



OPEN DISCUSSION

VALENCIA
November 2023

SoftNet 2023 & SocSys 2023 & IARIA Congress

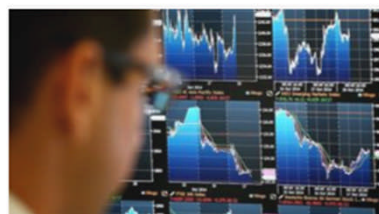
Diving into generative-AI to Assess its Current Status

Coordinator: Prof. Dr. Petre Dini, IARIA, USA/EU

petre@iaria.org

<https://www.iaria.org/fellows/PetreDiniAtAGlance.pdf>

IARIA is member of ORCID



AI bot 'capable of covering up illegal trading'



Trading is increasingly done by computers



Sudden Planetary Storm

Valencia
November 2023



King Charles: AI risks require urgency and unity

King enters debate on AI as UK holds summit and announces global declaration on managing threats.



Elon Musk ahead of his meeting with UK PM Rishi Sunak

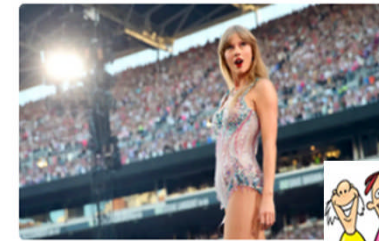


US announces 'strongest action yet' on AI safety

The measures have been issued less than 48 hours before the UK hosts an AI safety summit.

US vice-president to say short-term problems with technology as pressing as existential ones, before UK summit

UK politics live - latest updates



Security game-changer for concerts, sporting events that will get you inside faster



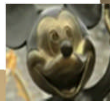
Is AI a blessing or a curse? Barcode developer says 'it could go either way'



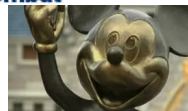
Apple CEO sings AI's praises on rare visit to Capitol Hill



AI has already surpassed human capabilities in several domains – which jobs are next?



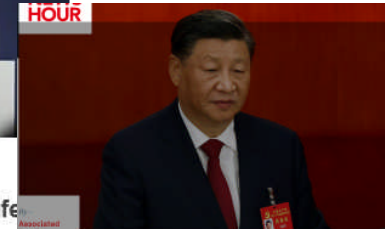
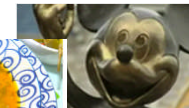
Germany invests millions into AI military metaverse' that could forever change combat



Kamala Harris will reveal that 30 countries have agreed to sign a US-sponsored declaration for the use of AI by militaries. Photograph: Manuel Balce Ceneta/AP



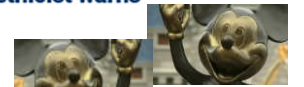
Society & Equity
US to launch its own AI safety institute



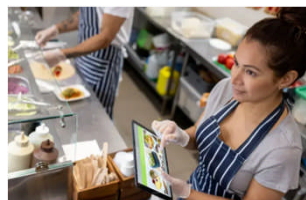
China warns of artificial intelligence risks, calls for increased national security measures



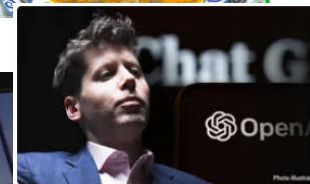
Terrible things in store if Washington doesn't act on AI race, tech ethicist warns



Disrupted
LinkedIn hits 1 billion members, adds AI features for job seekers



The military metaverse enables pilots to have more frequent training against relevant targets. Robinson said. (Dad A)



CEO warns of 'very strange outcomes' from new tech with 'superhuman' skills





Before anything...

VALENCIA
November 2023

- **I acknowledge** that generative-AI is a useful approach for certain activities/duties, not necessarily ‘artificial’, but definitively, not ‘intelligent’, either; it seems a useful tool on a narrative in context, without any innovation in that context.

YET: multilingual narrative translation: I've seen que tu peux gerer istorii in mai multe limbi" → "Ho visto che puoi gestire storie in diverse lingue.»

- **There are many areas and themes** where output from generative-AI tools **might be useful**, when carefully considered:

- drafting some content (yet to be combed by humans) on a given topic; a reasonable summary on a topic, quick reply,
- coding chunks, multiple programming languages, ... providing useful classroom personalized materials
- making trip/travel plans in certain areas, saving time, pointing to things you might not be aware-off
- others (situation on new nano-art, position ethics,...); very useful at the level of being informed; very promptly!

- **As of Nov 13, 2023, my observations** are that:

- the output replicates (quicker, more comprehensible) what a human can do, usually called ‘automation’
- the output is subject of unintended (not easily detectable) mistakes issued with confidence
- the trust in the output (apart you have a clear understanding of expectation) is jeopardized by the nature of data used (not-validated, eventually obsolete, incomplete, not scientific)
- there is a danger of spreading false information (and news, facts)
- there is no accountability, liability, explainability of the output

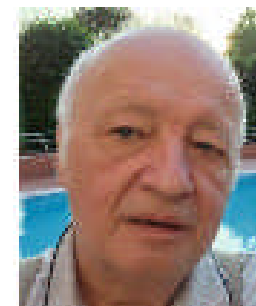
- **Generative-AI is a fledgling piece in the AI jigsaw**, useful in trivial cases, mostly informative, but its output cannot be taken as a proved and trustable fact || (try-test-trust-test-again-try-again and so forth, until you **lose trust or get confidence**)



