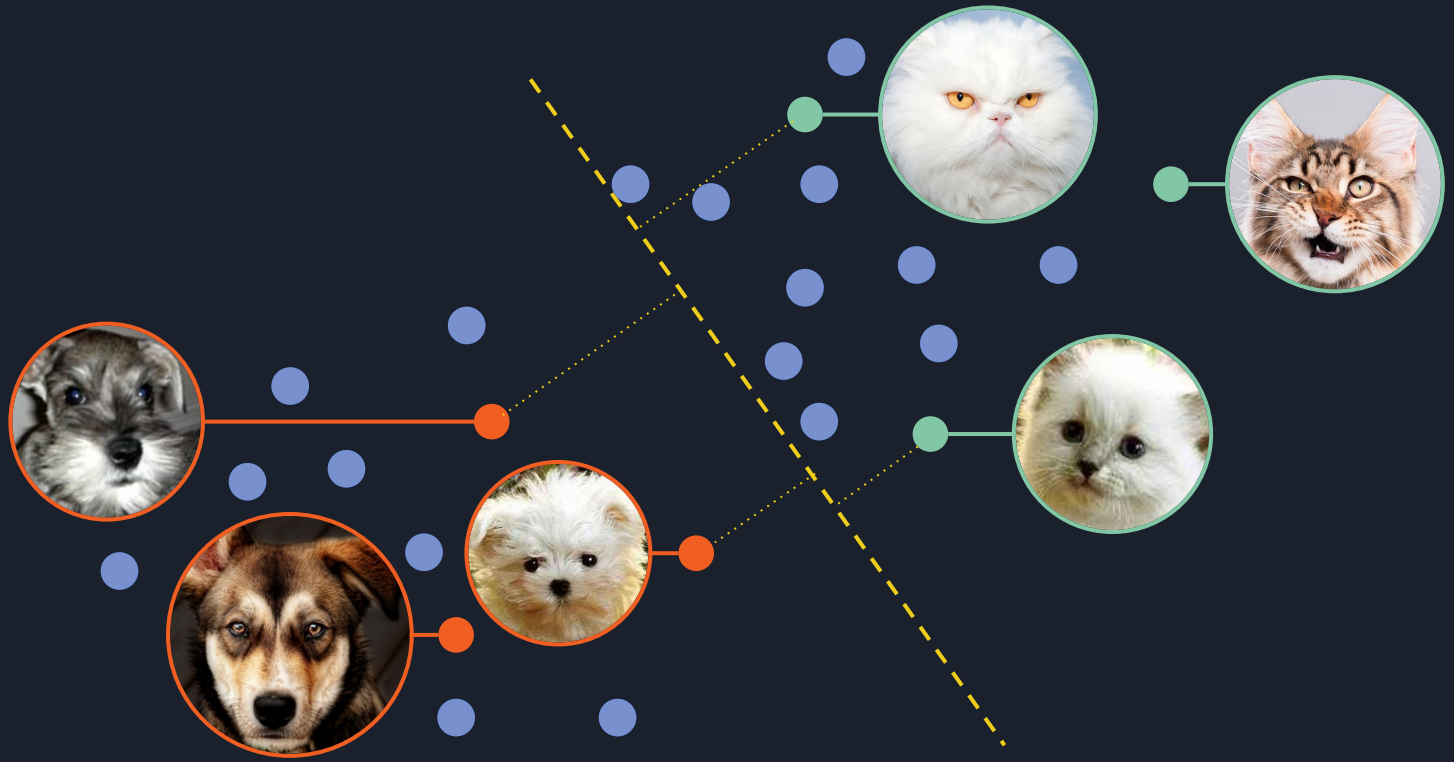
Add unlabeled examples



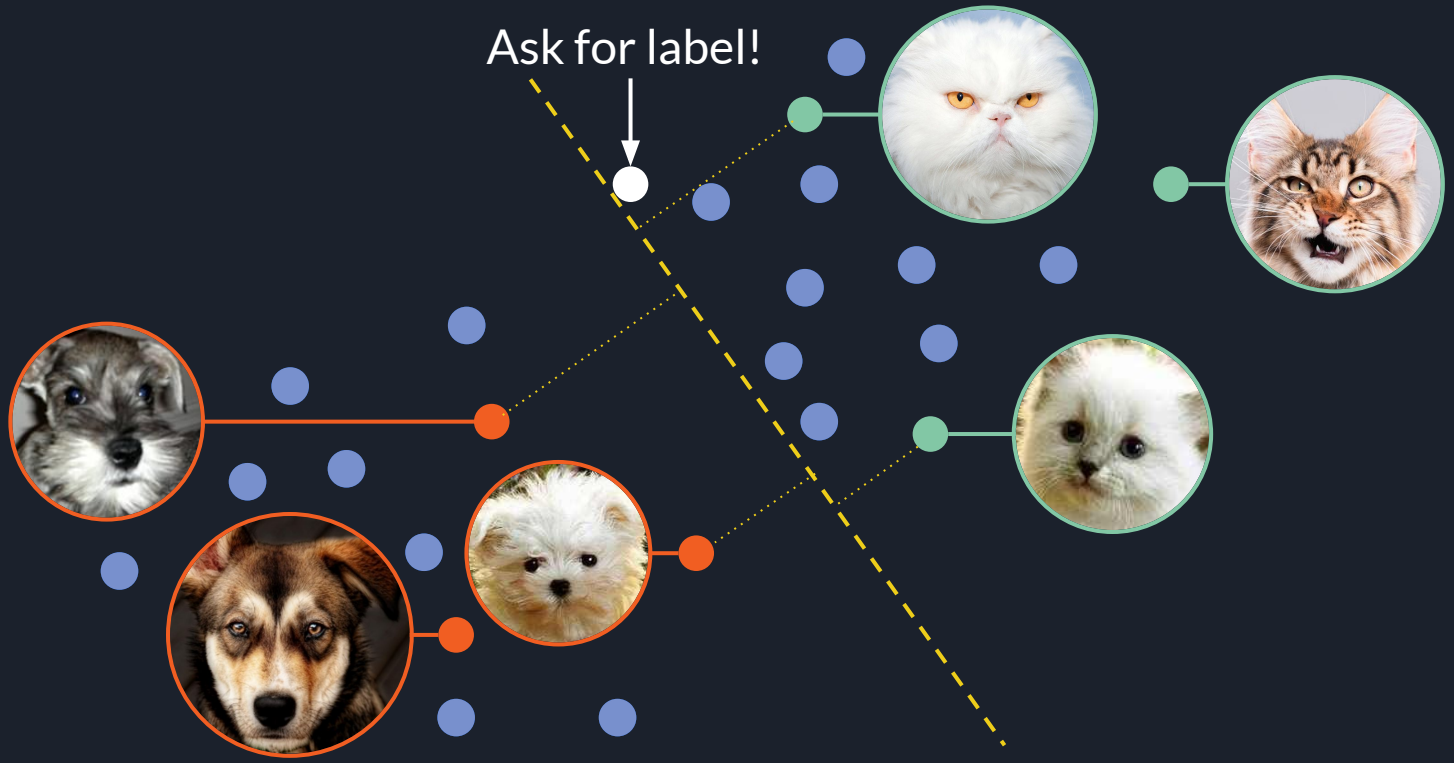
