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## 1 Introduction

## 2 background

### 2.1 neural networks and deep learning

keywords to explain (maybe) from [2] - knowledge distillation - generalist models - large unsupervised training data sets - transformers - cnns - deep neural networks - self attention - convolution - transfer learning - encoder/decoder - model compression - loss functions - cross-entropy - data augmentation - training/validation/test data sets - learning rate - batch size - tokenizing - image patches - self-attention - multi-head self-attention - performance metrics - precision - recall - f1

### 2.2 paleoecology

This section will have a summary on what fossil data can be used for.

the why: why do this at all? why is accurate dental data relevant, in general?

#### 2.2.1 Basics on ecology

Tolerances and niches: basis for environmental reconstruction [1]

Theory that the data analysis relies on

#### 2.2.2 Paleoenvironmental reconstruction

maybe, how the data is used

#### 2.2.3 Diets, evolution, etc

maybe, how the data is used

#### **2.2.4 Animal teeth notation**

Add here description of teeth: types and different notation styles in fossil catalogues

### **3 data methods etc**

things to try data augmentation

### **4 results**

### **5 conclusion**

## **References**

- [1] J. T. Faith and R. L. Lyman. *Paleozoology and Paleoenvironments: Fundamentals, Assumptions, Techniques*. Cambridge University Press, 2019.
- [2] M. Li, T. Lv, L. Cui, Y. Lu, D. Florencio, C. Zhang, Z. Li, and F. Wei. *TrOCR: Transformer-based Optical Character Recognition with Pre-trained Models*. 2021. arXiv: 2109.10282 [cs.CL].