

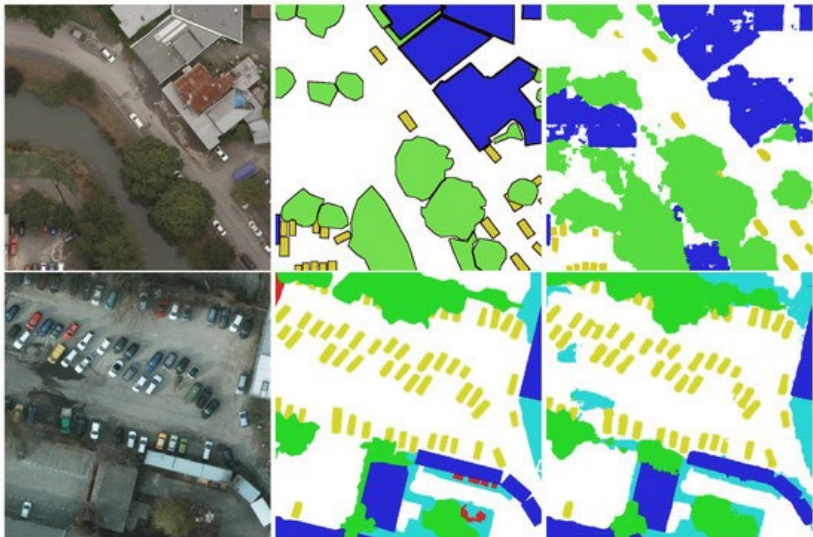
# Understanding Variational Autoencoders' Latent Representations of Remote Sensing Images

Hannes Stärk

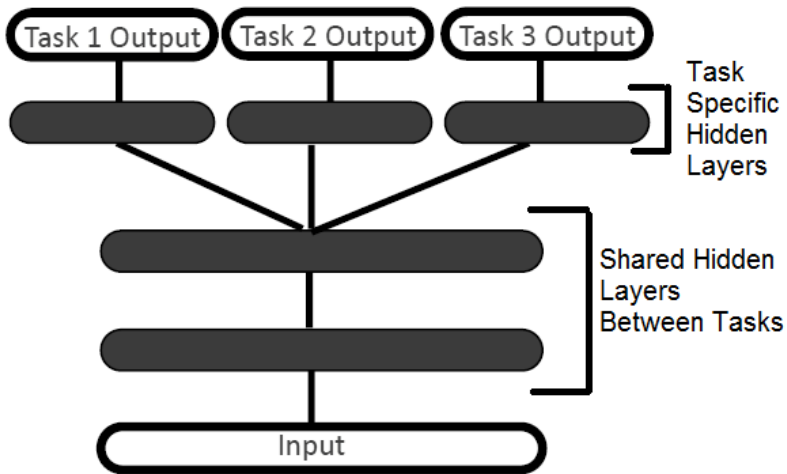
September 13, 2019

# Gliederung

- ▶ Motivation
- ▶ Vorwissen
- ▶ Implementierung, Hardware, Software
- ▶ Datensatz
- ▶ Architekturen
- ▶ Architektur Experimente
- ▶ Latenter Raum Experimente
- ▶ Fazit, Wie kann es weiter gehen



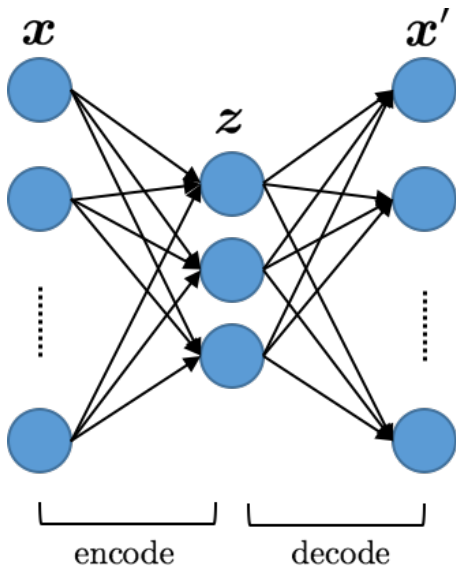
Credit: *Audebert et al. 2017*



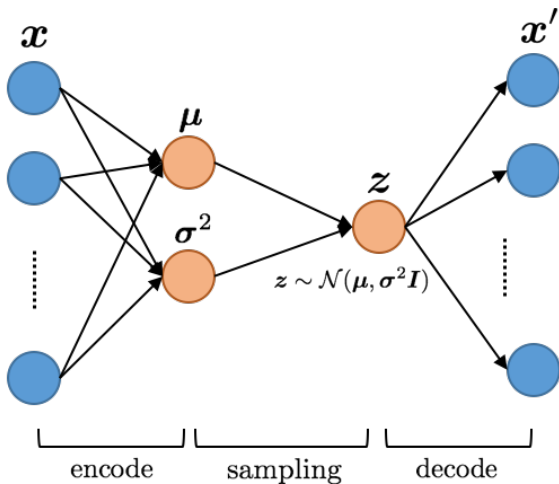
Credit: *Riemer et al. 2015*

# Motivation

- ▶ Trial-and-Error Multi-Task Architekturen
- ▶ Multi-Task Taxonomie
- ▶ Latente Informationen einzelner Schichten in Single-Task Modellen
- ▶ Latenten Raum eines Variational Autoencoders verstehen



