CNN, RNN and applications

P. Daniušis, A. Indriulionis

2018 03 08

Presentation plan

- Konvoliuciniai NN ir pvz.
- Rekurentiniai NN ir pvz.
- Taikymas: cross modal distillation.
- Taikymas: image captioning.
- Taikymas: object detection.

Research criteria

Demo filmukas (▸ Link)

- Konvoliuciniai NN ir pvz.
- Rekurentiniai NN ir pvz.
- Taikymas: cross modal distillation. (▸ Link)
- Taikymas: image captioning. (▸ Link)
- Taikymas: object detection. (▸ Link)

What criteria should be met for SMART prototype?

- Type of usage: Indoor/Outdoor recognition
- Type of sensors
- Accuracy
- Costs
- Prototype limitations
- Working regime: Day/Night
- Object detection range: Min/Max
- Objects Classification: Static/Dynamic
- Used Techniques: for Classification, Recognition, Detection, Localization
- Object Detection: Real time/Static

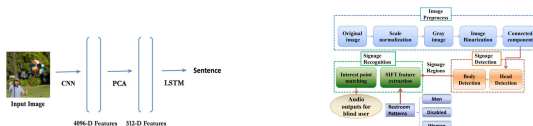# Image Preprocessing to Sentence
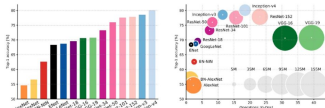
Preprocessing image to text

Image preprocessing logical schema

mage preprocessing algorithm schema

CNN Framework and applications

An Analysis of Deep Neural Network Models for Practical Applications, 2017.

Figure : Deep Neural Networks for practical applications

Figure : Deep Neural Network Framework

Hardware Implementation: CPU, GPU, FPGA aspects

Deep Learning Frameworks: ▸ Link

- NVCaffe ▸ Link
- Caffe2
- Microsoft Cognitive Toolkit (CNTK)
- Digits
- MXNet
- PyTorch
- TensorFlow
- Theano
- Torch
- Keras

Image to Text to Speech

- CNN-based Image Feature Extractor
- LSTM-based Sentence Generator (LSTM learning algorithm using Simultaneous Perturbation Stochastic Approximation (SPSA))
- RNN-based Sentence Generator

Evaluation metrics

- BLEU (Bilingual Evaluation Understudy)
- METEOR (Metric for Evaluation of Translation with Explicit Ordering)
- CIDEr (Consensus-based Image Description Evaluation)

Image, Video and Audio data sets

- COCO ▸Link ▸Link
- ImageNet ▸Link
- SUN ▸Link
- Google Open Images(9M images) ▸Link
- Youtube-8M (8M videos) ▸Link
- AudioSet(2M sound clips) ▸Link