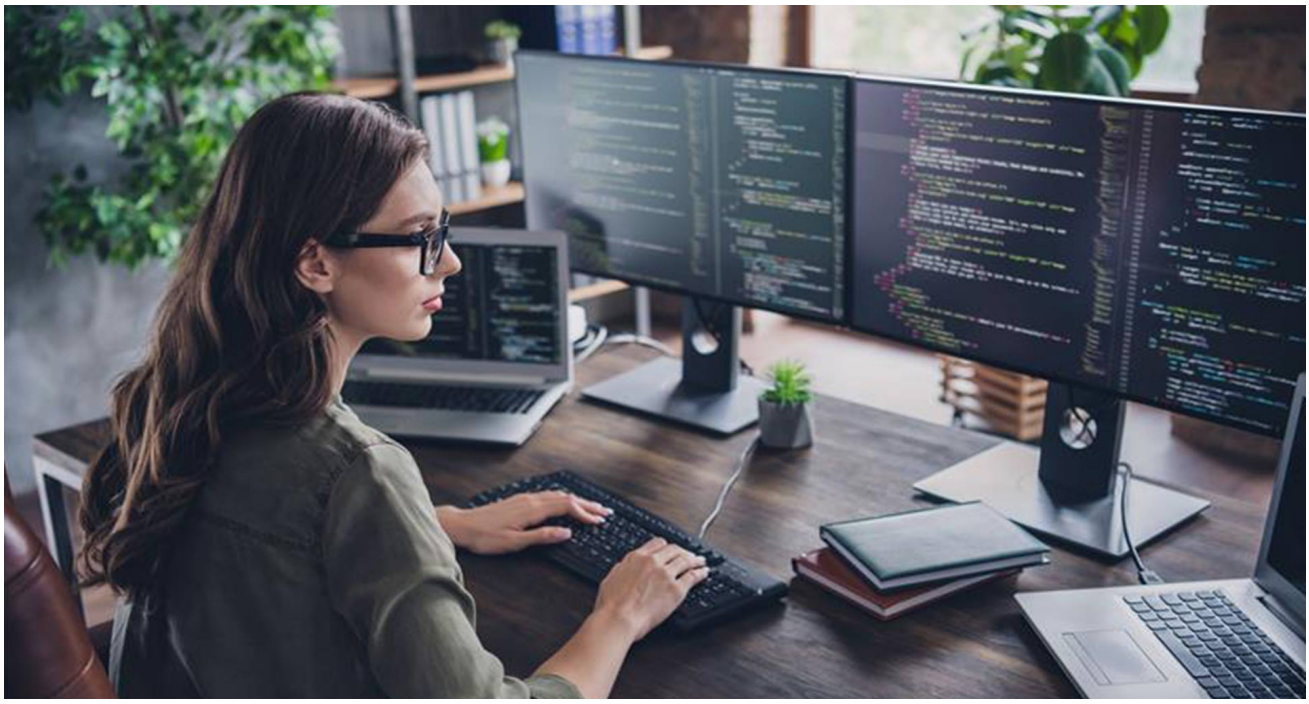
HALF-FULL REPORT 03/28/25



Paradigm Shifts

Alfred Brown asked a very intriguing question on the TTP forum after last week's HFR. It is an intriguing question:

Mr. Ryan:

I would like to ask a question based on the statement "the work of almost every member of the laptop computer class is quickly becoming redundant."

I am a member of the committee of the State Board of Engineering and Land Surveying that meets to interview and select candidates for empty seats on the Board for consideration by the Governor. I represent the AIChe on this committee of professional Societies. I leave out the state where I practice to maintain confidentiality.

When interviewing an Electrical Engineering Candidate for the Board, I thought up this question as we were discussing licensure, and how to encourage it among the declining numbers of both student and practicing engineers. For those not watching the numbers, with the retirement of the baby boom, where most of the engineers were, following their Dad's who all got engineering

degrees on the GI Bill, the number of Engineers in the US has fallen to about half what it was in the 1990s. Chemical Engineers Like myself have dropped from about 39,000 in the mid 1990's to under 21,000 today.

So the question I posed was:

Will AI ever be in Responsible Charge?

Is it capable of being in Responsible Charge?

Will the various state boards allow AI to be placed in Responsible Charge, and how will it be held Responsible?

Great question.

The speed with which AI is advancing is breathtaking and appears to be following something like Moore's Law in the early days of the PC computer revolution.

However, AI relies on the probability of a specific word or piece of computer code following another based on the occurrence of the relationship among billions of lines of text or computer code. AI drives everything towards the status quo by its design.

The central concept is logical induction, and this introduces a problem.

