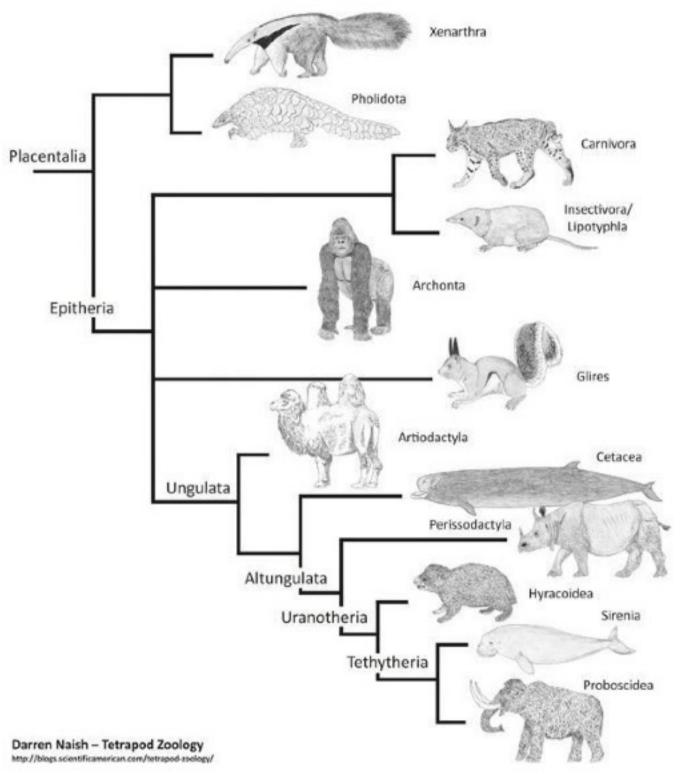
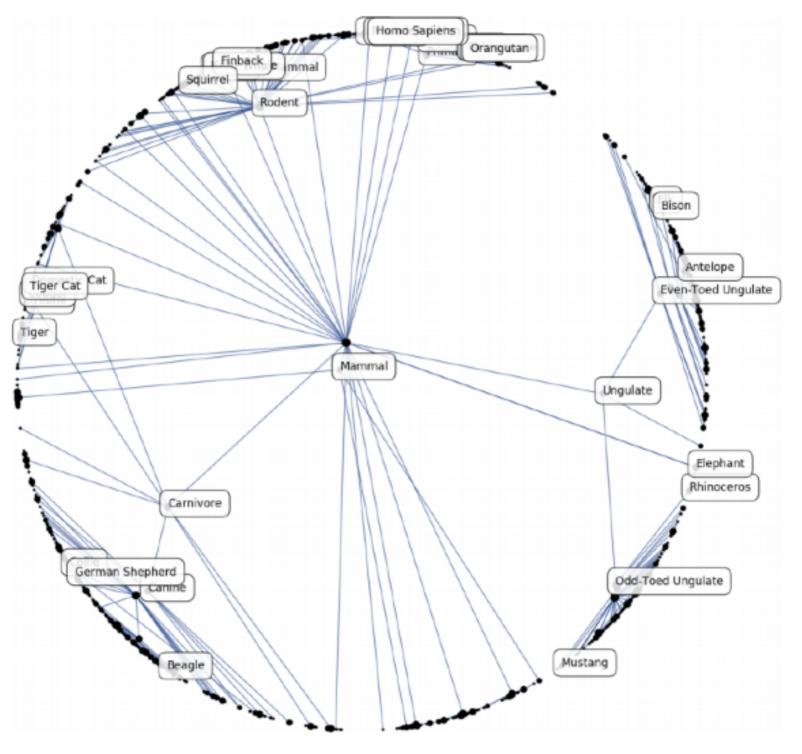


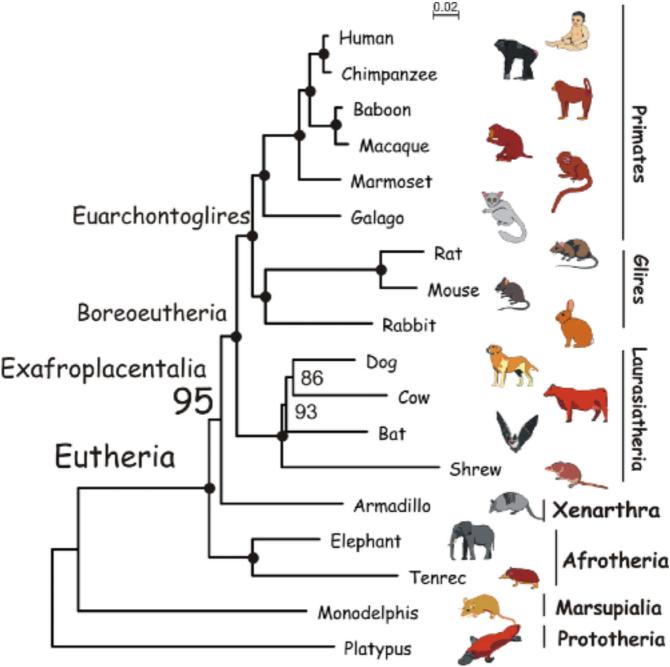
In a nutshell

Hyperbolic Embeddings





Nickel and Kiela, 2017



Montoya-Burgos et al., 2007

$$\min_{\mathbf{u}_{i},\mathbf{v}_{i}} \sum_{(u,v)\in\mathcal{D}} \log \frac{e^{-d(\mathbf{u},\mathbf{v})}}{\sum_{v'\in\mathcal{N}(u)} e^{-d(\mathbf{u},\mathbf{v}')}}$$

