

19.01.21

# ***Machine Learning With TensorFlow***

## **What's next?**



- **SCHEDULE NEXT WEEK**
- **IMBALANCED LEARNING**
- **TRANSFORMER MODELS**
- **SOFTWARE 3.0**
- **WHAT'S NEXT?**

# SCHEDULE

<b>18.00 h</b>	<b>6 Presentations of 8-10 minutes each</b>
<b>19.10 h</b>	<b>Break</b>
<b>19.25 h</b>	<b>5 Presentations of 8-10 minutes each</b>
<b>20.25 h</b>	<b>Final Remarks</b>
<b>20.30 h</b>	<b>End</b>

# IMBALANCED LEARNING

- **Undersampling (removing instances from the majority class)**
- **Oversampling (adding instances to the minority class)**
- **Additional Clustering (of the majority class)**
- **Cost-Sensitive Neural Networks**

# UNDERSAMPLING

## Using a Keras generator

```
from imblearn.keras import BalancedBatchGenerator

training_generator, steps_per_epoch = balanced_batch_generator(X, y,
                                                                sampler=NearMiss(),
                                                                batch_size=10,
                                                                random_state=1)

history = model.fit_generator(generator=training_generator,
                              steps_per_epoch=steps_per_epoch,
                              epochs=10, verbose=0)
```

[https://imbalanced-learn.org/stable/generated/imblearn.keras.balanced\\_batch\\_generator.html](https://imbalanced-learn.org/stable/generated/imblearn.keras.balanced_batch_generator.html)

# COST-SENSITIVE NEURAL NETWORK

## Weighted Neural Network With Keras

- **Large Error Weight:** Assigned to examples from the minority class.
- **Small Error Weight:** Assigned to examples from the majority class.

```
# fit model
weights = {0:1, 1:100}
history = model.fit(trainX, trainy, class_weight=weights, ...)
```

<https://machinelearningmastery.com/cost-sensitive-neural-network-for-imbalanced-classification/>

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# Attention Is All You Need

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## Abstract

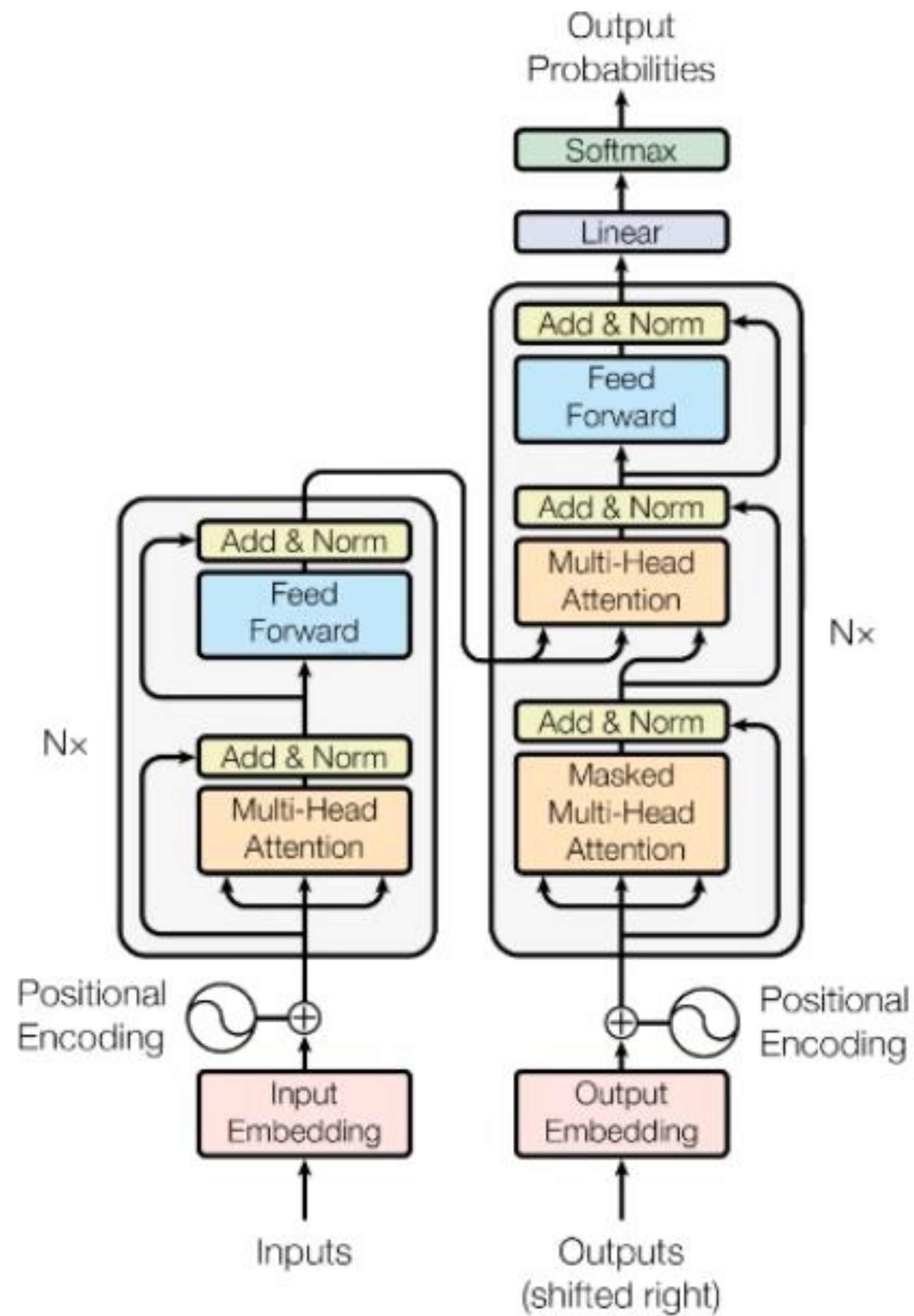
The dominant sequence transduction models are based on complex recurrent or convolutional neural networks that include an encoder and a decoder. The best

