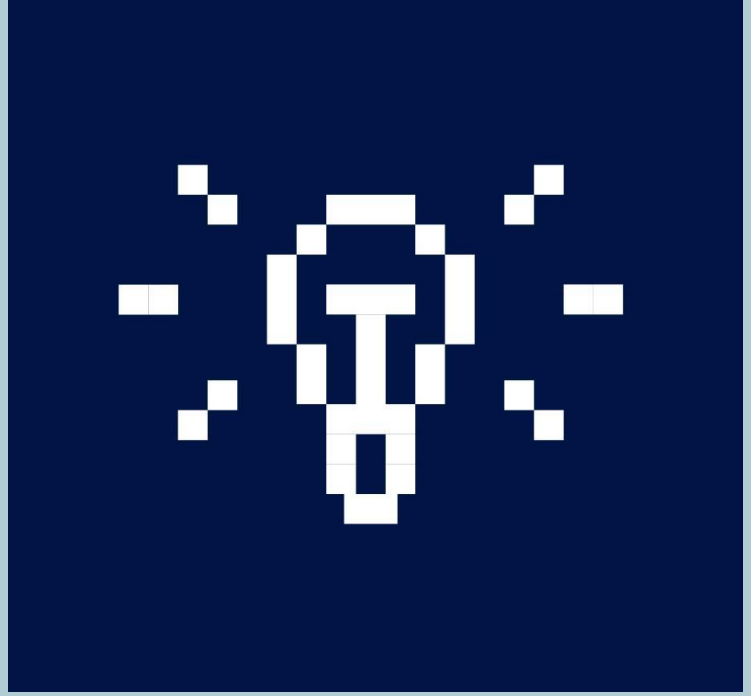

AIslovakIA

GAP DATA INSTITUTE

Explainable Machine Learning/AI (xAI) & Future of Artificial Intelligence CODECON 2023 #AIslovakIA, #CODECON, #CODECON2023

(#AIslovakIA, #CODECON, #CODECON2023, Stará Tržnica, Bratislava, Slovakia)

11. 5. 2023

Radovan Kavický, GapData Institute & AIslovakIA

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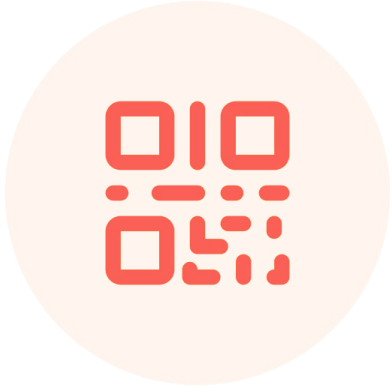

Join at slido.com
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ⓘ Start presenting to display the joining instructions on this slide.

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Which programming language do you develop in?

ⓘ Start presenting to display the poll results on this slide.

About me

Economist (Ing./Macro, Finance/NHF); Slovak Economic Association

AI Expert, PhD. (xAI & Data Science/TUKE, prof. Sinčák), AI & Data Science Evangelist @ AIslovakIA (National platform for AI development in Slovakia), President & Principal Data Scientist (GapData), Consulting (public, private)

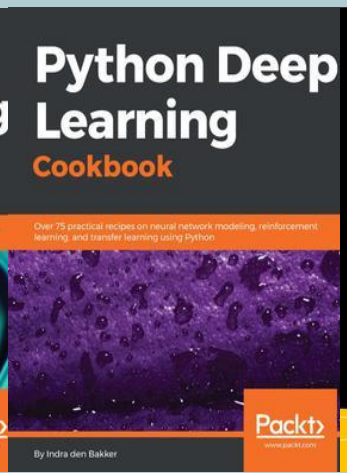
Member of Slovak.AI (currently AIslovakIA), CLAIRE, European AI Alliance, TAILOR (TrustworthyAI @ EU)

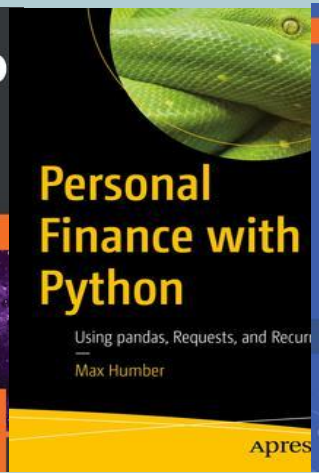
Data Science Instructor @ DataCamp, BaseCamp.ai, Learn2Code/Skillmea, robime.it, NSCC.sk +others

