Unsupervised image segmentation trained on a single image

Piotr Migdał (QF, ECC), Bartłomiej Olechno (ECC)
Typical image segmentation

- Supervised
- Many similar images
- If transfer learning: similar as patterns in ImageNet or COCO

https://deepsense.ai/deep-learning-for-satellite-imagery-via-image-segmentation/
But what if it is different?
Our case: scans of race tracks

- Each with various scaled, in different place (continent, foliage, season, etc)
- Yet, we want to extract subtle features (e.g. angle of tire tracks)
Motivation: word2vec

“A word is characterized by the company it keeps” - John Rupert Firth

$$\vec{v}_{dog} \cdot \vec{v}_{cat} \approx \log \frac{P(\text{dog AND cat})}{P(\text{dog})P(\text{cat})} = PMI(\text{dog, cat})$$
Motivation: word2vec

Tiles, prediction

- anchor
- positive
- negative
Loss function

- Noise Contrastive Estimation
- Triplet loss
- Linear loss function (does not work well)
Serialized

Neighbors

Not-neighbors
Other nice examples
Other nice examples
Interactive

GREEN:
  close

RED:
  far

https://www.w3.org/2020/Talks/mlws/piotr_migdal/slides.html
Thanks you!

pmigdal@gmail.com