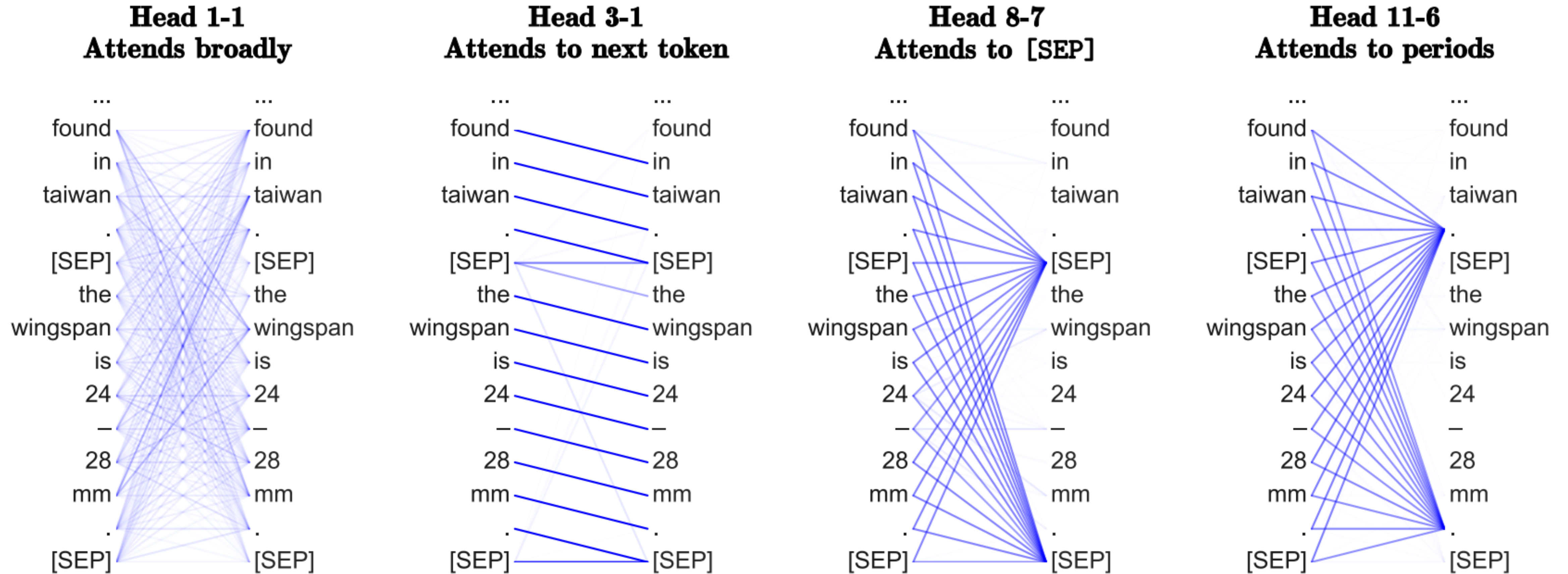
# **Transformer Neural Networks – EXPLAINED!**