Active learning



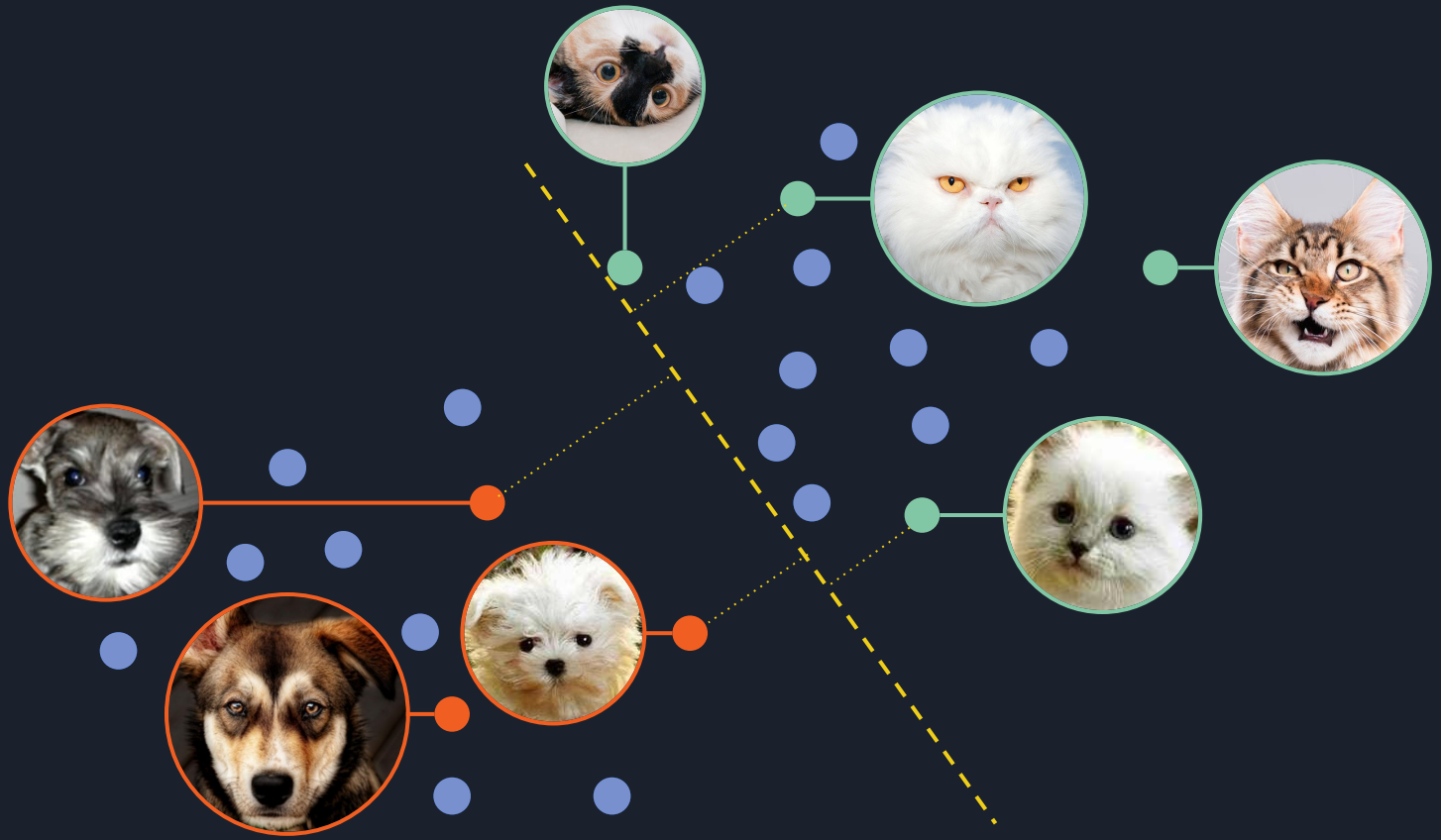
Active learning



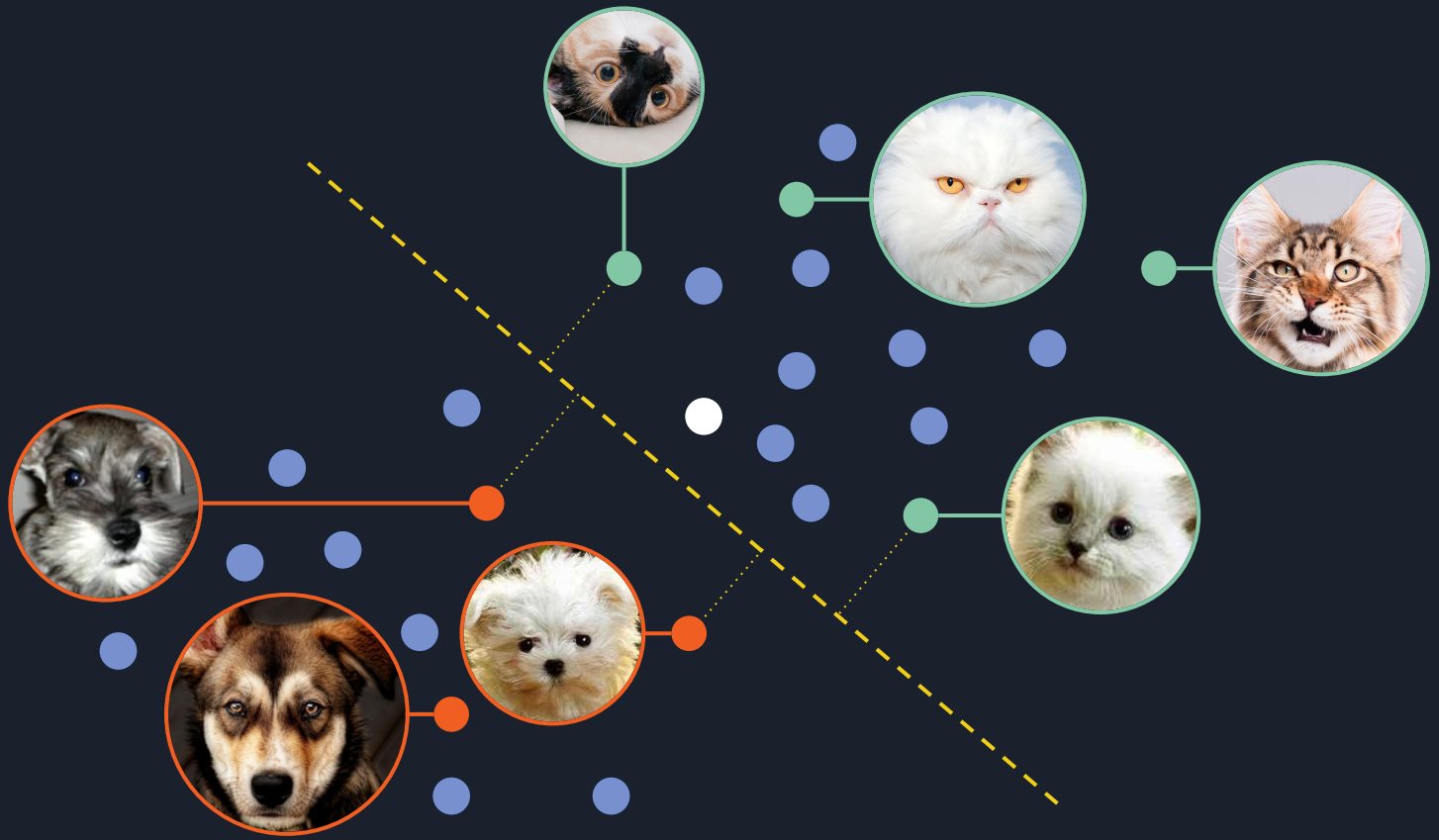