PETRE – AI-related activities

VALENCIA
November 2023

- Petre: 1980/90
 - Fuzzy-based resource allocation, Automatic knowledge incorporation, CAD/CAM Expert Systems,
 - Real-time embedded systems, Space/time thinking and processing, Multi-layers context-based meaning
- Petre: 1992: The First ITC Conference (Montreal), tutoring systems, self-adaptable Q&A professor-student systems (advanced Chatbots)
- Petre: 1997 Dartmouth, Mobile Intelligent Agents (Intelligent Grasshopping Polling)
- Petre: 1997-2000: Nomadic code, Mobile agents, (Grasshopper EU project)
- Petre: 2000-2010: Autonomous systems, Policy-driven systems, Intelligent systems (pushed to Patents, ITU, TMF, standards)
 - Capturing emerging properties, Variable pooling frequency, Self-adaptable decision policies, Reflexive-policies (Digital-Twins)
 - Routers embedded-AI (temporal logic in Syslog processing, policy-driven signal processing)
- AI-driven Selection of Content Servers based on Current Server Availability (dynamic availability, heuristics, real-time)
- Petre: 2010 - now (active observer and critic, panels, open discussions)



Petre DINI
petre@iaria.org

At large: <http://www.iaria.org/fellows/PetreDini.pdf>



AI Dream - Strong Evidence

VALENCIA
November 2023

AI does not exist in itself! (Ignorance, Arrogance, or Charlatanism)

AI is a parable, an umbrella, a target, a catalyzer, a Morgan the Fairy, an Accelerator, a distant dream, a fight for perfection, to reach the humans' intelligence capabilities.

Steam-engines, pencils, wind propellers, there were ALL steps of inventions towards AI (**EXPERIMENTS** are imperative)

- Can you imagine any AI entity thinking at **a pencil**, by itself, finding needed materials, shipping them, building the process, building the machinery, finding the glue, the powder, and having it in various types (more than 600 activities)
- Same question on simply **building a wind propeller pallet, a church, or proposing a recipe**. *(each item takes a human collective thinking approach)*
- One may think at **ANYTHING** and the above statement holds; and this, because *everything* involves **brain activity**.

As dreams are not easy to be achieved, humans invented satisfactory levels, for their own comfort (as life is short, we should be proud of something, 😊); mainly, the famous 'one step at a time'. 😞 currently, we are at the very beginning of the first step!

There are:

- 5 Levels of Capability Maturity Models (software), as there were/are well too many software failures
- 5 Levels for automation on Driverless Cars, as well to many failures and challenges (to claim one step ahead)
- 3 Levels of Chargers for Electric Cars

and **surprise**

- (at least) 4 levels of AI capabilities, as of Nov 13, 2023; some, name 7, already; <https://builtin.com/artificial-intelligence/types-of-artificial-intelligence>

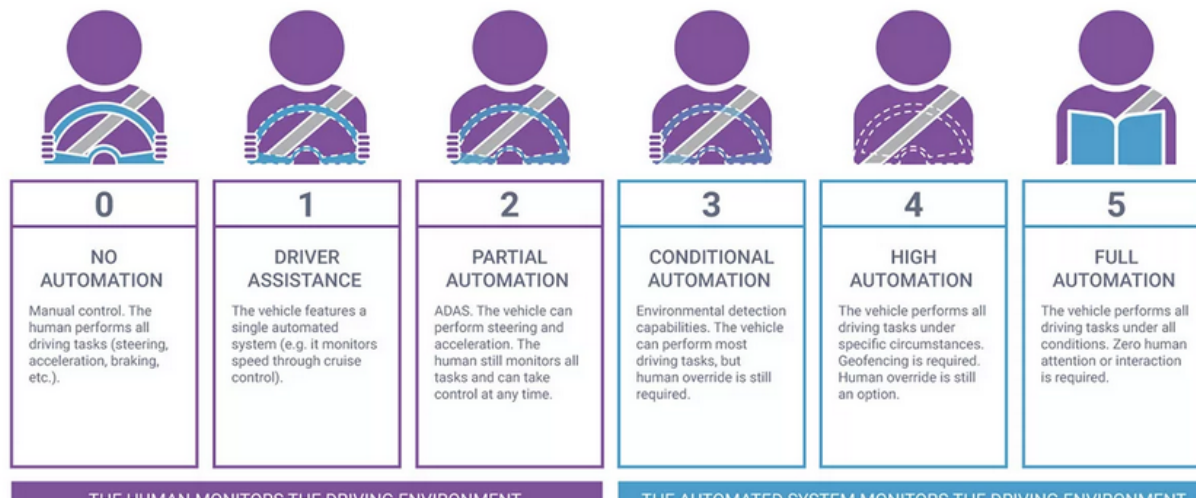
Generative-AI is the very first (still, sloppy achievement) and at a very low level of AI-dream (that is as much as we can, now).



AI Dream - Strong Evidence

VALENCIA
November 2023

LEVELS OF DRIVING AUTOMATION



7 TYPES OF ARTIFICIAL INTELLIGENCE

- Artificial General Intelligence:** AI designed to learn, think and perform at similar levels to humans.
- Artificial Superintelligence:** AI able to surpass the knowledge and capabilities of humans.
- Reactive Machines:** AI capable of responding to external stimuli in real time; unable to build memory or store information for future.
- Limited Memory:** AI that can store knowledge and use it to learn and train for future tasks.
- Theory of Mind:** AI that can sense and respond to human emotions, plus perform the tasks of limited memory machines.
- Self-aware:** AI that can recognize others' emotions, plus has sense of self and human-level intelligence; the final stage of AI.



AI Dream - Strong Evidence

VALENCIA
November 2023

Generative-AI

Do not be disappointed; the model is rather trivial; only the context makes it more relevant; see quantity vs quality!

The working model is like having all the maps and trying to get from A to B, in a mountain region (you have detailed maps of), by checking the stability of any little rock and decide to go one step ahead (after seeing that you didn't fall); and so, repetitively, until the end is reached. Same as marching on moving sand! The process is deemed having additive errors.