## **(Attention is all you need)**



# **NLP with Neural Networks & Transformers**





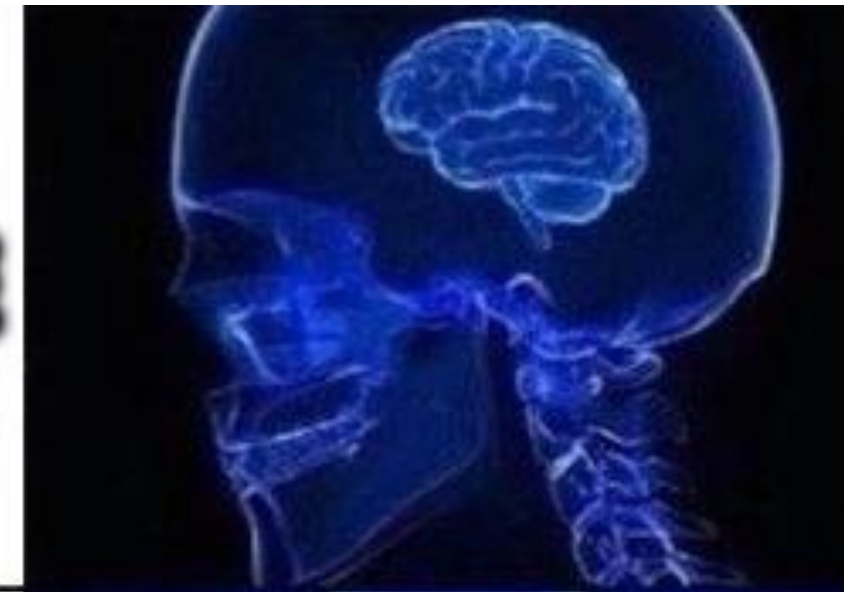
**Head 1 of encoder layer 3 focuses on the next token for each input token;  
Head 6 of encoder layer 11 focuses on dots; ...**

# GOOD READ

**The Illustrated Transformer**  
**by Jay Alammar**



**PRE-SOFTWARE:  
SPECIAL-PURPOSE  
COMPUTER**



**SOFTWARE 1.0:  
DESIGN  
THE ALGORITHM**



**SOFTWARE 2.0:  
DESIGN  
THE DATASET**



**SOFTWARE 3.0:  
DESIGN  
THE PROMPT**



# PROMPT DESIGN

- **Context**
- **Zero- / One- / Few-Shot Learning**

# Playground ⓘ



Chat



The following is a conversation with an AI assistant. The assistant is helpful, creative, clever, and very friendly.

Human: Hello, who are you?

AI: I am an AI created by OpenAI. How can I help you today?

Human:

Submit →



56

Engine

ada



Response Length 150



Temperature 0.9



Top P 1



Frequency Penalty 0



Presence Penalty 0.6



Best Of



# What's next?



Oculus Quest 2 Augmented Reality-News KI-News Deepfakes VR-News VR-Filme VR-Spiele VR-Brillen im Vergleich



Featured

OpenAI: Bild-KI DALL-E ist so revolutionär wie GPT-3

4



Featured

Künstliche Intelligenz: Was 2020 war und 2021 wird

2

Meistgelesen	Meistkommentiert
VR-Spiele, VR-Filme & Apps: Alle Releases in der Übersicht	
VR-Brillen 2021: Vergleich & Kaufberatung - Das müsst ihr wissen	
Oculus Link: Alle Infos zu Preis, Leistung & Kompatibilität	
Samsung patentiert neue VR-Controller und VR-Brille	
Oculus Quest 2 lässt Vorgängermodell im Staub zurück	