Active learning



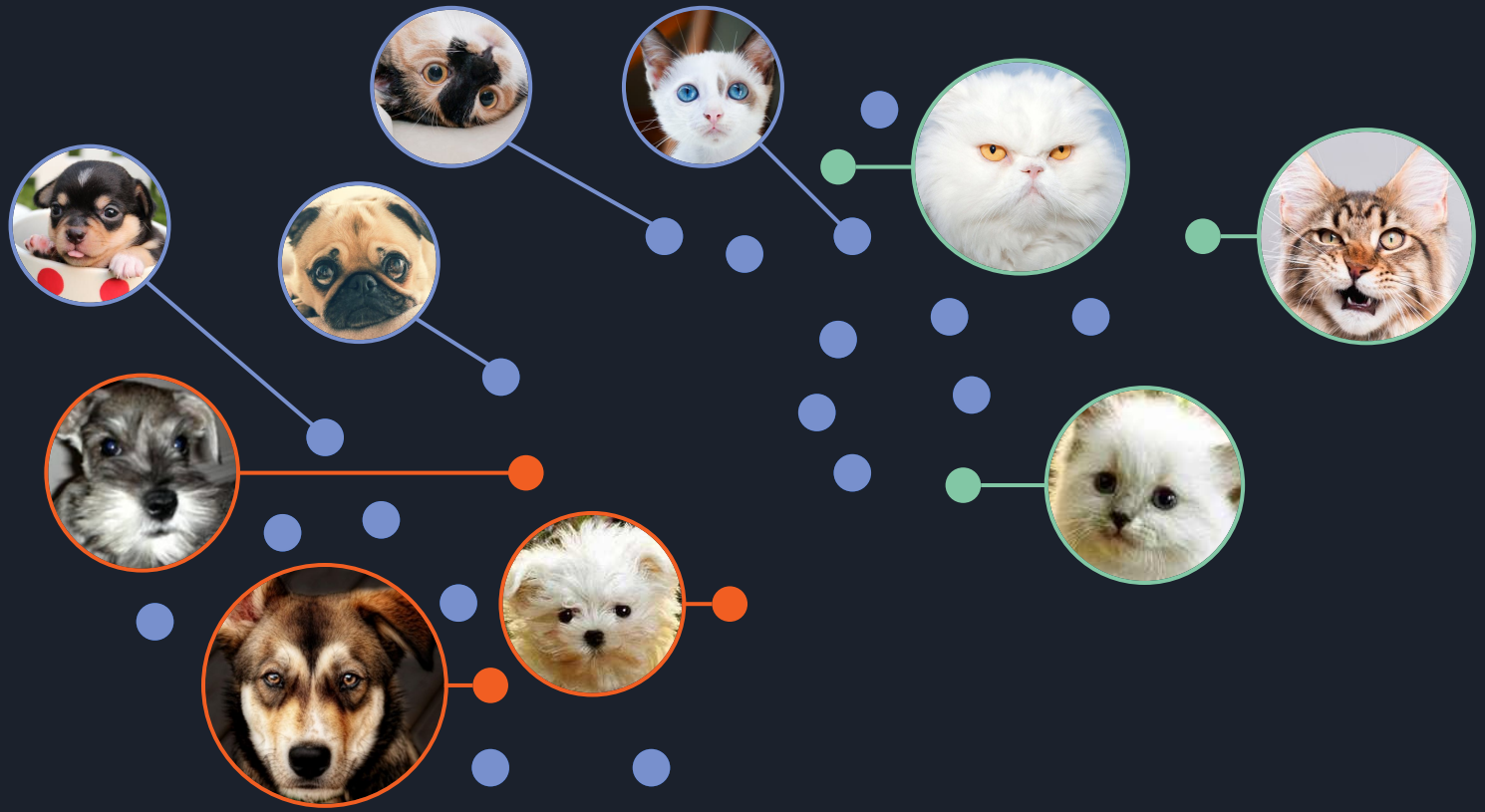
Active learning



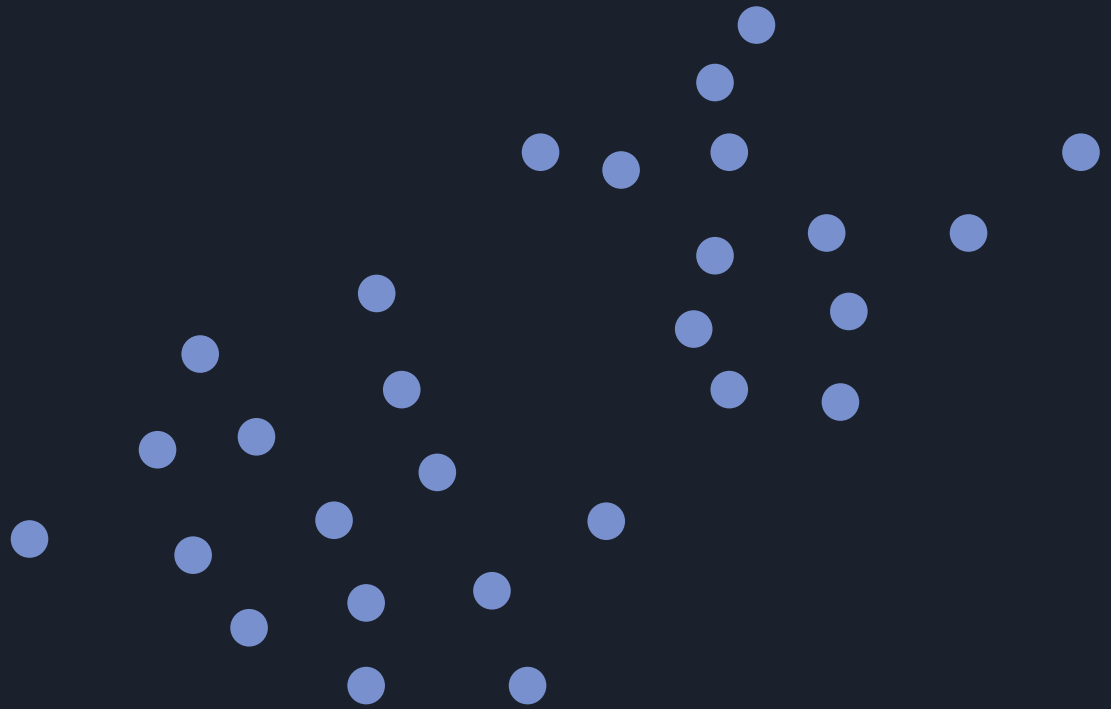