The key process: guessing, predicting, and getting a weight of successful action; then, repeat, until you reach the peak!

The approach is based on Large Language Models; a large amount of data is stored; patterns are inferred from it, in the context (derived from a query through a known token). No token means no answer or a tentative (usually wrong) one.

Note: The text is broken down into chunks, which can be as short as one character or as long as one word (or even more in some languages). Jumping from a chunk to another is question of in context-prediction (there are other cosmetics such normalization, greedy decoding, beam, searching, etc.)

Much better than Google translator! Comprehension of narratives with mixed-languages!

Some obvious limitations of generative-AI (as of Nov. 13, '23)

- There are not real bidirectional interactions; the only way for a better accuracy is obtained by rephrasing the query
- Knowledge is limited to public data access only (no private, no scientific databases); therefore, no validated
- Knowledge is behind the real state-of-the-art (however, lagging by a few years, in any domain, means a lot on accuracy)
- There is no guarantee, no liability; this situation leads to limited trust, or no trust at all.
- Some feedback is cooked, incomplete or incorrect; some is wrong but expressed with confidence **(test-try-trust-test-....)**

YET, Generative-AI is useful in many cases, especially as a quick idea (mostly useful for already knowledgeable people)



AI Dream - Strong Evidence

VALENCIA
November 2023

Generative-AI (example)

- Petre: What might follow after 'I am ...'?
- ChatGPT: The phrase "I am ..." can be followed by a wide variety of words or phrases to describe or define oneself or one's current state. Here are some examples:

Descriptions of identity or profession:

I am a teacher.
I am an engineer.
I am a mother.
I am a student.

Emotional or physical states:

I am tired.
I am happy.
I am confused.
I am sick.

Personal beliefs or opinions:

I am certain that...
I am of the opinion that...
I am convinced that...

Locations:

I am at home.
I am in the office.
I am on my way.

Descriptions of characteristics or personality:

I am outgoing.
I am introverted.
I am ambitious.
I am kind-hearted.

Temporary situations or roles:

I am the team leader for this project.
I am the designated driver tonight.
I am on a diet.

Affiliations:

I am a member of the local club.
I am a Democrat/Republican.
I am a Christian/Muslim/Hindu/etc.

Back in '80, 90'

Expert systems

Rules-based systems

A* algorithm

AI (Japanese, Fifth Generation)

Lisp

Prolog



AI Dream - Strong Evidence

VALENCIA
November 2023

Generative-AI (example)

- Petre: What physical state can a human be in?
- ChatGPT: Humans can exist in various physical states, based on physiology, consciousness, and activity. Here are some general categories of physical states:

Conscious States:

Wakefulness: The state of being alert and aware of one's surroundings.

Drowsiness: A transitional state between wakefulness and sleep, often characterized by a decrease in alertness.

Sleep States:

Non-Rapid Eye Movement (NREM) Sleep: Divided into three stages (N1, N2, N3), ranging from light to deep sleep.

Rapid Eye Movement (REM) Sleep: The sleep stage associated with vivid dreams.

Altered States of Consciousness:

Hypnosis: A trance-like state of focused attention and heightened suggestibility.

Meditation: A state of deep concentration or relaxation, sometimes accompanied by a shift in awareness.

Flow: A state of being completely absorbed or immersed in an activity, often accompanied by a loss of the sense of time.

Trance: A semi-conscious state, often brought on by repetitive sounds, movements, or rituals.

Physiological States:

Resting: Characterized by a reduction in physical and mental activity, but not necessarily asleep.

Activity: Engaged in physical or mental tasks, ranging from mild (e.g., walking) to intense (e.g., sprinting).

Fasting: The state of not consuming food for a period.

Digestive: Post-meal, where the body is processing and absorbing nutrients.

Emergency Responses:

Fight or Flight: An acute stress response, preparing the body to either face a threat or flee.

Freeze: An immediate reaction to danger or threat, characterized by immobility.

Fawn: Behaving in a servile manner or trying to please a potential threat to diffuse danger.

Health-Related States:

Healthy: Optimal functioning and well-being.

Illness or Disease: Compromised health due to infections, chronic conditions, or other diseases.

Injury: Physical damage or trauma.

Recovery: The process of returning to a healthy state after illness, injury, or surgery.

Life Stages:

Fetal: Pre-birth, developing inside the womb.

Infancy: Early stage post-birth.

Childhood, Adolescence, Adulthood, Senior: Various stages of life characterized by physical, cognitive, and social changes.



Let us not foul ourselves!

VALENCIA
November 2023

Let us set the record straight (*as of Nov 13rd, 2023*)!

Inventions (~1% on purpose, 99% unintended discovery); on former, I know a very few, indeed!

Basis is: 'understanding' and 'inserting' a new acquired information in the right place of the existing knowledge. Mostly, incidental action, followed by experience, failures, experiments again, improvements, acceptance, improvements, etc.

Let us think at:

- Fire
- Matches
- Tires (cars, bicycles, ...)
- C Vitamin
- Stickers
- Wheels
- Bicycles

Music (i) (mind expression, even silent)

Music instruments (ii) (100% invention) for sharing

<https://www.the-sun.com/tech/9508495/chatgpt-ceo-ai-superhuman-persuasion-skills-strange-outcomes/>

<https://www.foxnews.com/us/chatgpt-chief-warns-superhuman-skills-ai-develop>

AI Scarecrow



Oracle of Delphi

Delphi was an ancient religious sanctuary dedicated to the Greek god Apollo. Developed in the 8th century B.C., the sanctuary was home to the Oracle of Delphi and the priestess Pythia, who was famed throughout the ancient world for divining the future and was consulted before all major undertakings.