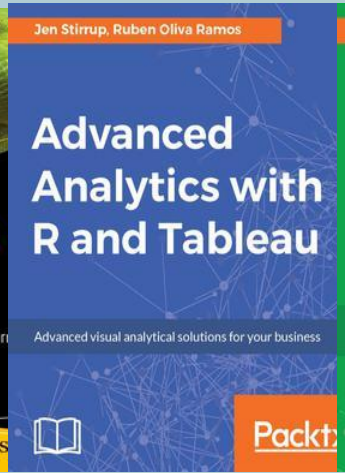
Founder of PyData Slovakia/Bratislava (#PyDataBA), R <- Slovakia (#RSlovakia),

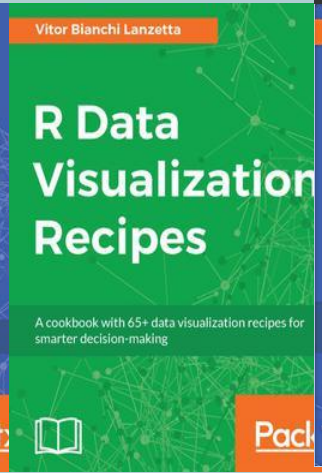
Julia Users Group Slovakia (#JUGSlovakia) & SK/CZ Tableau User Group (#skczTUG)

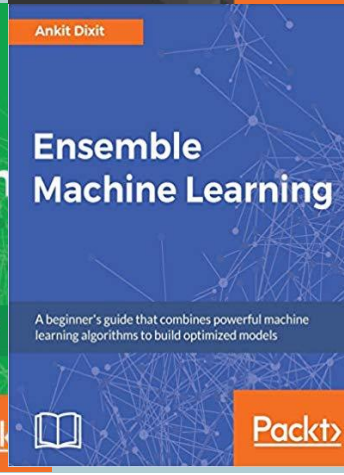
Analýza systému súdnictva a jeho výkonnosti do r. 2010 - Ministerstvo spravodlivosti SR (gov.sk)
https://www.justice.gov.sk/tlacovespravy/tlacova-sprava-1581/











Explainable Machine Learning/AI (xAI) & Future of Artificial Intelligence

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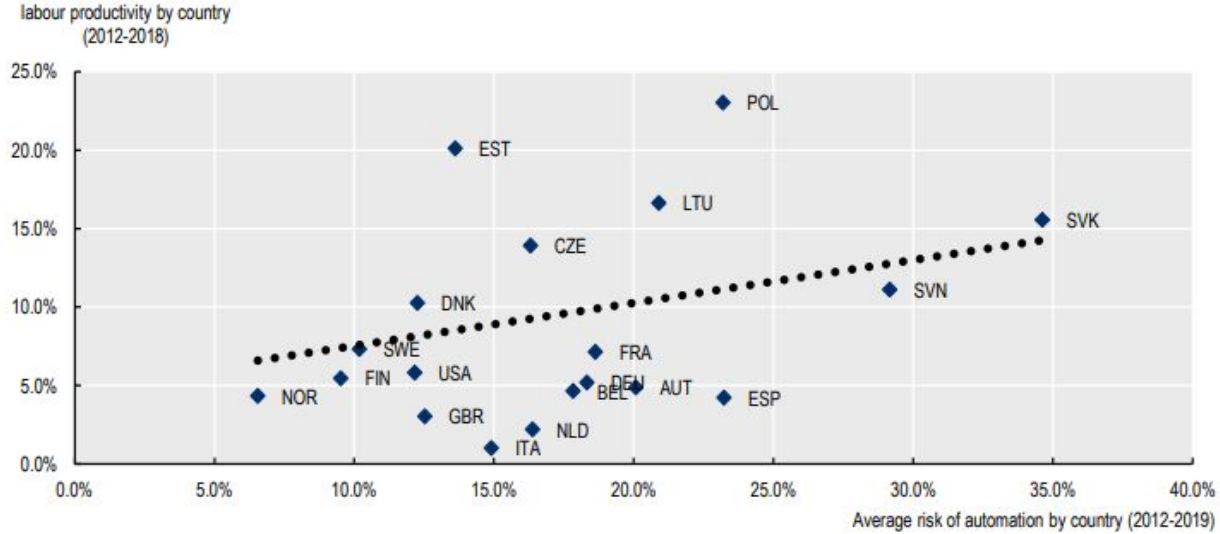
What IDE you are using for programming/development?

ⓘ Start presenting to display the poll results on this slide.

AI & Slovakia or why should you even care?