Active learning



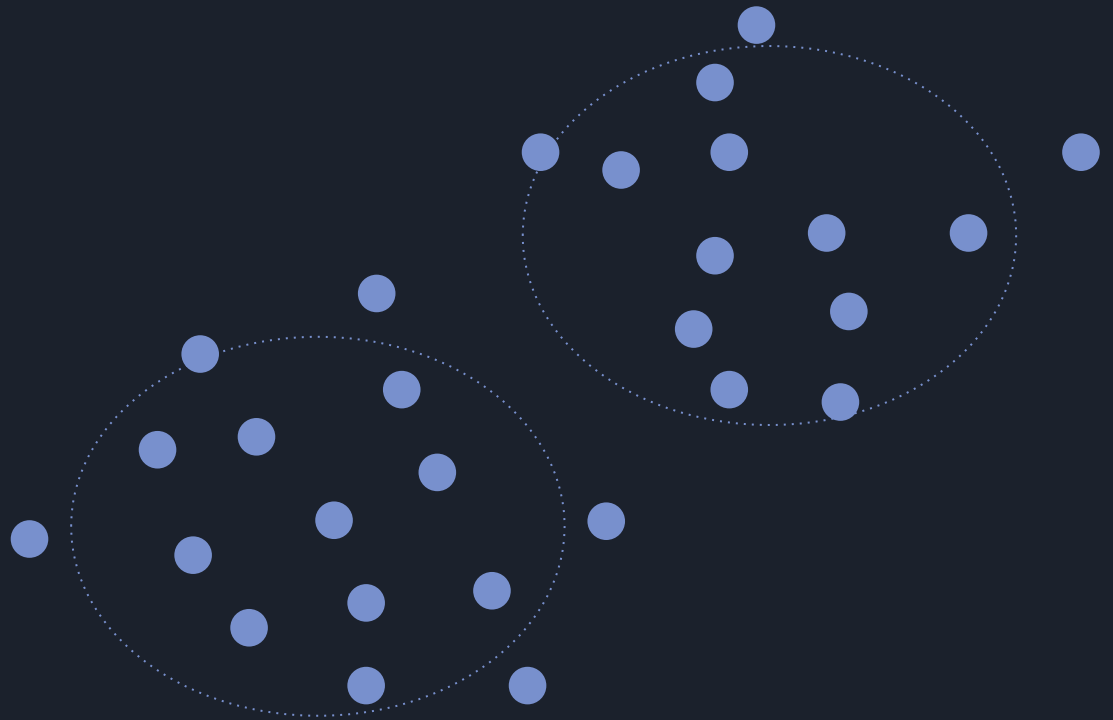
Semi-supervised learning