CEO warns of 'very strange outcomes' from new tech with 'superhuman' skills

Cutting through the Hype

(towards AI - so-called Literacy!)

Fathering AI

AI Experts

AI Analysis

AI Ethicists

AI-based producers

AI Beneficiary

AI culture, AI Literacy

AI skeptics

AI charlatans

AI Governments summit

AI (-self) governance

AI governance

Corporate self-guaranty entitlement

Corporate **self-explainability duty**
(see: [Oracle of Delphi](#))

Corporate self-safety checking

True AI Enthusiasts and Supporters

Professors trying to get various flavors of scientific help in their teaching endeavor: CENTRIC, ICSEA, CYBER, etc.)



AI – Media push

VALENCIA
November 2023

It seems that Media take us for fools and bombard us with alarming news about the destruction of humanity!

When a (right or wrong) statement is endorsed by one known name, there is little chance to object! Yet... !?

Note:

- A crane sure **surpasses** the capabilities of humans, when it comes to lift heavy pieces.
- An automatic searching engine will certainly **exceed** the human skills for (quicker) grabbing information from websites.
- **Dangers come from** humans handling AI-tools, not for the AI-tools; see the dynamite!



メディアは私たちを愚か者とみなし、人類滅亡に関する憂慮すべきニュースを私たちに浴びせているようです

It seems to me being either trivial or wrong statements

<https://www.cmswire.com/digital-experience/5-bill-gates-takes-on-the-future-of-artificial-intelligence/>

What does the Microsoft co-founder now say about artificial intelligence? You may be surprised.

The Gist

- **Deepfake danger.** *AI can help identify deep fakes and safeguard democracy, and there are lessons for customer experience and marketing professionals.*
- **AI security.** *Prioritize software vulnerability fixes and establish AI regulation.*
- **Job shift.** *Manage AI's job impact with support, retraining and strategic policies.*

<https://www.youtube.com/watch?v=s1qZbsytk08>



AI - Political push

VALENCIA
November 2023

STOP AI!: The letter signed by the Band of Six



Tech billionaire Elon Musk makes an eerie prediction about the future of AI

AI UN



- Over the course of two days, tech and business executives and world leaders — including Vice President Kamala Harris — discussed the future of AI, regulation and safety issues associated related to the advanced technology. Nearly 30 countries including China and the European Union signed the Bletchley Declaration, which recognizes potential risks associated with AI.

It seems to me being an eerie prediction, indeed, but not the sense of the article.

<https://www.foxbusiness.com/technology/elon-musk-ai-eventually-create-situation-no-job-needed>

The Gist:

"We will have for the first time something that is *smarter than the smartest human*," Musk added.

Musk said, "It's hard to say exactly what that moment is, but there will come a point where *no job is needed*."

"You can have a job if you want to have a job — sort of personal satisfaction — *but the AI will be able to do everything*," the billionaire Tesla CEO added.

But the lack of guardrails surrounding AI has not stopped Musk from developing *his own generative AI models* to compete with those already available for commercial use, including chatbots ChatGPT and Google's Bard.

A "maximum truth-seeking" AI chatbot could be coming, which he dubbed "**TruthGPT**."



AI Dream – Petre's level 5

VALENCIA
November 2023

IF you think that this is AI, then, I am kindly inviting you to revisit the meaning of: ai vs Ai vs al vs AI

(**MUST**) next steps, for the very first next AI (true) Level:

Mechanisms leading to inventions, things, and facts that are not apriori known: sailing, rowing, flying,... video cameras, cooking recipes, clothes buttons, sewing needles, perfusion needles, bicycle pedals, etc. ; they came as a necessity; an artificial piece has no necessities to be fulfilled.

PRIORITY #1

Discovery and understanding of Brain mechanisms; thinking, inventing, acting, self-repairing, body coordination, external exposure, feeling necessities, etc., etc.

This will allow us to go to the next level of AI fulfillment, if ever.

Some timid (yet, in progress for ~ 50 years) steps: Machine-Brain interface, Cognitive Research

The greatest difficulty is that one cannot do conclusive experiments on humans' brain. No experiments, no progress!

Note: Knowledge for understanding mental diseases, Parkinson procedures, addiction, etc. is badly missing.

This might be at **Level 5** on the AI-scale in terms of achievements (understanding what does not work in the Brain and invent cures for findings, namely, AI-self-healing via AI itself). **YES, this might be the pillar piece of AI dream.**



AI Dream - Strong Evidence

VALENCIA
November 2023

- Petre: What are the most prominent Cognitive achievements as of Sept '21"
- ChatGPT: As of September 2021, cognitive science, which encompasses interdisciplinary research from psychology, neuroscience, philosophy, artificial intelligence, and several other disciplines, has seen numerous achievements over the years. Some of the most prominent (? : I do not know who decided this complement) cognitive achievements include:

Neuroplasticity: The discovery that the brain is plastic, meaning it can change and adapt structurally and functionally throughout life based on experiences. This challenged the once -held belief that the brain's structure is fixed past a certain age.

Mirror Neurons: The identification of neurons that fire both when an individual acts and when they observe the same action performed by another, leading to insights into empathy, imitation, and social cognition.

Dual-Process Theory: The proposal that there are two systems of thought: "System 1" which is fast, instinctual, and emotional; and "System 2" which is slower, more deliberative, and more logical.

Cognitive Behavioral Therapy (CBT): Development and widespread acceptance of this form of psychotherapy, based on changing negative thought patterns to produce more positive behaviors and outcomes.

Mapping the Brain with fMRI: Functional Magnetic Resonance Imaging (fMRI) has allowed researchers to non-invasively study brain activity, illuminating how different brain regions function and interact.

Understanding Memory: Insights into different types of memory, like procedural, declarative, short -term, and long-term memory, and how they're stored and recalled.