Figure 4. Labour productivity growth was greater in countries that were at higher risk of automation

Percentage change in labour productivity (2012-2019) and risk of automation (2012)



Note: The averages presented are unweighted. Labour productivity is measured by GDP (in USD, constant prices) per hour workers.
Source: OECD Productivity Database and (Nedelkoska and Quintini, 2018[1])

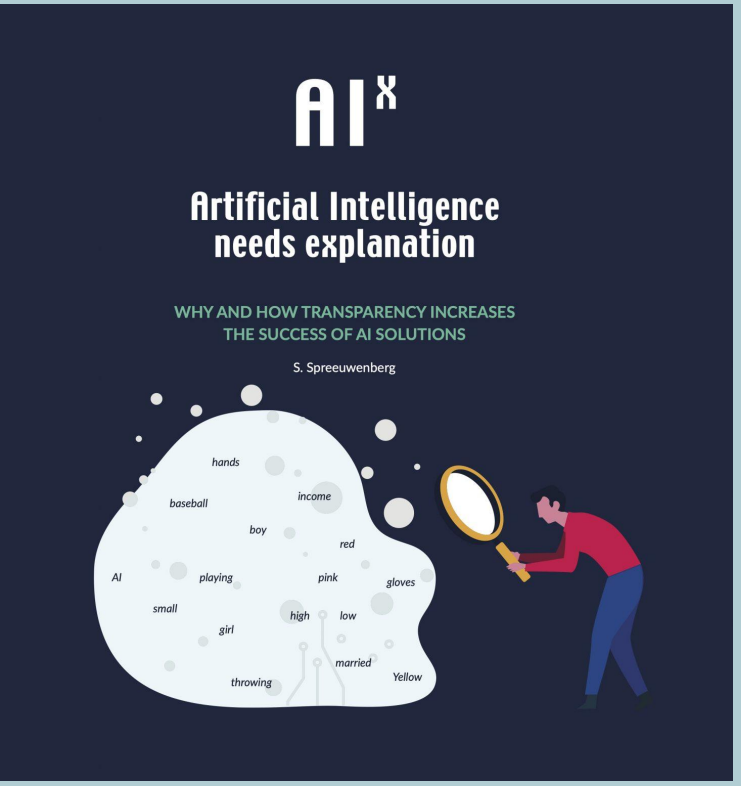
- Source: https://www.oecd.org/future-of-work/reports-and-data/what-happened-to-jobs-at-high-risk-of-automation-2021.pdf
  +
- AI Strategies and Policies in Slovak Republic - OECD.AI, https://oecd.ai/en/dashboards/countries/Slovakia
  +
- AI, automation, and the future of work: Ten things to solve | McKinsey Global Institute

Explainable Machine Learning/AI (xAI), Era of Chatbots, AI & BI collide

DataRobot

- Complex, modern-day ML algorithms, where deep learning & ensemble methods dominate
- really hard to fully understand, but the decision process behind them
- ChatGPT is not transparent/open (at all/bans and restrictions)
- can & need to be transparent and trustworthy for decision makers
- AI & BI coming together
- critical domains as finance, healthcare or public sector & governmental services, where TRUST is a MUST
- Explainability vs. Simplicity
- growing regulatory pressure also outside these areas Explainable AI (xAI) will be necessity for any organization soon
- understand the inner workings of these ML algorithms & how to design systems that imitate intelligence in a transparent way
- overview of current trends in Explainable AI/ML & the challenges that are ahead of us
- Next big thing?

Explainability & Tools (LIME, SHAP & others)



- LIME (Local Interpretable Model-agnostic Explanations)
- explainable AI method that helps to illuminate a machine learning model
- make its predictions individually comprehensible
- method explains the classifier for a specific single instance (suitable for local explanations)
- model agnostic tool which can give explanations for any supervised learning model
- one of the most popular XAI tools out there due to its simplicity and intuitiveness
https://github.com/marcotcr/lime

- SHAP (SHapley Additive exPlanations)
- game theoretic approach to explain the output of any machine learning model.
- connects optimal credit allocation with local explanations using the classic Shapley values from game theory and their related extensions
https://github.com/slundberg/shap
+
Others (100+ tools), f.e.:
- Alibi (Algorithms for explaining machine learning models)
https://github.com/SeldonIO/alibi
- Captum (Model Interpretability for PyTorch)
https://captum.ai/

AI & Slovakia, what exactly are you talking about? What future?

