Thoughts on the future of human knowledge and machine intelligence

Throughout history, nations and armies have brawled for knowledge. The burning of the Library of Alexandria, the destruction of Xianyang Palace's archives, the secret investigations of the Dead Sea Scrolls, the destruction of the Mayan Codex, and many other examples illustrate the continuous human quest for owning knowledge or eliminating it from an enemy.

Knowledge however, has a peaceable face; like music, love and beauty – knowledge is the most amiable thing. It transfers through borders, through time, and even some preliminary studies show that knowledge can transfer via our DNA through generations. In many cases, knowledge would either hinder or thrust human progress. Fortunately, our collective knowledge is always growing. One cannot undermine the *Knowledge Doubling Curve*, it dictates the following: Until year 1900, human knowledge approximately doubled every century; by 1950 however, human knowledge doubled every 25 years; by 2000, human knowledge would double every year.

Today, our knowledge is almost doubling every day! Although hard to measure or validate; as a result of such fast pace, three significant questions are yet to be answered: how are we going to manage this mammoth knowledge overflow? What if that knowledge can be organized, structured, and arranged in a way that can allow its usage? What if it falls in the wrong hands?

Answers to those three questions is becoming increasingly possible through the new promise of *Data Science*; which is a reincarnation of the old testament of Artificial Intelligence (AI). Through a variety of AI models, knowledge can be extracted, recorded, represented, and formulised in an electronic form. That doesn't merely allow for its direct usage, but also enables improving it, facilitates pulling insights from it, and adding more to it. That AI model is referred to as a Knowledge-Based System (KBS) within the AI research community.

Data (besides the algorithm) are the main fuel for any AI model. The new wave of Data Science has given a new face to KBS. Data are collected through our laptops, tablets, phones, wearables, cars, sensors, and credit cards; anything we buy, any swipe, click, snap, or flick is being recorded as a data point. That data can provide unimaginable insights, disruptive technologies, and a unique chance to comprehend human desires, trends, habits and preferences. However, most importantly, data can lead to real solutions to serious problems. Information about diseases and their cures, formulas for forecasting hurricanes and earthquakes, fraud detection, government transparency, better policy making, improved healthcare, technologies for renewable energy, solutions for water scarcity, and many other challenges facing our race could be resolved through data-driven AI.

For instance, during medical diagnosis, doctors in many cases are not able to include all the factors that would influence their decision, or comprise all the input parameters that might change the outcome. The variables that lead to a decision are in some cases, too many. That applies to many other areas of decision-making, such as policy making at government, and launching a space shuttle. As human beings, studies show, we are able to manage up to seven entities of thought at the same time; beyond that point, our brains start clustering, dodging, bucketing, and forgetting ideas. AI models for decision-making, predictions, finding patterns, and locating trends offer solutions to this inescapable challenge.

Consequently, data that provide such knowledge, is highly valuable. There is no doubt therefore that electronic data is the new oil! As the main fuel for AI models (i.e. intelligence), the next best *national commodity* will be data; terms such as *data economy* will be increasingly common in coming years. Countries' economies will be partly measured and driven by the amounts of useful data that they own.

Governmental data will be driving progress, friendships, and possibly conflicts and wars around the world in the near future. Data and AI models are aimed to achieve 'complex tasks within complex environments'. However, to avoid the recent loud babble of buzz words, *Artificial General Intelligence (AGI)* is still at a 'caveman' stage. Future generations will probably refer to us as *AI cavemen*. Our autonomous car that is designed to avoid accidents, is more like discovering fire that is ignited to avoid the cold.

AI, since its inception, has faced many challenges; mostly due to fears of machine superiority, theological resistance, loss of jobs to machines, and humans' informality of behaviour. Those reasons, along with the lack of any clear AI success, were major influencers of the AI winter during the 1980s. During that period, faith in AI diminished, funding to AI projects stopped, and general interest disappeared. Today, through the recent rise of data science, machine learning, and predictive analytics, the interest in AI is on the rise again; and this time, it is in fact spiralling out of control.

Some demonstrate it as the new silver bullet, and there are certain loud calls for declaring its premature success – which might lead to its failure (again) due to high expectations, ignoring its dangers, and not realizing that we need to manage it, regulate it, and develop treaties for its deployment, trade, migration, and control. Due to our increased dependency on technology, AI and its data ought to be steered away from a bubble-burst, or a serious meltdown. Furthermore, access to data must be controlled, one's right to not share their data, data privacy concerns, safety issues, and cybersecurity are daunting challenges that remain unresolved. Luckily, calls for AI and data democratization are rising, but they remain weak and scarce.

Henceforward, one aspect is key: For AI to reach its righteous goals, for humans to reap its benefits, and for our race to avoid another 'burning of the Library of Alexandria' – AI researchers, practitioners, and believers are on a mission to display the '*virtuous goodness'* of AI. If that is not clearly deployed and demonstrated, AI will surely experience another winter; an everlasting one.

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Notes:

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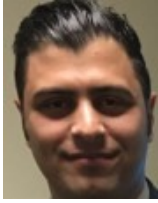
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