Cognitive Load Theory: The understanding of how cognitive resources are allocated during learning and the strategies to optimize this process.

Artificial Neural Networks: Drawing inspiration from the brain, these computational models have led to significant advancements in machine learning and AI, particularly in tasks like image and speech recognition.

Embodied Cognition: The idea that the mind is not only connected to the body but that the body influences the mind, emphasizing the role of sensorimotor experiences in shaping cognition.

Advancements in Understanding Disorders: Improved comprehension of cognitive disorders such as Alzheimer's, ADHD, and Autism Spectrum Disorder, leading to better therapeutic approaches.

Cognitive Offloading: The exploration of how and why humans use objects and tools in their environment to reduce their cognitive workload.

The Role of Sleep in Cognition: Discoveries related to the importance of sleep in memory consolidation, emotional regulation, and problem-solving.

These achievements only scratch the surface of the continuous advancements in the field. The interdisciplinary nature of cognitive science ensures that it remains at the forefront of understanding the intricacies of the human mind and its intersection with technology and society.



AI - Up front (... Morgan the Fairy)

VALENCIA
November 2023

Progress on the fields mentioned below
happened independently of **any kind of AI**

- Patterns recognition, Image recognition
 - Signal processing, Vision systems
 - Cognitive models, Autonomic systems
 - Learning models, Predictions systems,
 - Convolutional networks
 - Speech recognition, Image recognition
 - Conversion text-voice and vice versa
 - others
- and*
- High speed processing data, graphic, streaming
 - High Data collection/memory/storage
 - Miniaturization, Accessibility
 - High speed communication
 - Brain-human interface
 - others

Artificial Intelligence (AI) originally intended to create machines that could mimic human intelligence: to reason, learn from experience, recognize patterns, comprehend complex ideas, and employ language in meaningful ways, namely, to develop systems that could perform tasks that, when done by humans, would require the application of intelligence (emulation of cognitive functions, associated with human minds).

Over time, **AI became an umbrella** including a broad range of computational techniques and methods. Towards its original target practical applications helped creating specialized, task-specific algorithms and models. Yet, the underlying ambition remains: to capture or replicate facets of human intelligence in a machine, bridging the gap between organic cognition and digital computation.

The fields of AI, machine learning, statistics, and pattern recognition have interwoven histories, and many techniques have been appropriated or evolved across these disciplines over time

More AI specific

- Datasets (variety, solid methodology, etc.)
- (layered) DeepLearning (CNN, recurrent, transformer architectures, etc.)
- ? ML (accuracy, parameter tuning, computational needs, etc.)



AI - Up front (as a Catalyst, only)

VALENCIA
November 2023

1. Neural Networks and Their Variants:

- **Feedforward Neural Networks:** Basic networks where connections don't cycle back.
- **Convolutional Neural Networks (CNNs):** Tailored for image data.
- **Recurrent Neural Networks (RNNs):** For sequential data.
- **Long Short-Term Memory (LSTM) and Gated Recurrent Units (GRU):** Advanced RNNs.
- **Transformer Architectures:** Like BERT, GPT, which have revolutionized NLP.
- **Generative Adversarial Networks (GANs):** For generating data.
- **Autoencoders:** For dimensionality reduction and data generation.
- **Self-organizing maps, Hopfield networks, and Boltzmann machines:** Early forms of neural networks.

2 Reinforcement Learning:

Algorithms like Q-learning, Deep Q Networks (DQN), and various policy gradient methods like REINFORCE, A3C, and PPO predominantly belong to the AI realm.

Monte Carlo Tree Search (MCTS): Used in game-playing AI like AlphaGo.

3. **Modern Optimizers:** Techniques like Adam, RMSprop, and AdaGrad, developed mainly in the deep learning context.
4. **Attention Mechanisms:** Especially in the context of neural networks, allowing models to "focus" on specific parts of the input.
5. **Transfer Learning:** Techniques like fine-tuning where pre-trained models are adapted to new tasks.
6. **Few-shot and Zero-shot Learning:** Techniques that enable models to make predictions in scenarios where very few or no examples are available.
7. **Neural Architecture Search (NAS):** Techniques to automatically search for the best network architecture.
8. **Explainable AI (XAI):** Techniques specifically designed to make AI decisions interpretable.
9. **Neural Turing Machines and Differentiable Neural Computers:** Extensions of neural networks to give them the ability to work with external memory in a differentiable manner.
10. **OpenAI's DALL·E, CLIP, etc.:** Represent a new wave of models trained to perform tasks like image generation from textual descriptions.



AI - Looking behind and ahead!

VALENCIA
November 2023

For everybody's comfort

Humanity will not be replaced by artificial entities as

- There are no personalized memory(ies)
- There is no instant personalized thinking
- There is no visibility on any personal past activity
- There are no feelings of fear, emotions (eventually mimicking by instructions/learning)

Do not fear and do not have compassion on those thousands that regret fathering AI, because there were very few of them; most of the tens of thousands vocal ones truly were and are not.

These two pictures: 2023 – March, Wilmington DE, MedExpress Lab Poster and Vitaly's input from the College of Healthcare Information Management Executives, April 1995, (Canada) triggered my initiative for documentation and for preparing this open discussion.



Lessons learned

- *Technologies were developed in a silos with great success*
- *Last 30 years of achievements allowed comprehensive results*
- *Awareness*
- *Education*
- *Societal services*



- Why there are not much progress in Healthcare AI?



