Importance and advances in Language Data Processing in Slovakia

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LDS Country Workshop in Slovakia

2024-11-07, Bratislava

NLP

- start: sometime in 1950s

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  - Machine Translation

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- 2020s: transformers, LLMs
- 2030s: AI will kill us all

Text Corpora

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- Slovak language corpora – start: 1993
- 2002 – Slovak National Corpus

Corpora sizes

- 1 million – lemmatization, morphological analysis
- 10 million – terminology extraction, named entity recognition
- 100 million – pocket dictionary (body of law, Slovak Wikipedia)
- 1 billion[1] – large dictionary, word embeddings, "classic" language models (SNK 1.6G)
- 10 billion – web corpus (HPLT+ARANEA 7G)
- 100 billion – English web corpora
- 500 billion – GPT-3
- 13 trillion[2] – GPT-4

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[2] 10^{12}

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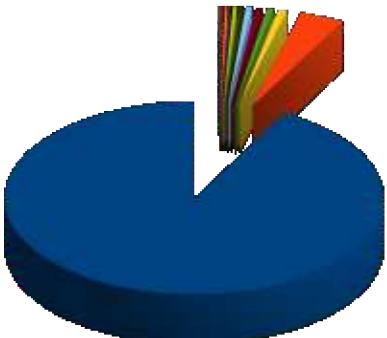
- hippopotomonstrosesquippedaliofóbia, hydrogénuhličitanovochloridová



slovenský
latinský
francúzsky
grécky
starohornonemecký
anglický
taliansky
český
praslovanský
stredohornonemecký
nemecký
germánsky
poľský
maďarský
španielsky
turkický
staroslovienský
ruský
turecký

Loanwords in Slovak

393475	musieť	sthnem
172916	problém	l←g
150089	škola	stlat←g
146048	otázka	čes
130222	chvíľa	sthnem
130170	skupina	čes
125669	štát	l
120238	systém	l←g
118469	situácia	f←l
117359	kniha	psl←akkad
109156	firma	t
105331	informácia	l
103613	program	l←g
94695	euro	g
94210	film	a
92650	cieľ	strhnem
91886	sociálny	l

English loanwords in Slovak

94210	film	a
81512	gól	a
63370	klub	a
62642	tím	a
55890	tréner	a←f
43347	in	10=l,9=a,1=t
35684	the	a
34992	dolár	a←n
32295	internet	l+a
31644	parlament	a←f
30633	partner	a←stfr←l
30607	televízia	g+a←l
30159	www	a+a+a
29962	of	a
27748	šport	a←strfr←f+l
26261	new	a
25058	nato	11=slk,9=a

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Breaking point

- pre-LLM (“classic”)

Breaking point

- pre-LLM (“classic”)
- LLM

Corpora sizes

- $\sim$ 5 billion – teach a LLM new language
- *mistral-sk-7b-v0.1* – `https://www.juls.savba.sk/llm.html`

Sources

- Slovak National Corpus (2002 –) 1.6 G `https://korpus.sk`

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- specialized corpora:
  - spoken `https://korpus.juls.savba.sk/shk.html`
  - historical `https://korpus.juls.savba.sk/hist.html`
  - dialects

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  - dialects
- parallel corpora – en, cs, ru, de, fr, la, hu, pl, bg, es
  `https://korpus.juls.savba.sk/par.html`

Level of support

- less resourced languages

Level of support

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- Rehm, Georg, Way, Andy (eds), 2022, European Language Equality. Cognitive Technologies. Springer, Cham. https://doi.org/10.1007/978-3-031-28819-7_3

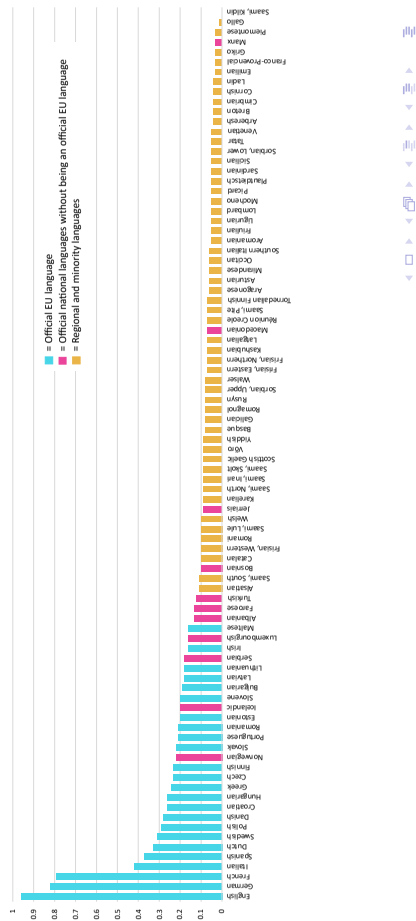

Fig. 2 Contextual Digital Language Equality scores as of late February 2023

Level of support

- LLM: the big equalizer

Level of support

- LLM: the big equalizer(?)
- multilingual models

Level of support

- LLM: the big equalizer(?)
- multilingual models
- death sentence for (even) small(er) languages?

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- **non-human creative work**
- precedence: juridical person

Thank you for your attention