XIV
CONGRESSO
NAZIONALE
DEGLI
ATTUARI

L'ATTUARIO GLOBALE
PER UN MONDO
SOSTENIBILE
TRA TRADIZIONE,
INNOVAZIONE
E RISCHI EMERGENTI

MILANO
15-17 Novembre 2023
Hotel Quark

AI Challenges

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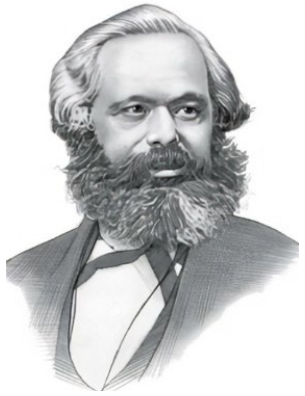
Sir Edmond Halley's life table of 1693



Age. Curt.	Per-fons.	Age. Curt.	Per-fons	Age. Curt.	Per-fons	Age. Curt.	Per-fons	Age. Curt.	Per-fons	Age. Curt.	Per-fons
1	1000	8	680	15	628	22	585	29	539	36	481
2	855	9	670	16	622	23	579	30	531	37	472
3	798	10	661	17	616	24	573	31	523	38	463
4	760	11	653	18	610	25	567	32	515	39	454
5	732	12	646	19	604	26	560	33	507	40	445
6	710	13	640	20	598	27	553	34	499	41	436
7	692	14	634	21	592	28	546	35	490	42	427
Age. Curt	Per-fons.	Age. Curt.	Per-fons	Age. Curt.	Per-fons	Age Curt	Per-fons	Age. Curt.	Per-fons	Age. Curt.	Per-fons
43	417	50	346	57	272	64	202	71	131	78	58
44	407	51	335	58	262	65	192	72	120	79	49
45	397	52	324	59	252	66	182	73	109	80	41
46	387	53	313	60	242	67	172	74	98	81	34
47	377	54	302	61	232	68	162	75	88	82	28
48	367	55	292	62	222	69	152	76	78	83	23
49	357	56	282	63	212	70	142	77	68	84	20

Age.	Persons.
7	5547
14	4584
21	4270
28	3564
35	3604
42	3178
49	2709
56	2194
63	1694
70	1204
77	692
84	253
100	107
	34000
	Sum Total.

Main issues in today's AI:
From scarce and expensive data to abundant cheap data

- cheap projections (weather, customer profiles – the supercomputers that forecast weather are expensive, consume a lot of power and take a lot of time to carry out their calculations -> AI could and does speed up things without any meaningful dip in accuracy)
- needles from a haystack (proteins, antibiotics like halicin and abaucin, material science with a huge number of possible compounds – just as a large language model can generate fluent sentences by predicting the next best word in a sequence, generative molecular models are able to build molecules, atom by atom, bond by bond)

➢ and when something gets cheaper, it is utilised a lot more

Use of AI today in insurance

- most (but not all!) examples related to making sales processes more efficient or streamlining claims management
- maybe understandable, as in b2c contracts in general insurance admin costs are tens of per cents of the premium
- we could reach razor thin margins with novel technology, which would make risk sharing more efficient and bring new hitherto uninsurable risks into the domain of insurability
- in the meantime this could also mean cherry-picking: those good at AI can keep current premiums with efficient AI and earn a lot (and also target clients whose risks are smaller than average) – possibly good at creating the push to better use of technology

Where are actuaries?

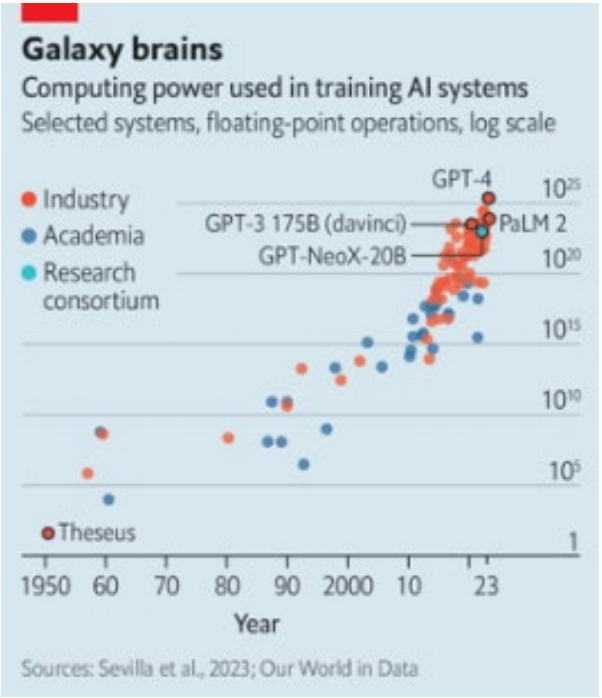
- have we identified actuarial problems that have remained impossible until now but would be within reach with AI?
- are we too much top-down actuaries – we have a theory/model in our mind and we want to fit it to our data – AI can find tentative theories/models from data – should we be somewhat more bottom-up actuaries?

Where AI can help us

- whereas AI might be useful to help fill in gaps in knowledge, the models still struggle to push beyond the edges of what is already known – AI is good at interpolation but less so at extrapolation
- AI can help us by using an LLM to comb through the mountains of research literature and summarise the important articles much faster than any human could

Where is AI going to?

- Eye-watering costs of training and running more powerful models is forcing model-builders to become more efficient. Faced with this, for instance, OpenAI is not yet training its next big model GPT-5, but GPT-4.5 instead, a more efficient version of its current leading product.
- High computing costs have also encouraged the proliferation of much smaller models, which are trained on specific data to do specific things



Not so cheap data after all

- All these models are now scrambling for data – the second force shaping the generative-AI industry. The biggest, such as OpenAI's and Google's, are gluttonous: they are trained on more than 1 trn words. But the internet is close to being exhausted
- Generative AI's hunger for data and power makes a third ingredient more important still: money. Many model-makers are already turning away from ChatGPT-style bots for the general public, and looking instead to fee-paying businesses

Is this our Edmond Halley moment?

Or our David Hilbert Moment?

Hilbert put forth the most influential list consisting of 23 unsolved problems at the International Congress of Mathematicians in Paris in 1900. This is generally reckoned as the most successful and deeply considered compilation of open problems ever to be produced by an individual mathematician.

Where is our Hilbert stating the actuarial problems?

- Actuaries were not ready for AI
- will we be ready for quantum computing?
- who will be the first quantum actuary, showing how some impossible actuarial problems could be solved in a reasonable time with quantum computing?

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