Vitaly Herasevich



AI – Mile ZERO

VALENCIA
November 2023



In the back row from left to right are Oliver Selfridge, Nathaniel Rochester, Marvin Minsky, and John McCarthy. In front on the left is Ray Solomonoff; on the right, Claude Shannon. The identity of the person between Solomonoff and Shannon remained a mystery for some time. THE MINSKY FAMILY

Summer of 1956 at Dartmouth College in Hanover, New Hampshire, USA
These men had a shared vision for the potential of AI. They believed that it was possible to create machines that **could think and reason like humans**, and they propose a workshop to explore this possibility.

Meet the brilliant minds of John McCarthy, Marvin Minsky, Herbert Simon, Oliver Selfridge, Nathaniel Rochester, Ray Solomonoff, Trenchard More, and Claude Shannon who kickstarted the AI revolution.

<https://medium.com/@nickyverd/the-first-ever-ai-conference-tracing-the-evolution-and-the-history-of-ai-82347f93a89f>

The Proposal

“We propose that a two-month, ten-man study of artificial intelligence be carried out during the summer of 1956 at Dartmouth College in Hanover, New Hampshire”

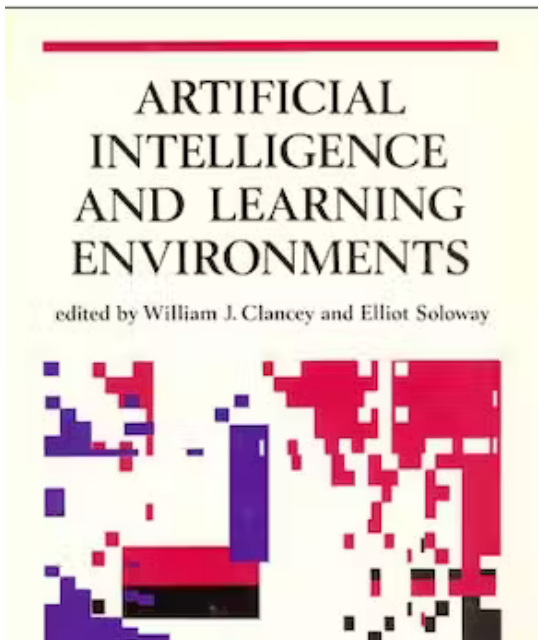
The written proposal to the [Rockefeller Foundation](#) was formulated by McCarthy at Dartmouth and Minsky, then at Harvard. They brought their proposal to the two senior faculty, [Claude Shannon](#) at Bell Labs and [Nathaniel Rochester](#) at IBM and got their support (Crevier, 1993). The proposal went as follows (McCarthy et al, 1955, reprinted in AI Magazine Volume 27, Number 4 pp. 12–14):





AI – Mile ZERO – my appendix

VALENCIA
November 2023



From: Special Issues of Artificial Intelligence

Artificial Intelligence and Learning Environments

Edited by William J. Clancey and Elliot Soloway

168 pp., 6 x 9 in,
Paperback
ISBN: 9780262530903
Published: September 27, 1990
Publisher: The MIT Press

Missing (I don't know the reason)
Elliot Soloway: University of Michigan
- AI (Intelligent) Tutoring Systems
- Learning/cognition at children level
Noam Chomsky: MIT
- Modern linguistics
- Analytic philosophy
and
- One of the founders of the field of
cognitive science



The New York Times

<https://www.nytimes.com> › 2023/03/08 › noam-chomsk...

Opinion | Noam Chomsky: The False Promise of ChatGPT

Mar 8, 2023 — As an AI, I am a **machine learning** model that has been trained on large amounts of text data, and I don't have personal experiences or feelings.

[www.youtube.com](https://www.youtube.com/watch?v=...) › watch

Noam Chomsky - Advances in AI: ChatGPT | Human Brain



Considered as the father of modern linguistics, **Noam Chomsky** talks about recent advances in natural language processing, **artificial** ...

YouTube · Teacher Development Webinars · Jan 26, 2023



AI - related - Fine Grain History

VALENCIA
November 2023

A little history... well-back

Multivariate **Dataset** introduced by Ronald Fisher (**1936**).

The first **artificial neuron** was the Threshold Logic Unit (TLU), or Linear Threshold Unit, first proposed by Warren McCulloch and Walter Pitts in **1943**

Neural networks were first proposed in **1944** by Warren McCulloch and Walter Pitts - University of Chicago (then, MIT)

The **concept of Deep learning** has been around since the **1950s**.

The **earliest successful AI program** was written in **1951** by Christopher Strachey, University of Oxford.

Strachey's checkers (draughts) program ran on the Ferranti Mark I computer at the University of Manchester, England.

The Dartmouth Summer Research Project on Artificial Intelligence, **1956** summer workshop - considered to be the founding event of AI

Generative AI was introduced in the **1960s** in Chatbots

Convolutional neural networks, also called ConvNets, were first introduced in **the 1980s** by Yann LeCun

AI ups&downs (~ '90-'20s. **Expert Systems** failing highly-set expectations) {**smart systems**, **cognitive systems**, **autonomous systems**, etc.,.... }

Generative AI (GAI) (processing: text, pictures, audio, ...) || from 60's Chatbots → 2022 LLMs (Solid state to VLSI : 1940 → 1960/70)

> Summarization, surveys, statistics, general reports; no measurements, no innovation, no link to reality, no interpretation, no feedback

> GAI tools generate new content based on a variety of inputs. Inputs and outputs to these models can include text, images, sounds, animation, 3D models, or other types of data.

> There is no validation of data, there is no corrective feedback, there is no guarantee, (user awareness)

Traditional AI targets (patterns, decisions, real systems, cognitive processing, brain-like mimicking, .. brain substitution, cohabitation, etc.)