The problem of induction involves making generalizations based on specific observations or experiences. For example, if we observe that the sun has risen every morning in the past, we infer that it will continue to do so in the future. The problem arises when we try to justify this inference, as past observations do not guarantee future occurrences.

In the context of AI, the limits caused by induction are significant. AI systems learn from data and make predictions or decisions. These systems are trained on large datasets and identify patterns or correlations to make informed guesses about new, unseen data. In most cases, this works pretty well and is the reason why most of the laptop class will be made redundant.

Elon Musk certainly knows this, as his company developed Grok. If readers have not played with it, follow this link to **Grok** and have some fun.

Much, perhaps most, of what those angry federal workers do is move data from one place and

insert it in another. Of course, many federal jobs, such as park rangers or Navy underwater welders have jobs connected with the tangible world, but most do not. By linking the databases between agencies and departments, and using automated tools to find and apply data, the federal payroll can be significantly reduced. Most federal buildings are just big places full of obsolete file cabinets, built long before networked computers appeared.

AI finds data in huge databases and uses probability tools to insert what is most likely to come next.

However, data must exist in the system in order to be discovered and used. Sure, interpolation between data is performed, but if the data is incomplete, biased, or not representative of the real world, the AI's ability to make accurate predictions or decisions will be compromised.

Another problem called overfitting occurs and might be an ultimate limit to AI. Overfitting is when an AI model becomes too complex and starts to fit the noise in the training data rather than the underlying patterns, it can lead to poor performance on new, unseen data. Musk and the DOGE team often speak of the signal-to-noise ratio, and the tendency of the democrats to chase noise instead of signal.

And by the way, much of this week's drama around *Signal*, the encrypted communication platform, sounds like a nerdy inside joke where the Trump team sent the Dems on a wild goose chase. When the MSM and their fellow travelers figure out the joke, it will all be Get Those Nerds!!. In a world where the Dems are conditioned to respond to stimulus without rational thought, manipulating the signal-to-noise ration will drive them over an edge.

But more to the point of Alfred Brown's excellent question, inductive systems lack causal understanding. AI identifies correlations and patterns, but does not necessarily provide a causal understanding of relationships between variables that is at the heart of engineering. This can lead to incorrect inferences and predictions when underlying causal chains change.

AI has serious trouble handling novelty. As of today, AI datasets struggle to generalize datasets to novel situations that differ from their training data. This is because induction relies on past observations, and when faced with entirely new scenarios, the AI may not have the necessary information to accurately predict the next bits of data.

AI systems have inherent biases and built in assumptions in the form of rules that guide their internal workings. A "good" AI system is one that has internal rules consistent with needs of its users. If the rules do not align with reality, then bad things will happen.

Engineering, as a discipline, relies on logical deduction from primary theorems. There is an

element of data table lookup, but only after problems have been structured.

When an AI system is asked to use logical deduction, it will accept a set of premises or facts as input and apply the appropriate logical rules or inference mechanisms to the premises. Then it will derive conclusions that follow logically from the given premises.

But if the premises are not given to the AI system or not already in the database, the AI will fail. This makes the job of the engineer heavily biased towards identifying, testing, and validating premises in the era of AI. It also prevents, for the time being, for the AI from becoming the responsible charge engineer on a project.

This could change, and change rather quickly, if AI tools become very good at selecting and applying engineering premises and mathematics to problems. One could imagine a master AI that validates the premises and code compliance of all other AIs. The role of the human becomes identifying the missing information rather than working with the know information.

This will likely become true in all the licensed professions.

****

Ministry of Propaganda

On March 26, 2025, Katherine Maher, the CEO of National Public Radio (NPR), testified before the House Subcommittee on Delivering on Government Efficiency, chaired by Representative Marjorie Taylor

Greene. The hearing, titled "Anti-American Airwaves: Holding the Heads of NPR and PBS Accountable," focused on allegations of political bias in NPR's reporting and questions about the use of federal funding for public media. Maher appeared alongside Paula Kerger, the CEO of PBS, as lawmakers examined the operations and editorial practices of both organizations.

The link to C-Span is here: NPR Head Before Congress

During the session, Republican lawmakers, including Representatives Greene and Jim Jordan, questioned Maher about NPR's coverage and her personal statements, particularly past social media posts from before her tenure at NPR. They raised concerns about perceived liberal bias, pointing to specific examples such as NPR's handling of the Hunter Biden laptop story and Maher's earlier tweets, some of which criticized former President Donald Trump and expressed progressive viewpoints. Maher acknowledged that NPR's leadership, including herself, believed the outlet should have covered the Hunter Biden laptop story more thoroughly, calling it a mistake.