## News.

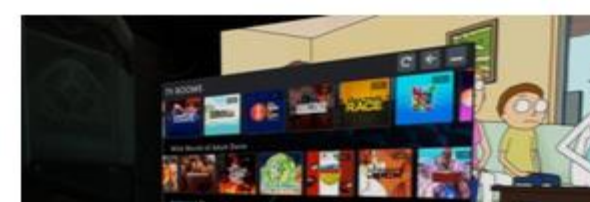


Deals

Deals: Philips Ambilight TV fast 1000 € billiger

von MIXED | 12.01.2021

Deals



Social VR

Bigscreen: Mehr TV und Desktop-Streaming für Oculus Quest



- ✓ Mixed-Reality-News per E-Mail
- ✓ VR, AR, KI
- ✓ Jederzeit kündbar
- ✓ Kostenlos

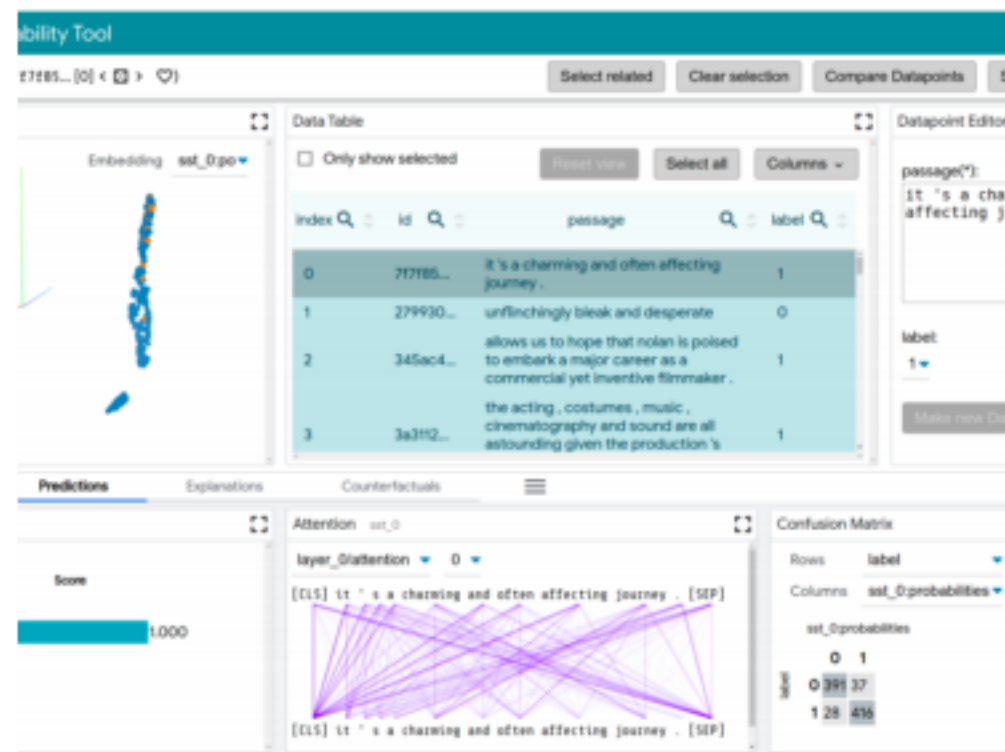
E-Mail-Adresse \*

Abonnieren

[Datenschutz](#)

New! Select "Design your profile" in the menu to create a personalized space.

Got it



Synced in SyncedReview

## Google Introduces NLP Model Understanding Tool

Google Research released a paper tackling this issue with a new open-source analytic platform: the Language Interpretability Tool (LIT).