ANI

AGI

ASI



AI - More Data - Higher Speed

VALENCIA
November 2023

Knowledge and Information of any kind

----> ~ 99% undetected/not check-able false information (on purpose coalitions, or simple fake, or science fiction)

and

-----> ~1% fact-checked information

---- >>> any inference leads to biased, unproved, and unanimously (falsely) trusted facts/conclusions

Danger of too much pre-processing: of Data compression/fusion/pre-processing

Inquiry: How much data processing is enough (see 99.999% *service availability*)

ROI on Costs: Data Quality Assurance (profiling, cleansing, validation, auditing, etc.)

Lack of Academic Curricula and advanced **Education on AI-fluency**

Note: 99%, 1% is my pessimistic estimation.

You can cite me, as there is no proof either way!

99,999% was AT&T customer SLA agreement on service availability, by the year 2000

However, a tiny fraction (~ 7%) of Syslog messages were possible to be processed in the NOCs (Network Operation Centers)



USE CASES - outlook hereafter

VALENCIA
November 2023

A. IEEE Webinar (regular emails to members)

Theme: Selecting your next oscilloscope; Why digital triggering

matters? White Paper by ROHDE&SCHWARTZ

https://www.rohde-schwarz.com/us/knowledge-center/webinars/oscilloscope-webinars_253039.html

ChatGTP Q: I ask the same question, I refined for brands of portable oscilloscopes, then refine for 'hysteresis' control, other functions, etc.

B. IEEE Spectrum (Sept '23)

Preparing IEEE for 2050 and Beyond (by Kathy Pretz)

"... how the information is curated and delivered will change

> .. Initial vetting will be partially/fully automated

> Proceedings will be a compendium of articles, algorithms, videos, and other media (kind of [Encyclopedia Britannica](#))

> Promoting the use of AI, Virtual Reality, Digital Twins.... practically, virtual models of our real-world

C. Interactive hesitation of LLM-based (fledgling) tools; (ChatGPT)

D. Barron's (Oct '23) AI Analysis on AI Market value as of Oct 30.

Some obvious proofs on use of tools

History (random selection)

- gun powder
- dynamite
- knives
- nuclear arms
- - ...

- AI-induced scarecrow

Potential causes (random listing)

- On purpose induced fear
- Stupidity
- Ignorance
- Credulity, Naivety
- Mislead by others (on purpose, or not)
- Lack of proper education, self- evaluation
- add (whatever you want)



SELECTING TOOLS — Generative-AI

VALENCIA
November 2023

Case study #1 | Puzzled, yet Informed

Selection tools/devices (Oscilloscope, Spectrum Analyser)

Petre (background: electronics, measurements, signal processing, long term practice, ...)

Students receiving info from ChatGPT on “What are the criteria for selecting my next oscilloscope, considering Digital achievements?”

Output: Background is assumed

Practicing is assumed

Learning from experience is assumed

Curriculum proposal: Hybrid teaching

Basics: provided by professors (selectively, tuned to students' background, feedback loop, etc.)

Practicing: in a real lab (currently, a lot of videos, showing practices, but not self-practicing)

Validation of knowledge (boosting self-confidence)

Reading materials (ChatGPT)

Finding unclear topics (ChatGPT)

PORTO: https://www.iaria.org/conferences2023/filesSECURWARE23/PetreDini_OpenDiscussion_WhereAI.pdf



Case study #2 | Puzzled, yet Informed

Scientific contributions

Petre (background: teaching, writing, learning, self-criticizing, asking for peers, reviewing, failures, accept/reject, ...)

Students receiving info from ChatGPT on “exact research topics”, no failures, no arguments-against, no base for understanding a particular statement

Output: Students remain ignorant (not knowing ‘why’) [theme itself, state-of-the-art, critical thinking on open issues, etc.]

Students lose ability to write by themselves; self-confidence, gradual improvements, self-critical (fights between the models)

Students do not acquire the ability to identify mistakes and to confidently evaluate others’ work

Education:

Next professors might be less gifted with adapting to different levels of student understanding (see: Intelligent Tutoring Systems)

Tooling effort to put on catching culprits instead of massive education and enforced punitive rules.

Approach proposal: Hybrid scientific education/evaluation/creation + explicit and mandatory ethics rules

Automated tools should complement, not replace, the researcher's own judgment and understanding of their work. Especially in academic contexts, nuanced and context-specific decisions about language and phrasing are crucial. It's always a good idea to have a human with expertise in the subject area review the paper in addition to using AI-based tools.

A collaboration between AI tools and human reviewers and new scientific thinkers seems to be the most promising way forward, capitalizing on the strengths of both, namely, volume and speed of AI-based tools + intelligence and cognition via human thinking.

Anti-plagiarism tools are essential for educators, students, and writers to ensure the originality of content. Yet, they should be not needed, if education on fairness is enforced and punishment for wrong doers is enforced, too.

PORTO: https://www.iaria.org/conferences2023/filesSECURWARE23/PetreDini_OpenDiscussion_WhereAI.pdf



Case study #3 | Informative, partially useful, unintended errors

Gradually difficult Interaction

On Being Informed and Being Trained by Generative-AI: Lessons Learned Illustrated from Practical Cases

A. What period Napoleon reigned and how many wars he was involved in?

- i. You might not have any idea; yet historical information seems accurate
- ii. You can cross-validate with multiple documents, if vital.

B. What are the specific wine grape species and wine brands of the Oltenia region, part of Romania?

- i. You have an idea; the question was tuned a few times until the correct answer was crafted.
- ii. It depends on how much the notion in questions is spread and on 'how many entries are available' on the topics for sufficient training.

(correctness depends on volume of training data, at a given point in time)

C. How to select a spectrum analyzer device?

- i. The output of G-AI assumes a solid training and implicit knowledge of a subject.
- ii. The answer leaves the impression of easiness, while the background of the user is missing.
- iii. The practical experience is assumed in specific answers.
- iv. Classical classes, labs, and projects are needed

Caveat:

When the problem is described in detail, a spectrum analyzer device might be picked, on somebody's behalf, with no influence on the selection/decision.

