Digitālās transformācijas problemātika pašvaldībās

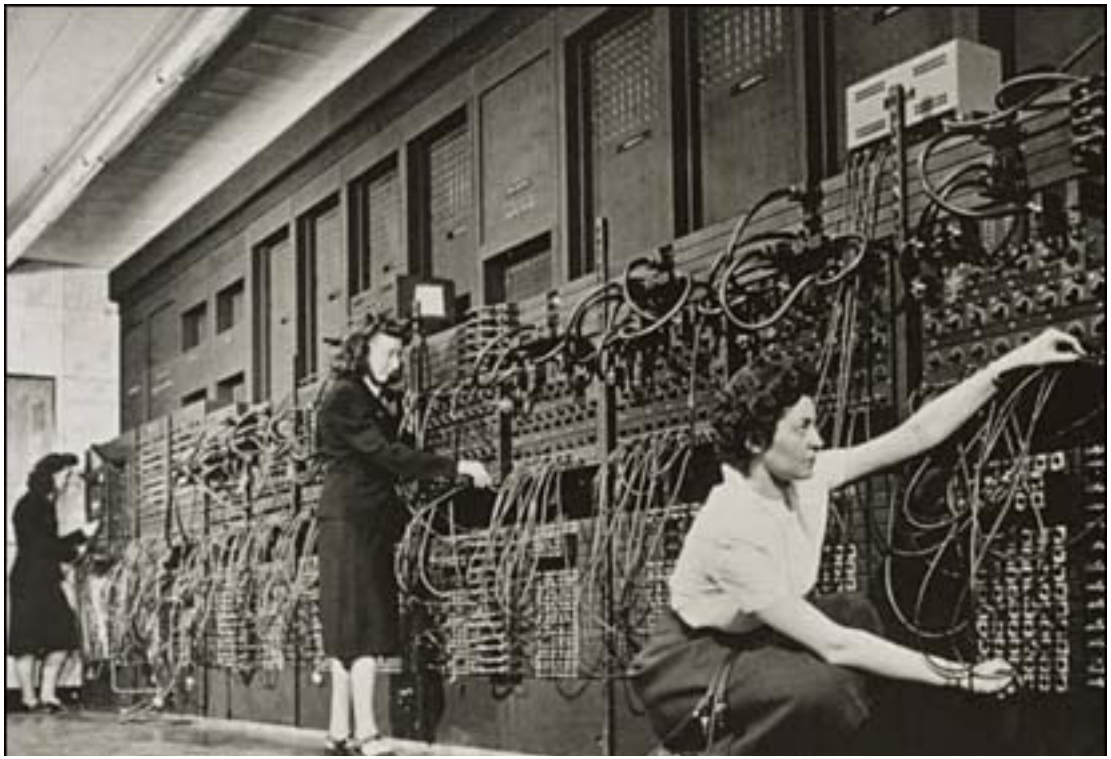
Egons Spalāns
Ventspils pilsētas domes
izpilddirektora vietnieks

EuroHPC
Joint Undertaking

EURO

VENTSPILS DIGITĀLAIS CENTRS

Augstas veiktspējas skaitļošana



Electronic Computer Flashes Answers, May Speed Engineering

By T. R. KENNEDY Jr.

Special to THE NEW YORK TIMES.