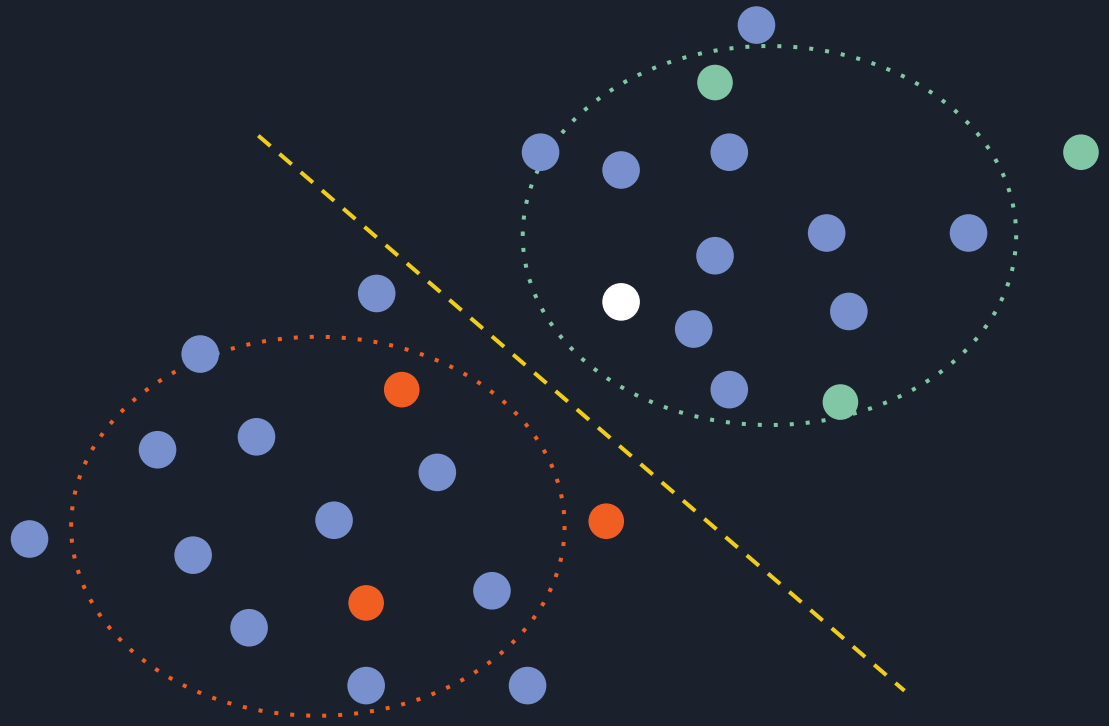
Semi-supervised learning



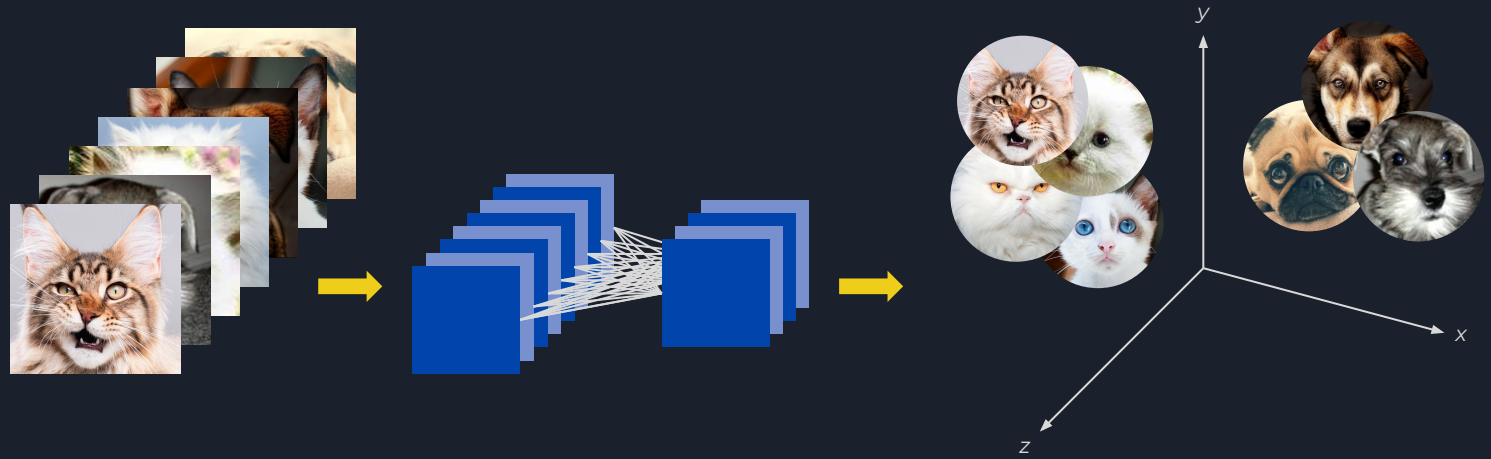
Unsupervised learning