Nickel and Kiela, 2017

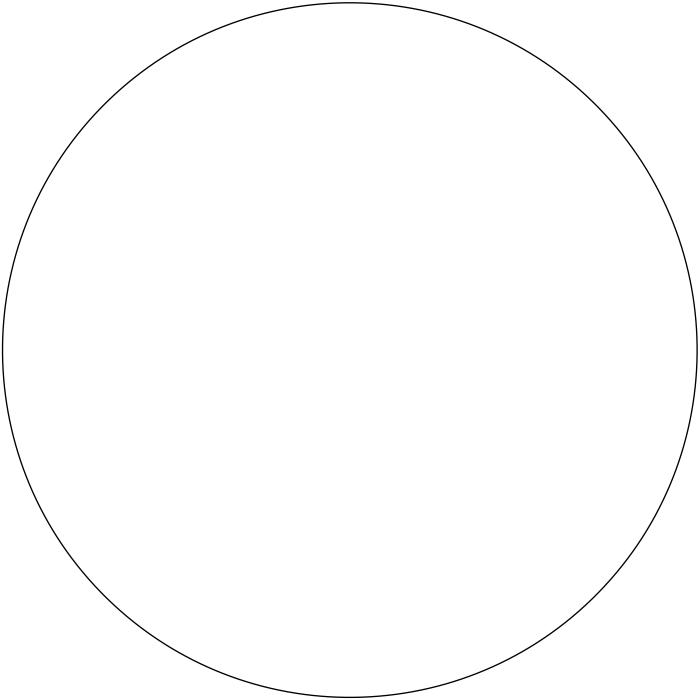
Relations: $(u, v) \in \mathcal{D}$ if u is subconcept of v

Nodes: u

Embeddings: $\mathbf{u} \in \mathbb{D}^d$

Want: $d_{\mathbb{D}}(\mathbf{u}, \mathbf{v})$ small if $(u, v) \in \mathcal{D}$

minimize fitting loss



Hyperbolic Embeddings In a nutshell

Nodes: u

Relations: $(u, v) \in \mathcal{D}$ if u is subconcept of v

Human
Chimpanzee
Baboon
Macaque
Marmoset
Galago
Rat
Mouse
Exafroplacentalia
95
Eutheria
Armadillo
Elephant
Monodelphis
Platypus
Primates

Primates

Rabbit

Armadillo
Xenarthra
Afrotheria
Prototheria

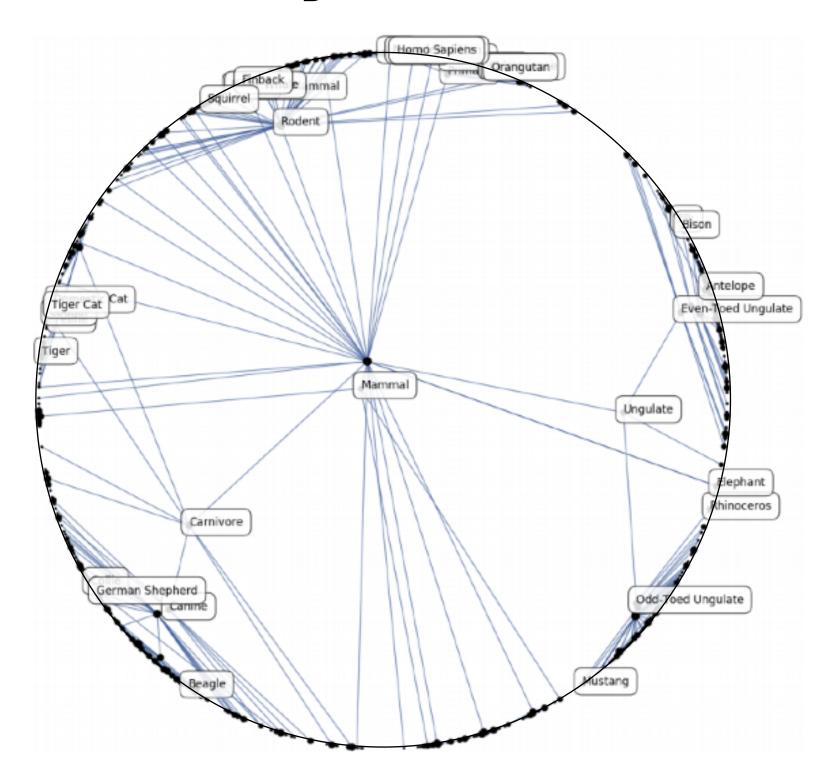
minimize fitting loss

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Nickel and Kiela, 2017

Embeddings: $\mathbf{u} \in \mathbb{D}^d$

Want: $d_{\mathbb{D}}(\mathbf{u}, \mathbf{v})$ small if $(u, v) \in \mathcal{D}$



Nickel and Kiela, 2017

Aligning Hyperbolic Spaces putting it all together

Given two related hierarchies embedded in the Poincare Disk, can we match them?