Tradicionālais pielietojums

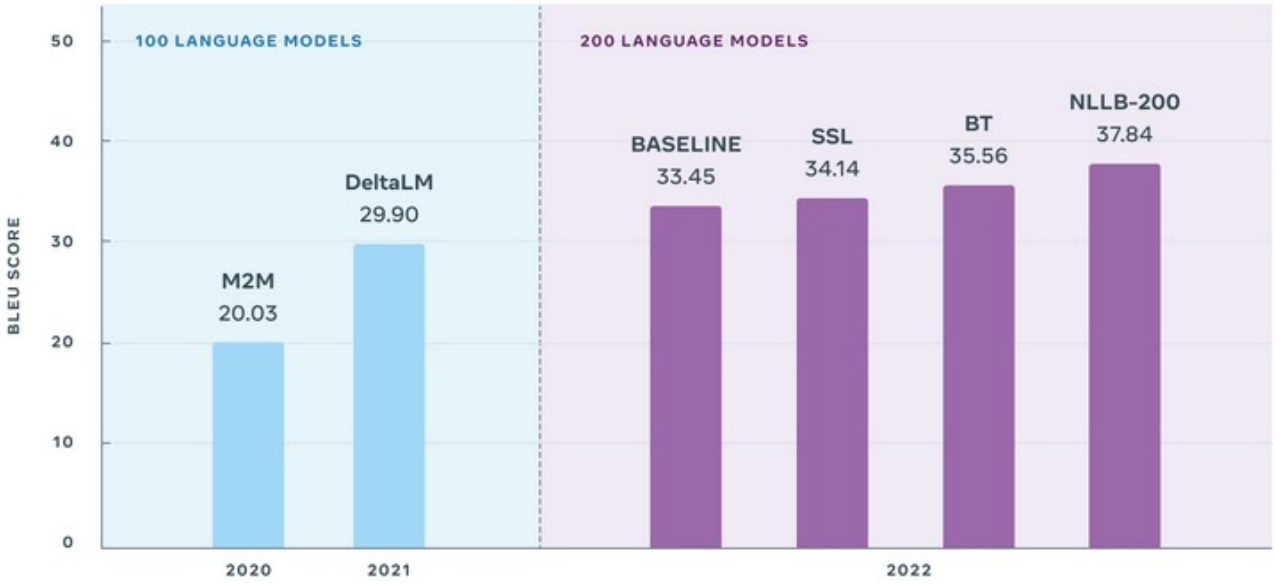
Year	Country of site	Site	Vendor / builder	Computer	Performance[a]	R
1938	Germany	N/A	Konrad Zuse	Z1	1.00 IPS	[1]
1941				Z3	20.00 IPS	[2]
1946	United States	University of Pennsylvania	Moore School of Electrical Engineering	ENIAC	5.00 kIPS	[3]
1951		Massachusetts Institute of Technology	MIT Servomechanisms Laboratory	Whirlwind I	20.00 kIPS	[4]
1958		McGuire Air Force Base	IBM	AN/FSQ-7	75.00 kIPS	[5]
1960	United States	Los Alamos Scientific Laboratory		7090	229.00 kIPS	[6]
		Lawrence Livermore National Laboratory	Remington Rand's UNIVAC	LARC	250.00 kIPS	[7]
1961	United States	Los Alamos Scientific Laboratory	IBM	7030 Stretch	1.20 MIPS	[8]
1962	United Kingdom	University of Manchester	University of Manchester, Ferranti International, and Plessey Co.	Atlas	1.00 MFLOPS	[9]
1964	United States	Lawrence Livermore and Los Alamos	CDC	6600	3.00 MFLOPS	[10]
1969		Lawrence Livermore National Laboratory		7600	36.00 MFLOPS	[11]
1974				STAR-100	100.00 MFLOPS	[12]
1976		Los Alamos Scientific Laboratory	Cray	Cray-1	160.00 MFLOPS	[13]
1980	United Kingdom	Meteorological Office, Bracknell	CDC	Cyber 205	400.00 MFLOPS	[14]
1983	United States	National Security Agency	Cray	X-MP/4	713.00 MFLOPS*	[15]
1985	United States	Lawrence Livermore National Laboratory	Cray	Cray-2	1.41 GFLOPS*	[16]
1988		NASA Ames Research Center		Y-MP/832	2.14 GFLOPS*	[15]
1990	Japan	Fuji Heavy Industries	Fujitsu	VP2600/10	4.00 GFLOPS*	[17]
1992	Canada	Atmospheric Environment Service	NEC	SX-3/44	20.00 GFLOPS*	[18]
1993	United States	Los Alamos National Laboratory	Thinking Machines	CM-5/1024	59.70 GFLOPS*	[19]
	Japan	National Aerospace Laboratory of Japan	Fujitsu	Numerical Wind Tunnel	124.20 GFLOPS*	[20]

Jaunais pielietojums

- Facebook (Meta) AI Research SuperCluster (RSC) – pašlaik ātrākais izmantošana - mākslīgā intelekta sistēmas
- Google, Microsoft, IBM u.c. veido savas mākslīgā intelekta sistēmas

