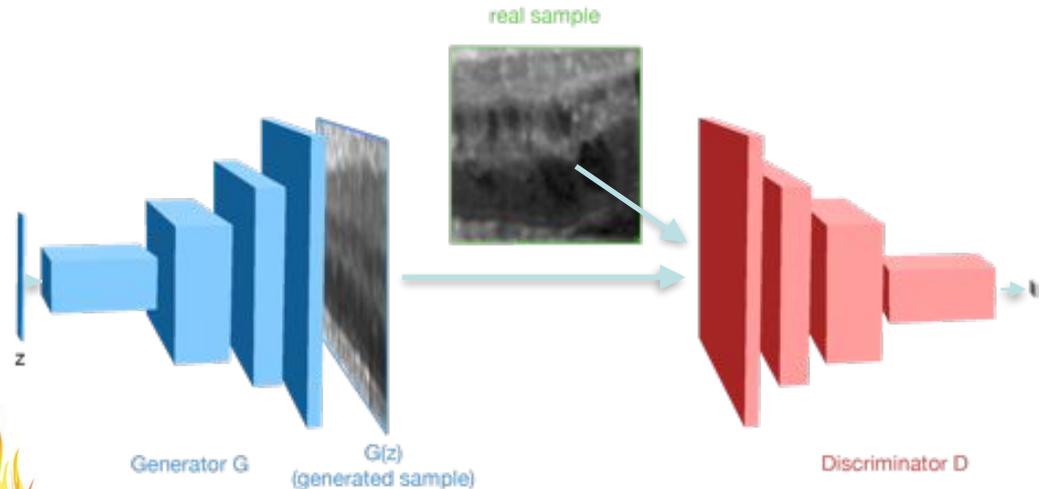


Unsupervised Anomaly Detection in Medical Images using GANs

Christoph Baur, Shadi Albarqouni

Description:

Train a Generative Adversarial Network (GAN) for unsupervised anomaly detection in breast mammography data.



Generative Adversarial Net:



- **HOT TOPIC**
- Unsupervised Deep Learning: No need for labels!
- GANs can generate realistic looking data from random input
- Anomaly Detection: compare optimal generated sample to a query image to find anomalies in the query image

1. Schlegl, Thomas, et al. "Unsupervised Anomaly Detection with Generative Adversarial Networks Discovery." arXiv preprint arXiv:1703.05921 (2017).



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Required tasks:

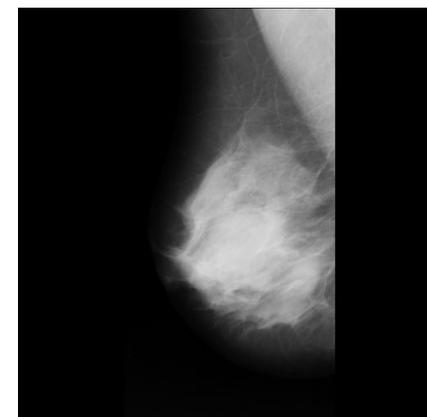
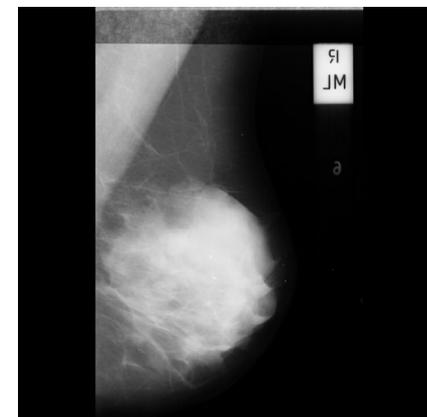
- Read on GANs, DCGANs and AnoGANs
- Implement the AnoGAN paper
 - > reproduce the results on Breast Mammography data
 - > fine-tune the parameters
 - > investigate extensions to DCGANs (w.r.t. training stability, image quality)
 - > more sophisticated loss functions
- Write-Up: Write a technical report, document your code and prepare a final presentation

Notes:

- DCGAN code is already on Github²

Clinical Database: Mammography (MIAS)¹

Programming skills: TensorFlow 1.0, Python



1. MIAS, <http://peipa.essex.ac.uk/info/mias.html>
2. <https://github.com/carpedm20/DCGAN-tensorflow>