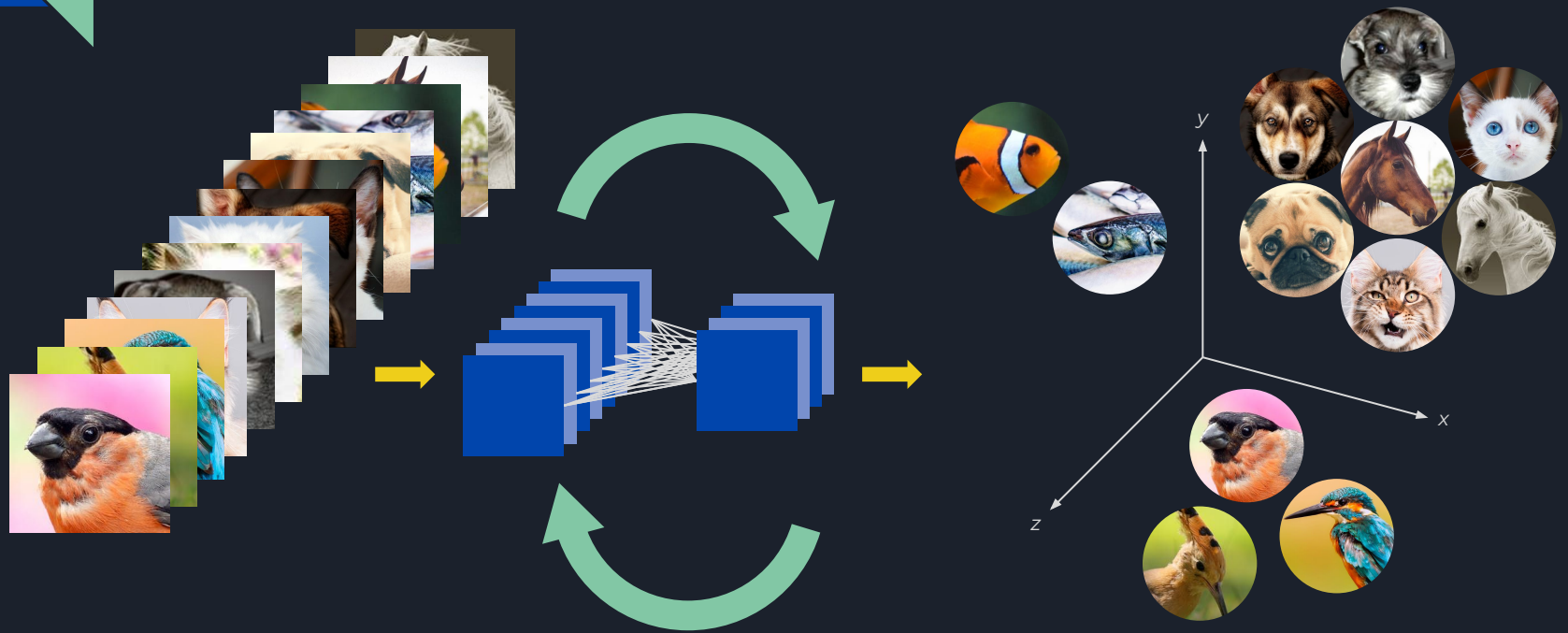
Semi-supervised learning



Representation learning