Iespējamais pielietojums publiskajā pārvaldē

- Mašīntulkošana
  - Meta: >200 valodas
  - Google > 1500 valodas
- Tulkošanas kvalitāte – BLEU* algoritms teksta kvalitātes novērtēšanai, kas ir mašīntulkots no vienas dabiskās valodas citā.
- Jo tuvāk mašīntulkošana ir profesionālam cilvēka tulkojumam, jo BLEU vērtējums tuvāk 1(100%)



BLEU Score	Interpretation
< 10	Almost useless
10 - 19	Hard to get the gist
20 - 29	The gist is clear, but has significant grammatical errors
30 - 40	Understandable to good translations
40 - 50	High quality translations
50 - 60	Very high quality, adequate, and fluent translations
> 60	Quality often better than human

*Bilingual Evaluation Understudy Score
https://cloud.google.com/translate/automl/docs/evaluate

Iespējamais pielietojums publiskajā pārvaldē

- Publisko pakalpojumu sniegšana nediskriminējot iedzīvotājus valodas dēļ – Eiropas Parlamenta un Padomes Regula (ES) 2018/1724 ar ko izveido vienoto digitālo vārteju
- Pakalpojumu sniegšana visās 23 oficiālajās Eiropas Savienības valodās

Iespējamais pielietojums publiskajā pārvaldē

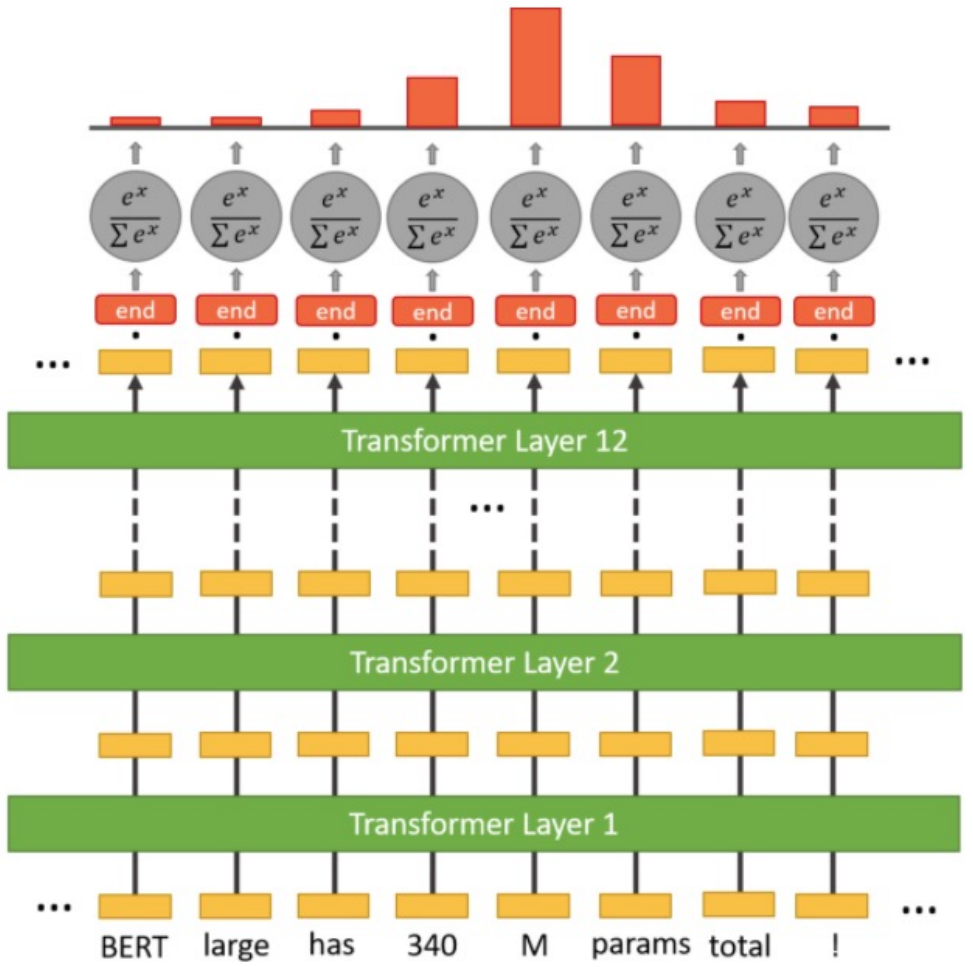
Saziņa ar klientu daudzvalodu vidē – čatboti, kas māk izanalizēt dokumentus un korekti atbildēt uz jautājumu, pat ja dokumentos tiešas atbildes dotas nav

Q: Where was France's Huguenot population largely centered?