- **OECD.AI** that provides an overview of AI strategies and policies in Slovakia. It includes an action plan for the transformation of Slovakia into a successful digital country and development of the digital single market. The action plan offers a set of concrete steps on how to start building a sustainable and human centric, and trustworthy AI.
- **AIslovakIA,** which is a neutral, independent and non-profit platform with an ambition to develop excellence and bring together experts and those interested in artificial intelligence in Slovakia.

- The national platform of artificial intelligence (AIslovakIA) is part of the Center for Artificial Intelligence (hereinafter referred to as "CAI"), a non-profit organization

- AI/ML augmented analytics (scenarios for data-driven decision making)
- build and deploy highly accurate machine learning models without writing a single line of code, experiment, simulate and compare different scenarios using various models/scenarios to identify the best strategy or test ideas before committing resources
- focus on the right data to analyze, get predictive insights with explanations in your dashboards + run simulations to get actionable prescriptive guidance on what to do next and get instant visual response
- Alphaa.ai (world's 1st AI voice analyst/not just regular "chat bot")

Future of AI/ML and Data Science

- Back to Basics

What Machine Learning/Artificial Intelligence is? What Data Science is?

"Artificial intelligence is the science of making machines do things that would require intelligence if done by men."

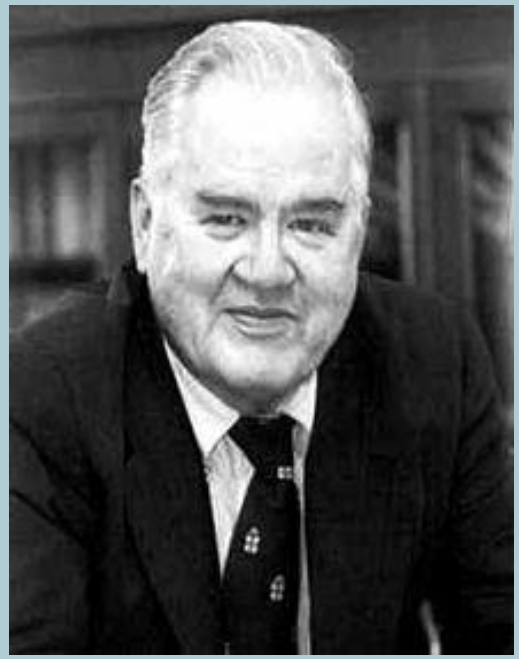
-- Marvin Minsky

- Data Science (definition): collection of scientific results and methods for transformation of data from raw form to meaningful information, knowledge and wisdom, which should support better decisions

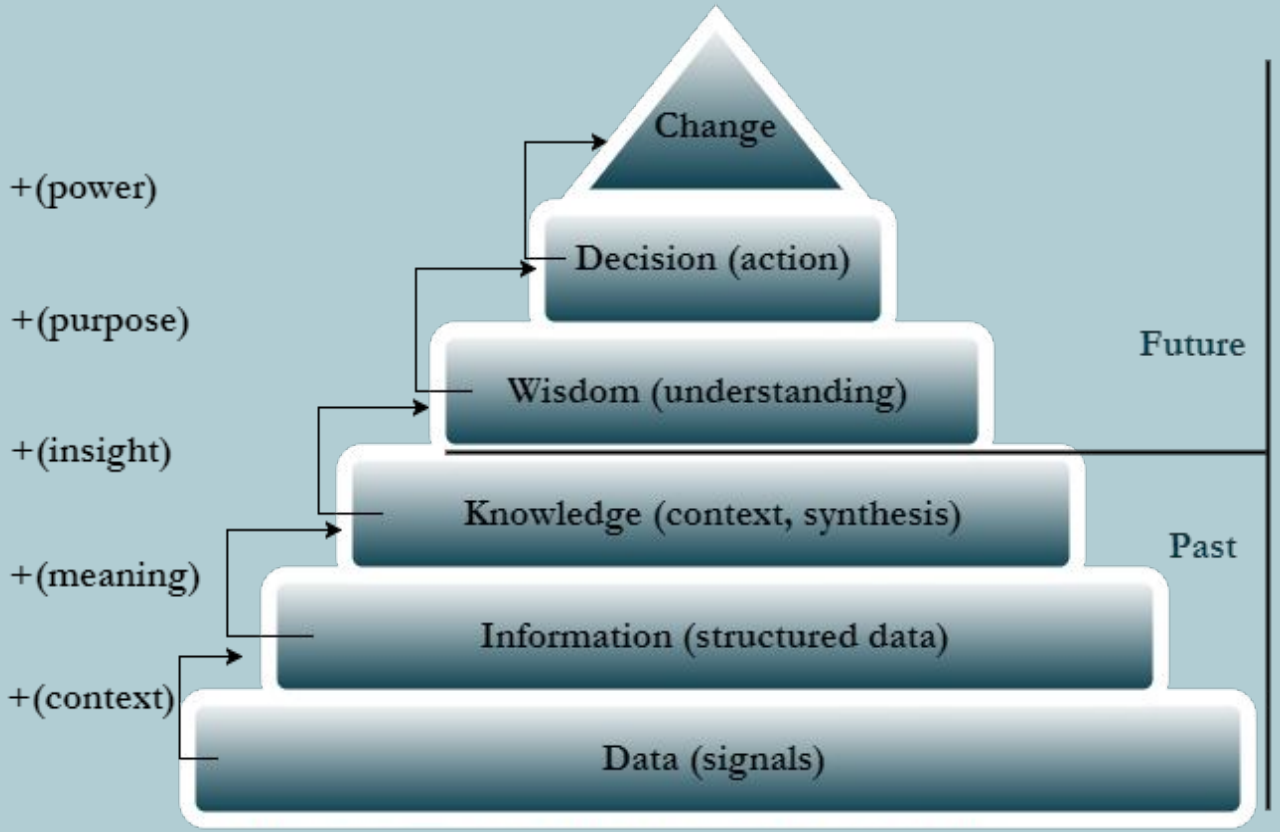
- Data Science: Statistics + programming; data analysis + Computer Science, modelling + Econometrics, Big Data, ML/DL