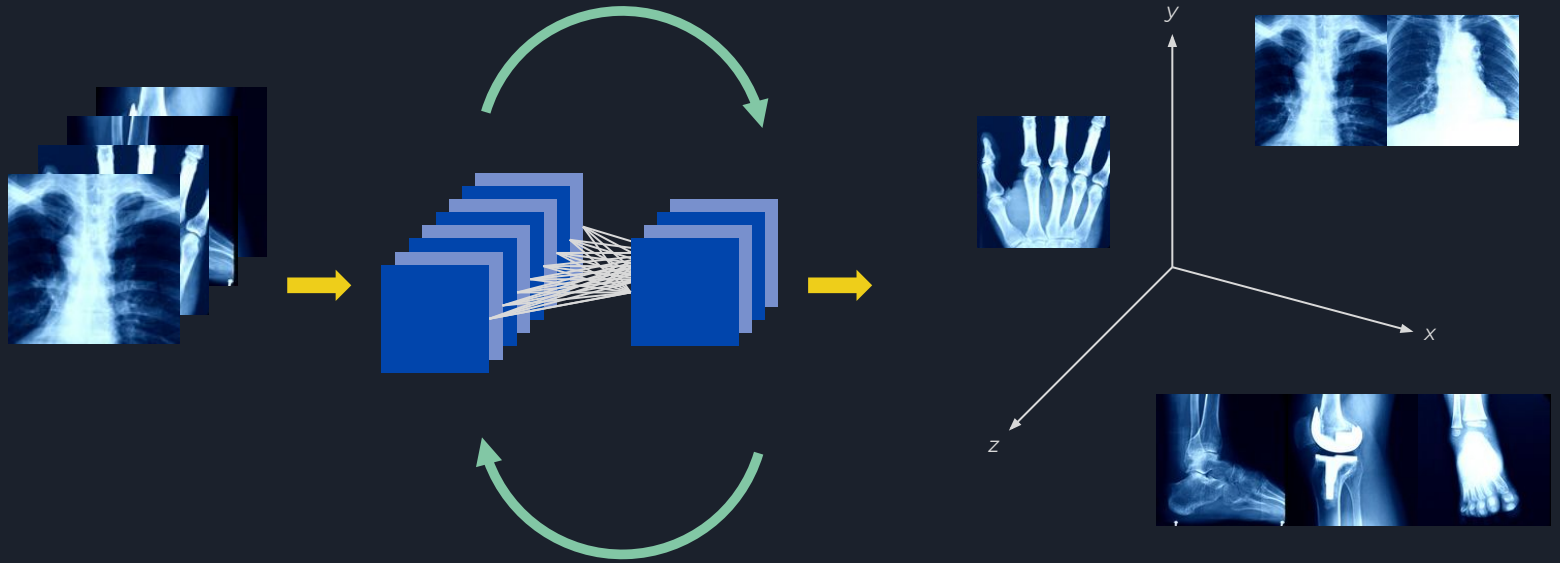


Transfer learning



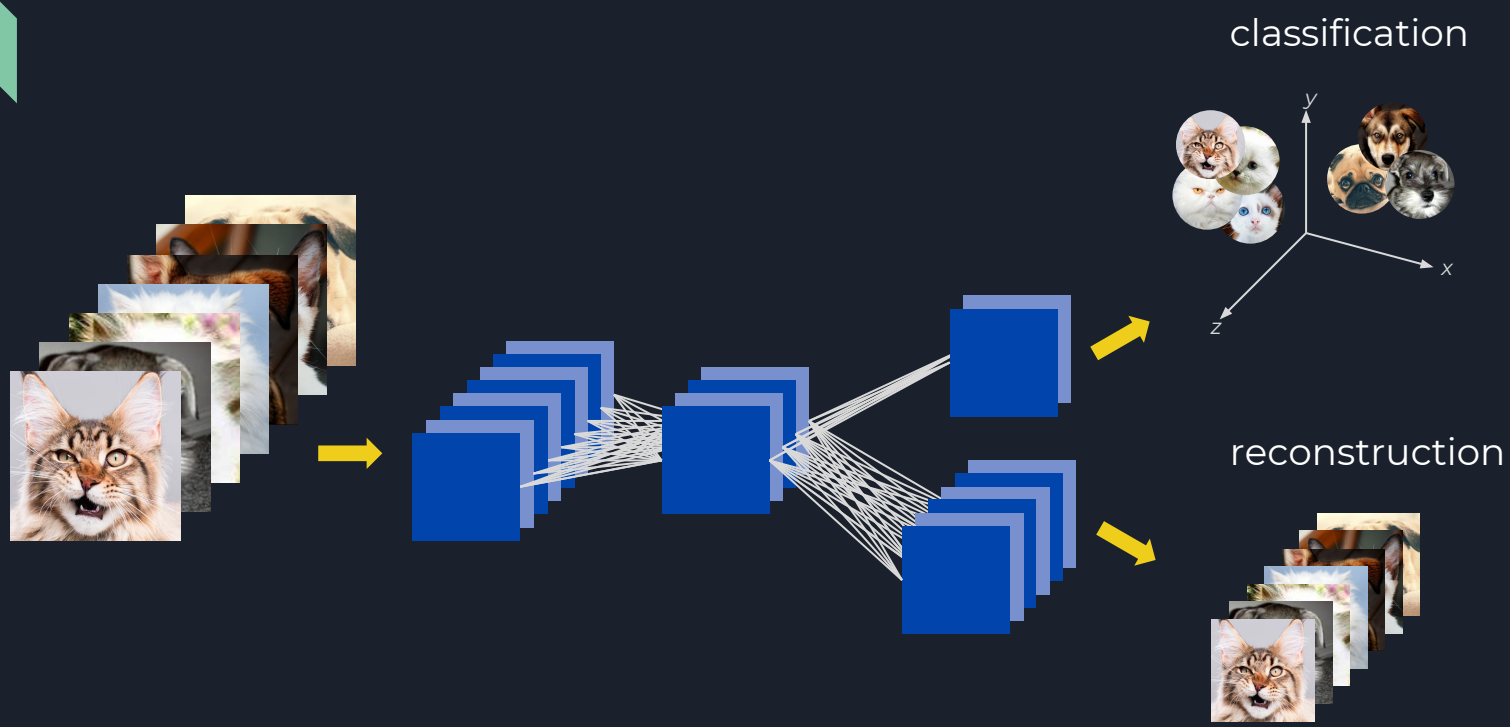
training

Transfer learning



fine-tuning

Multi-task learning



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Questions?