Doc: Huguenot numbers peaked near an estimated two million by 1562, concentrated mainly in **the southern and central parts of France**, about one-eighth the number of French Catholics...

A: the southern and central parts of France

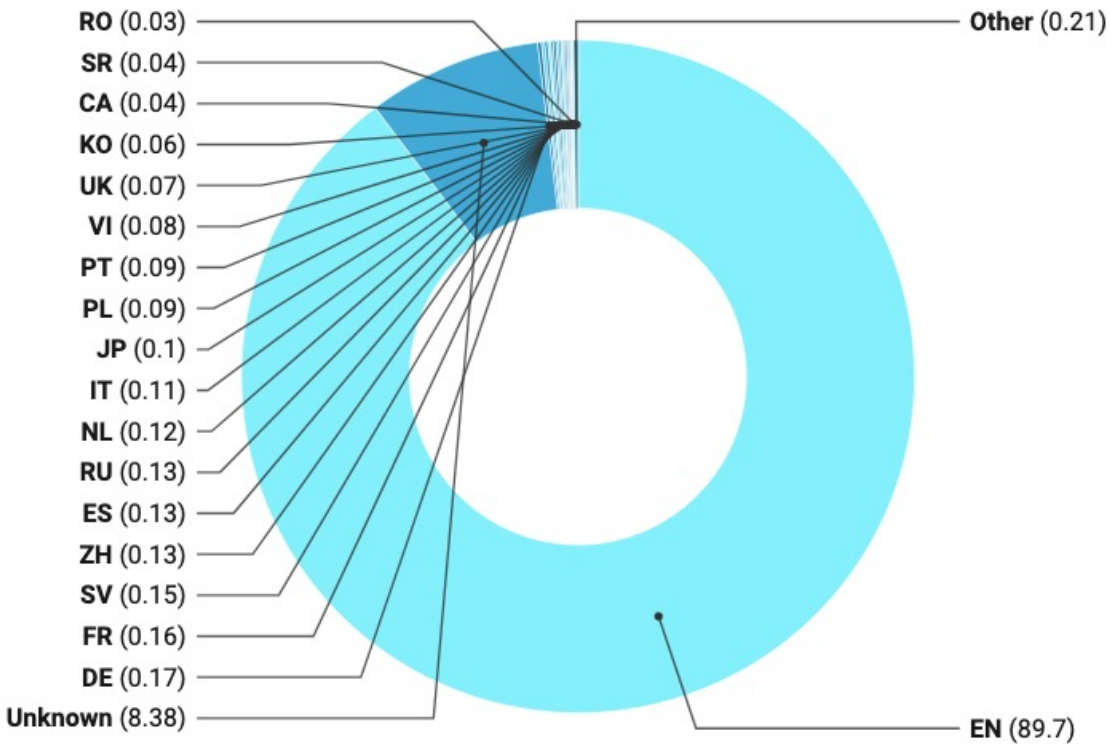
deepset.ai piemērs SQuAD 2.0 datu kopas



Paperspace Blog, How to Train A Question-Answering Machine Learning Model

Problēma – latviešu valoda mazais krājums

- Diemžēl latviešu valoda ir maz pārstāvēta un rezultāti ir vāji
- Nepieciešami praktiski pētījumi, lai noskaidrotu lielo valodas modeļu pieskaņošanas iespējas latviešu valodai



https://slator.com/meta-warns-large-language-model-may-not-be-suitable-non-english-use/