- Expectation/Prediction: Data Scientists, one of the first "victims" of automation

- Is Data Reality? Do we model reality? (noise/signal)



Data Science Pyramid



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Is data reality?

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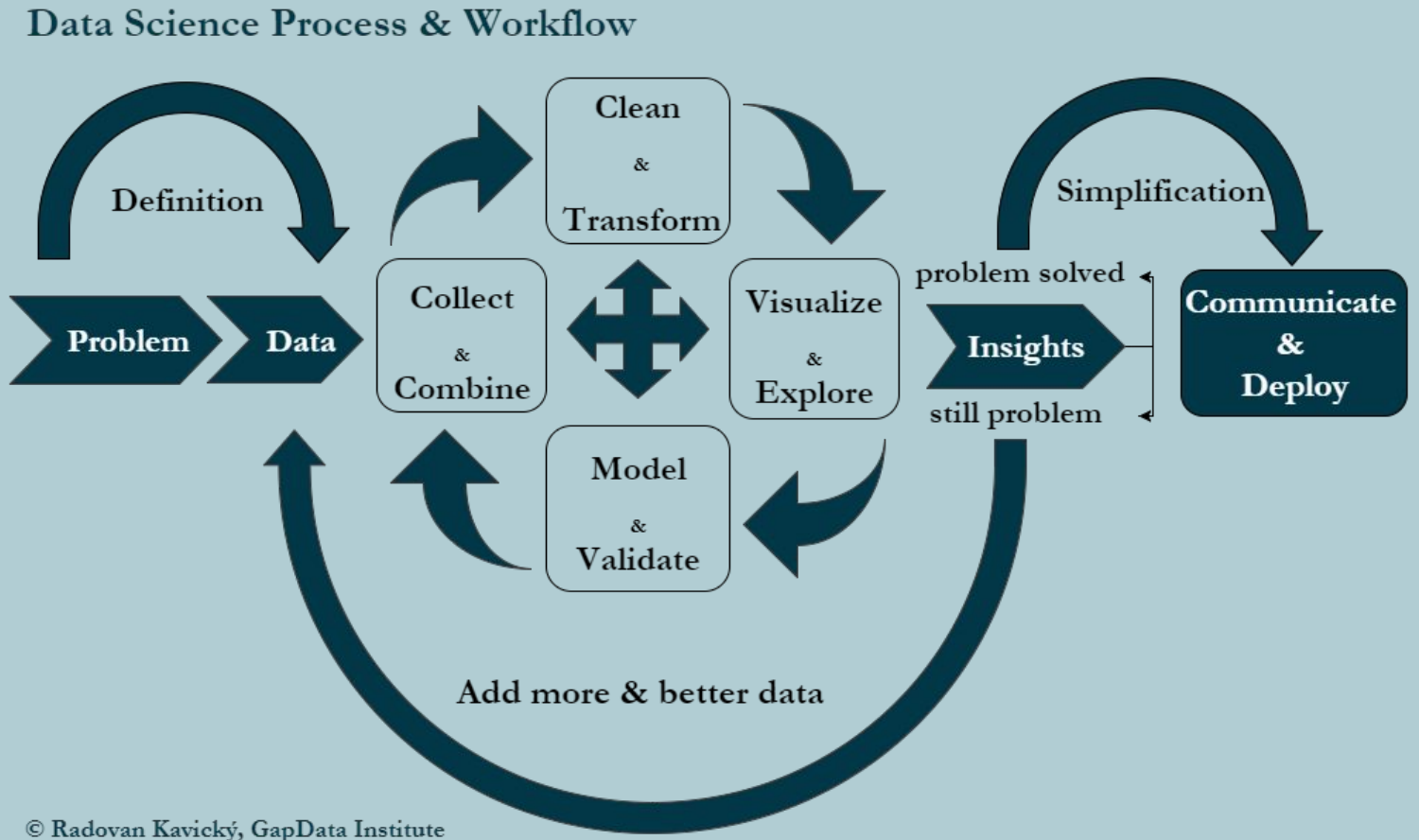
Data is not reality. And if you think so, you should quit your job… right now.