Then the real show started as she denied, over and again, having made radical, violent, and extremist statements on Twitter and other social media. One can only conclude that Maher is a graduate of the Hillary Clinton School of Public Smoke Screens.

She hails from an interesting background,Here moving quickly from being the daughter of a Connecticut senator to the head of major NGOs and government functions.

Let's just say that she moved up to become America's Propaganda Chancellor in Chief at the speed of Obama. Her father's alleged role as financier to the spooky world, and her mother's state senate seat had nothing to do with her success, don'tchaknow. After all, this isnt the same story as Obama, whose grandfather, grandmother, and mother's work for the world's most beloved agency put Obama in the right place, at the right time, with the right credentials.

Its not the same story because she is from Connecticut and Obama is from Hawaii.

But what do I know? Her rise as a manifestly dishonest and unqualified keeper of the narrative just looks like an Obama-esque duck and quacks like an Obama-esque duck. That's all.

As a propaganda tool, NPR is obsolete and should be shutdown for this reason alone. It's pro-globalist, BBC wannabe programming is narrowly directed to the feminists down at the drama and theater quad over at the local university. NPR has become irreverent.

****

Ceasefire

The Trump administration's shuttle diplomacy between Putin and Ukrainian President Volodymyr Zelensky has resulted in some short-term agreements, such as a 30-day ceasefire and a commitment to extend the ceasefire to the Black Sea. However, these deals have not been implemented, and fighting continues along the front lines.

The Black Sea initiative, aimed at protecting shipping lanes, has also faced difficulties due to disagreements over the terms and obligations. Russia insists on reconnecting some of its financial institutions to the SWIFT banking system to facilitate trade, but European allies are opposed to lifting any sanctions until there is tangible progress in the negotiations.

This stance puts Europe at odds with the Trump administration, which appears open to discussing Russia's demands. If the US decides to bring Russian banks back into the SWIFT system, European governments would need to agree, which seems unlikely given their current position.

Europeans still don’t have a plan, but leaders are starting to realize that the United States cannot, at this time, fight a two-front war with Russia and China. If China moves in the Pacific, the USA will protect Japan, Australia, and New Zealand, the Philippians, and Taiwan. This means that Europe must shoulder the burden of a belligerent Russia.

Sweden did have a secret nuclear weapons program during the 1950s and 1960s, which resulted in the production of two atomic bombs. The Swedish government later decided to dismantle these weapons and abandon the nuclear program. So they say.

The decision to dismantle the atomic bombs and halt the nuclear weapons program was likely influenced by Sweden's commitment to international non-proliferation efforts and its desire to

maintain a neutral stance during the Cold War. However, Sweden and Finland openly discussed the possibility of becoming nuclear states if the American nuclear umbrella is withdrawn from Europe. Poland would likely join the club. Finland's F-18s, Poland's F-16s, and Sweden's Grippen fighters can be modified to become nuclear strike aircraft.

Europeans, it seems, don't trust the French to maintain a French nuclear umbrella as the USA pivots to Asia.

****

Decentralization

So many new weapons and new technologies have emerged during the Ukraine War that the doctrines have not kept pace with the technology. Ukrainian doctrine focuses on territorial defense, mass, and asymmetric tactics. They are trying to make use of decentralized command and flexibility.

American doctrine is based on deterrence, multi domain operation (land-sea-air-space-cyber-economic-cultural), force projection and scale. The United States relies on mission-oriented central command. Ukraine's decentralized and flexible, territory based command, does not mesh well with American command and control. This is a problem.

Ukraine is doing things that America cannot, such as running a large number of garage-based drone factories that produce weapons like Claymore mines and mortar shells attached to radio-controlled cars. Ukrainians are out-innovating everyone right now, and this is a problem for NATO.

It is an even bigger problem for Russia. Just as the microchip crushed Russia's economy based on tons of steel produced, the explosion of AI-equipped autonomous weapons is unlike anything that any army has faced before. It is unclear whether Russia's highly centralized command and control can mount a defense against drone armies. Or whether Russia can decentralize decision-making sufficiently to deploy these weapons effectively.

This HFR discusses how artificial intelligence is increasingly replacing licensed professionals, signaling a shift in the job market, and the skills required to succeed The decline of state propaganda organs suggests a weakening of government-controlled media and the rise of alternative sources of information. Furthermore, the significant challenges faced by the large powers as they grapple with the complexities of the current geopolitical reality. Amidst these changes, there remains the perseverance and success of a small, determined state that bet everything on decentralization and innovation.

These are revolutionary times.

Mike Ryan is a chemical engineering consultant to heavy industry.