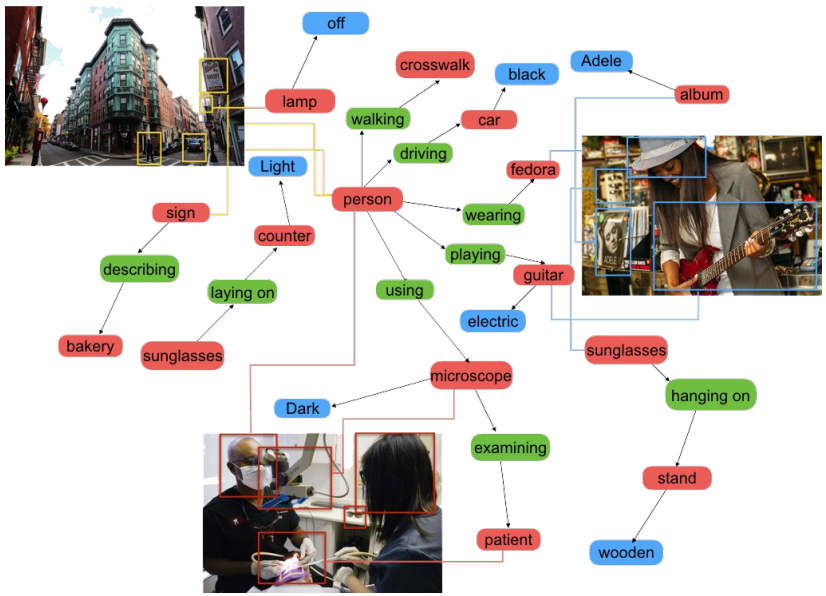
Haoran Xu, Young Jin Kim, Amr Sharaf, Hany Hassan Awadalla; A Paradigm Shift in Machine Translation: Boosting Translation Performance of Large Language Models https://arxiv.org/abs/2309.11674

Iespējamais pielietojums publiskajā pārvaldē

Vizuālais genoms – attēlu un valodas jēdzienu saisaiste*

*D. A. Hudson, C. D. Manning; GQA: A New Dataset for Real-World Visual Reasoning and Compositional Question Answering

* R Krishna, Y. Zhu, O. Groth; Visual Genome - Connecting Language and Vision Using Crowdsourced Dense Image Annotations



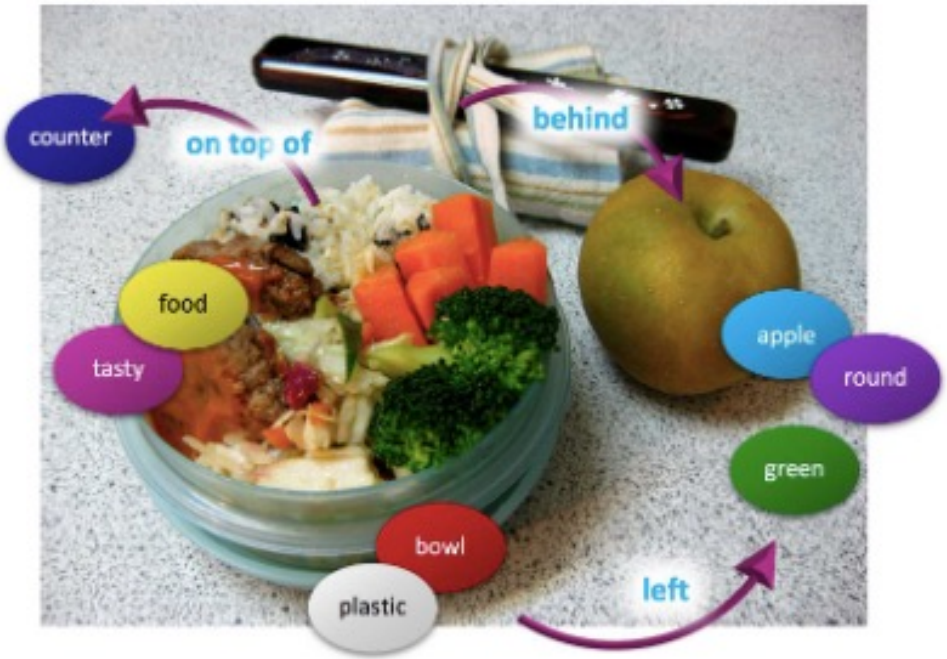


Figure 1: Examples from the new GQA dataset for visual reasoning and compositional question answering:
*Is the **bowl** to the right of the **green apple**?*
*What type of **fruit** in the image is **round**?*
*What color is the **fruit** on the right side, red or **green**?*
*Is there any **milk** in the **bowl** to the left of the **apple**?*