Read More · 3 min read ★

Robert C. in Mac O'Clock

## If You Want A Great iPad, Wait!

Jan 6 · 3 min read ★



OZ Dave Gershgorin in OneZero

## Take a Look at How Far Image Generation A.I. Has Come in Just 5 Years

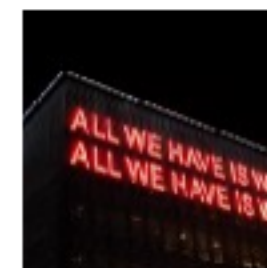
Jan 11 · 5 min read ★



Thilina Rajapakse in Towards Data Science

## BART for Paraphrasing with Simple Transformers

Aug 5, 2020 · 8 min read ★



Srini Janarthanam in Analytics Vidhya

## 5 Models for Conversational AI

Sep 2, 2020 · 7 min read ★



### TRENDING ON MEDIUM

01 Nicholas Grossman in Arc Digital  
**QAnon Woke Up the Real Deep State**  
Jan 11 · 6 min read ★

02 Mark Suster in Both Sides of the Table  
**How I Gamified My Own Brain to Lose Weight & Improve Fitness**

03 Meg Conley in GEN  
**A Majority of Mormons Embraced Trumpism. Now What?**




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PINNED BY MODERATORS

Posted by u/AutoModerator 22 days ago

Discussion [D] Simple Questions Thread December 20, 2020

205 Comments

10

Posted by u/ML\_WAYR\_bot 8 days ago

Discussion [D] Machine Learning - WAYR (What Are You Reading) - Week 103

18 Comments

21

Posted by u/hardmaru 3 hours ago

Research [R] Switch Transformers: Scaling to Trillion Parameter Models with Simple and Efficient Sparsity

arxiv.org/abs/21...

6 Comments

238

Posted by u/bendee983 18 hours ago

Research [R] Concept Whitening—Creating neural networks that are inherently interpretable

Researchers at Duke University introduced [concept whitening](#), a technique that aligns neurons in different layers of NNs with specific concepts.

- CW is a module that replaces batch norm. It performs the functions of batch norm, and in addition adjusts the latent space so that specific neurons are directly aligned with specific concepts.

- Training with CW is a dual process. One process trains the NN on the main task. The second training process is performed on a separate concept data set, with the goal of adjusting the latent space.

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# Artificial Intelligence

## Authors and titles for recent submissions

- [Tue, 19 Jan 2021](#)
- [Mon, 18 Jan 2021](#)
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[ total of 174 entries: [1-25](#) | [26-50](#) | [51-75](#) | [76-100](#) | ... | [151-174](#) ]

[ showing 25 entries per page: [fewer](#) | [more](#) | [all](#) ]

### Tue, 19 Jan 2021 (showing first 25 of 68 entries)

[1] [arXiv:2101.07220](#) [[pdf](#), [other](#)]

#### **A Tensor-Based Formulation of Hetero-functional Graph Theory**

[Amro M. Farid](#), [Dakota Thompson](#), [Prabhat Hegde](#), [Wester Schoonenberg](#)

Subjects: [Artificial Intelligence \(cs.AI\)](#)

[2] [arXiv:2101.07202](#) [[pdf](#), [other](#)]

#### **dtControl 2.0: Explainable Strategy Representation via Decision Tree Learning Steered by Experts**

[Pranav Ashok](#), [Mathias Jackermeier](#), [Jan Křetínský](#), [Christoph Weinhuber](#), [Maximilian Weininger](#), [Mayank Yadav](#)

Subjects: [Artificial Intelligence \(cs.AI\)](#); [Formal Languages and Automata Theory \(cs.FL\)](#); [Machine Learning \(cs.LG\)](#); [Logic in Computer Science \(cs.LO\)](#); [Systems and Control \(eess.SY\)](#)

[3] [arXiv:2101.07067](#) [[pdf](#), [ps](#), [other](#)]

#### **Data Obsolescence Detection in the Light of Newly Acquired Valid Observations**

[Salma Chaieb](#), [Ali Ben Mrad](#), [Brahim Hnich](#), [Véronique Delcroix](#)

Comments: submitted to the Journal of Artificial Intelligence Research (JAIR) on July 26, 2020 and re-submitted to the same journal on September 05, 2020

Subjects: [Artificial Intelligence \(cs.AI\)](#)

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1990	1991	1992	1993	1994	1995	1996	1997	1998

[illegible]

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