Credit: *GRID INC*



Credit: *GRID INC*

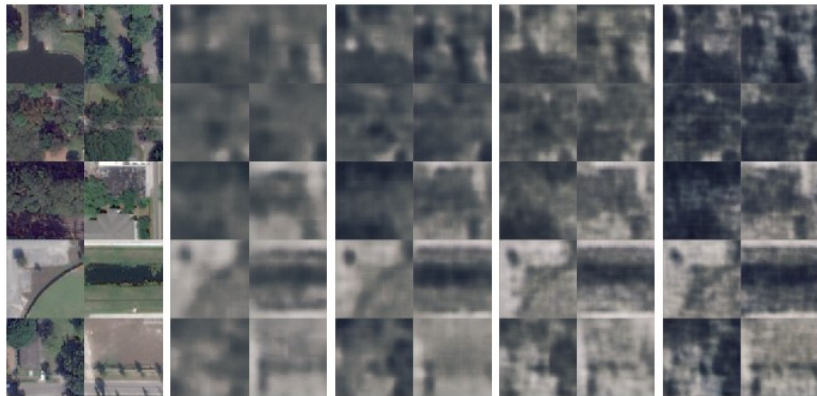
# Implementierung, Hardware, Software

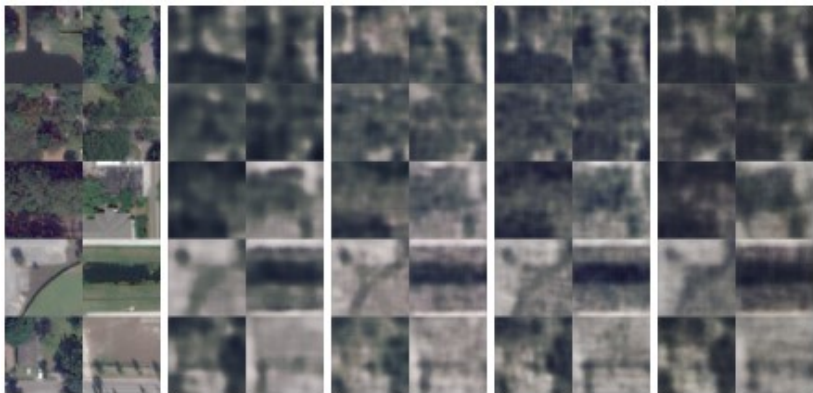
- ▶ Python
- ▶ Tensorflow
- ▶ Container der Uni Hannover
- ▶ Machine-Learning Rechner der UniBw

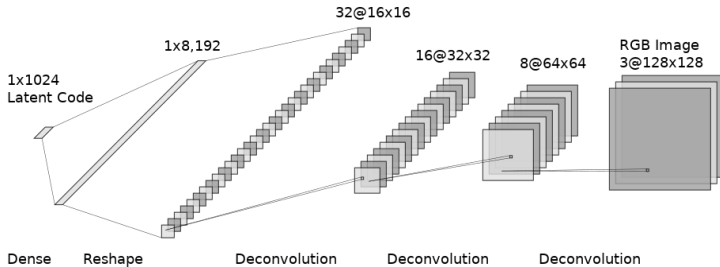
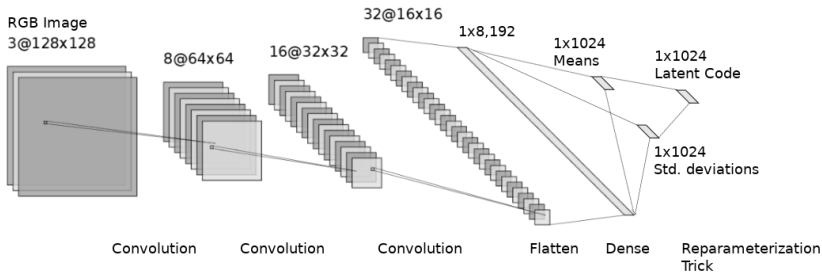


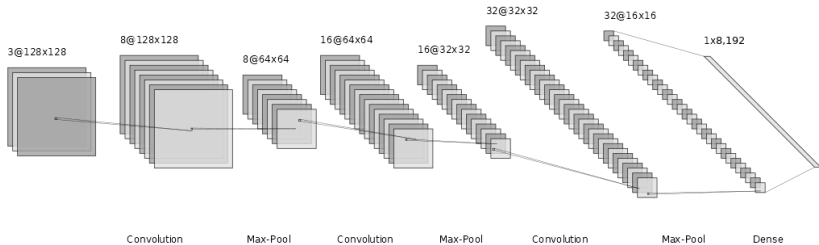
# Architektur Experimente

- ▶ Anzahl von convolutional Schichten
- ▶ Anzahl von Filtern
- ▶ Kernel Größe
- ▶ Max/Average Pooling











# t-Stochastic-Neighbor-Embedding

- ▶ Machine-Learning Verfahren zur Dimensions Reduktion
- ▶ Besonders gut geeignet für
- ▶ Fokus auf Kontext von Punkten zu ihren Nachbarn
- ▶

# Latenter Raum Experimente



# Fazit und wie es weiter gehen kann



Audebert, Nicolas et al. (Apr. 2017). “Segment-before-Detect: Vehicle Detection and Classification through Semantic Segmentation of Aerial Images”. In: *Remote Sensing* 9. DOI: [10.3390/rs9040368](https://doi.org/10.3390/rs9040368).



Riemer, Matthew et al. (Jan. 2015). “A Deep Learning and Knowledge Transfer Based Architecture for Social Media User Characteristic Determination”. In: pp. 39–47. DOI: [10.3115/v1/W15-1705](https://doi.org/10.3115/v1/W15-1705).