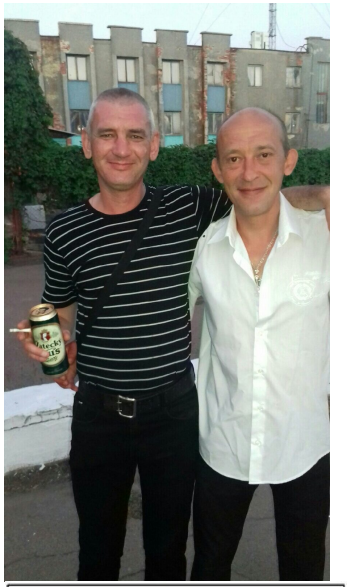
Problēma – latviešu kultūra, vēsture, sabiedrība

- Nepieciešama mākslīgā intelekta modeļu pieskaņošana Latvijas kultūrai, vēsturei, sabiedrībai

https://rundale.net/rundales-pils-apbuves-ansamblis-ieklauts-unesco-pasaules-mantojuma-latvijas-nacionalaja-saraksta/

Kurp ejam?

Мордоскоп



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https://vk.com/s.kolesnik77 (https://vk.com/id290025567)
https://ok.ru/sergant.ua

Apakšējais attēls: Yatskiv, A. Grakovski, E. Yurshevich; An Overview of Different Methods Available to Observe Traffic Flows Using New Technologies.

Iespējamais pielietojums nākotnē

Cilvēku uzvedības modelēšana

Dídac Surís*, Ruoshi Liu*, Carl Vondrick; Learning the Predictability of the Future; CVPR 2021.

In a new study, **Columbia Engineering** researchers unveil a computer vision technique for giving machines a more intuitive sense for what will happen next by leveraging higher-level associations between people, animals, and objects.

"Our algorithm is a step toward machines being able to make better predictions about human behavior, and thus better coordinate their actions with ours," said **Carl Vondrick**, assistant professor of computer science at Columbia, who directed the study, which was presented at the **International Conference on Computer Vision and Pattern Recognition** on June 24, 2021. "Our results open a number of possibilities for human-robot collaboration, autonomous vehicles, and assistive technology."

It's the most accurate method to date for predicting video action events up to several minutes in the future, the researchers say. After analyzing thousands of hours of movies, sports games, and shows like "The Office," the system learns to predict hundreds of activities, from handshaking to fist bumping. When it can't predict the specific action, it finds the higher-level concept that links them, in this case, the word "greeting."

Article | Open Access | Published: 18 March 2022

Using deep learning to predict human decisions and using cognitive models to explain deep learning models

Matan Fintz, Margarita Osadchy & Uri Hertz

Scientific Reports **12**, Article number: 4736 (2022) | Cite this article

3504 Accesses | **2** Citations | **7** Altmetric | Metrics

Abstract

Deep neural networks (DNNs) models have the potential to provide new insights in the study of cognitive processes, such as human decision making, due to their high capacity and data-driven design. While these models may be able to go beyond theory-driven models in predicting human behaviour, their opaque nature limits their ability to explain how an operation is carried out, undermining their usefulness as a scientific tool. Here we suggest the use of a DNN model as an exploratory tool to identify predictable and consistent human behaviour, and using explicit, theory-driven models, to characterise the high-capacity model.

Ko esam izveidojuši Ventspilī

- Pilsētas optiskais datu pārraides tīkls (MAN) 100 GigE
- 2 datu centri , N+1 redundancy is target
- ~250 TB datu
- ~200 virtuālu serveru
- ~1000 institūciju, kas to lieto:
    - Bezmaksas oficiālās elektroniskās adreses pārlūks,
    - Valsts un pašvaldību vienotie klientu apkalpošanas centri,
    - Visas publiskās bibliotēkas,
    - Protams, arī Ventspils valstspilsētas pašvaldība

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