Source: Me :), H2O.ai Meetup, Prague 2019,
https://www.meetup.com/Prague-Artificial-Intelligence-Deep-Learning/events/264335458/


Data Science Process & Workflow
Definition
Problem
Data
Collect & Combine
Clean & Transform
Model & Validate
Visualize & Explore
problem solved
Insights
still problem
Simplification
Communicate & Deploy
Add more & better data
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AI & Ethics (food for thought & main challenges for the future)

- we should all be humble & think all the time about ethical implications of our work
- data in not (at least our) reality & need of transparency (explainable AI/HLAI/Superintelligence)
- we have no programming of common sense (fails/CYC)
- we need both left and right brain/lobe thinking
- we don't know how we really think (and if you think you know, well… good luck)
- we don't know what intelligence is (unknown processes)
- we are not walking neural nets (but if some of you are, please, let me know)
- design perceptron (imitate brain without knowing how the brain really works), real research of brain started (Brain Initiative/public and private research, 2013 +DARPA, IARPA)
- we need to rethink the basic design of neural nets (mathematics of deep learning)
- we can count all the neurons in our brains (10's of billions and 1000's of billions synapses)
- we need rules (ethical & law standards/technology is currently before ethics)

"But the big feature of human-level intelligence is not what it does when it works but what it does when it's stuck."

-- Marvin Minsky

Source: PyData Berlin 2017, Talk on YouTube: https://www.youtube.com/watch?v=I5578BhU4sE

PyData Slovakia (19.-21. 4. 2024, Aula Ekonomickej univerzity v Bratislave) & activities within CEE + V4

WeAreDevelopers

O'REILLY® OSCON

PyData Slovakia 2024

- 300+ members
- 3000+ on mailing list
- 800+ followers
- Partners: O'Reilly, robime.it, codecon.sk, TouchIT.sk
- Sponsors: H2O.ai, Microsoft, kiwi.com
- WeAreDevelopers World Congress (“GAPDATA-25” & “PYDATA-25”), Berlin, 27.-28. July 2023
- Machine Learning Prague (“pydatask15” for 15% discount), Prague/O2 , 2.-4. June 2023
- Our meetups (15.5., 17:00 PyData Slovakia & Bratislava 16:00 skcz TUG/SK & CZ Tableau User)

Human Level AI

AI Startup Showcase

Machine Learning Prague

techsummit.sk bratislava

WEBEXPO

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Explainable Machine Learning/AI (xAI) & Future of Artificial Intelligence

GapData Institute (GDI) and how to support us.

GAP DATA INSTITUTE

- Economic Research & Public Policy & Data Science think-tank (data-tank)
- Data. Think. Change.
- GapData Institute (GDI) is a non-profit nonpartisan research institution harnessing power of data & wisdom of economics for public good.
- Transparent account (from day #1; SK7383300000002200933920 https://www.fio.sk/ib2/transparent?a=2200933920)
- Partnership (openness, transparency)
- Slides (this talk): tiny.cc/codecon2023bratislava
- https://github.com/radovankavicky/codecon2023

Thank you for your attention

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https://gapdata.slack.com/

Invitations (e-mail): https://gapdata.herokuapp.com/

https://github.com/radovankavicky

https://www.facebook.com/groups/356635138031671

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In case you have any question, feel free to ask.

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Audience Q&A Session

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