? Explainability, Over-confidence, AI-self-empowerment



MARKET - Generative-AI

VALENCIA
November 2023

/ best-performing AI stocks

Here are the seven best-performing stocks in the Indxx Global Robotics & Artificial Intelligence Thematic Index, ordered by one-year returns. This list is updated weekly.

Ticker	Company	Performance (Year)
NVDA	NVIDIA Corp	241.65%
SYM	Symbotic Inc	214.85%
HLX	Helix Energy Solutions Group Inc	113.75%
AI	C3.ai Inc	107.39%
AVAV	AeroVironment Inc.	46.51%
DT	Dynatrace Inc	38.10%
PATH	UiPath Inc	35.07%

Source: Finviz. Data is current as of Oct. 25, 2023 and is intended for informational purposes only.

Largest AI companies by market capitalization

#	Name	M. Cap
1	Microsoft 1MSFT	\$2.451 T
2	Alphabet (Google) 2GOOG	\$1.536 T
3	NVIDIA 3NVDA	\$1.000 T
4	Tesla 4TSLA	\$658.99 B

[35 more rows](#)



[World's first robot-human press conference at UN AI summit ...](#)

YouTube · DT Next
Jul 8, 2023



MARKET - Generative-AI

VALENCIA
November 2023





QUESTIONS under SCRUTINY

VALENCIA
November 2023

- **Theme questions:**
 - Is education/research getting out of human essence?
 - Who is going to infuse the human skills to students and young researchers from now on?
 - Are we baffled, and finally, unable to deny the wrong we perceive because of the trend and hype (political correctness)?
- #1 Will (free or commercial) Generative AI-based tools for handling editorial, punctuation and English be the basis for research?
- #2 Is human-based peer-reviewing process going to be replaced by Generative-AI-based peer-reviews, and teacher guidance by a set of narratives via generative-AI?
- #3 Are we hypocrite with double-blind review vs one-side blind review process when accepting unexplainable guidelines based on Generative-AI? (see: AI explainability)
- #4 Is Generative-AI-based feedback going to replace our education system (classes, research, projects)?
- #5 Are classes, professors already 'obsolete' and only still being maintained in the picture by 'empathy'?
- #6 What is the correct market value vs. the societal benefits?
- #7 How education systems should be adapted?



CAVEAT

VALENCIA
November 2023

AI, Generative-AI, LLM, ML, Deep Learning, Graphs, Ontologies, Taxonomies, etc. are only the pick of iceberg of human thinking process, perception & storage of data and building knowledge upon

- A. Knowledge acquiring and Learning are different from generation to generation.**
- B. Learning, as we teach, is only mimicking with an unknown approximation degree of how the human brain is working.**
*see: **typoglycemia** [**analogy with an editor corrector**] due to human intuition*
- C. Digital deskilling is the biggest danger of AI-based approaches/tools**
- D. Danger: The learning curve is much slower than the technology evolution pace.**
Procrastination is not a solution for being updated on changes.

Typoglycemia is the ability to read words even when the letters are jumbled, as long as the first and last letters remain in their correct positions. The human brain has the capacity to quickly process and comprehend written language, even with scrambled letters; even more, mixing letters and figures, e.g., v1tural -> virtual, 3rcaotr -> tractor.

Typoglycemia, playing with **typo** and **glycemia** (the condition of having low blood sugar).



QUO VADIS?

VALENCIA
November 2023

STAGE IS YOURS

Share your thoughts, experience, position

Caveat

We could be right, or fully wrong!



OSCILLOSCOPE -Back-up slides

VALENCIA
November 2023

Back-up materials

Oscilloscope /ə'silə,skōp/

vs.

Spectrum Analyzer /'spektrəm 'anl,īzər/

(Tektronix)

<https://www.youtube.com/watch?v=NBJCv0ONPnw>

Note:

It seems easier while 'only reading'
The very first achievement is to find the right button



Webinars – Oscilloscope-a

VALENCIA
November 2023

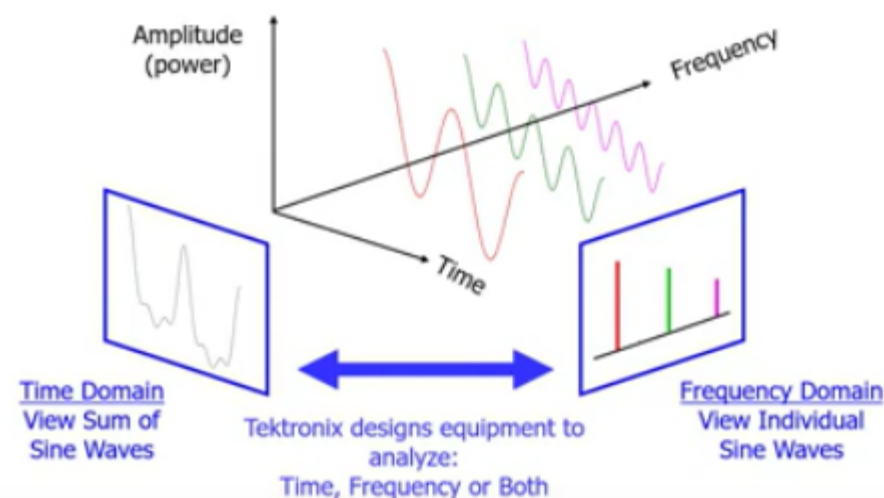
<https://www.youtube.com/watch?v=NBjCv0ONPnw>

• Spectrum Analyzers vs Oscilloscopes Webinar with Tektronix

Tektronix
Spectrum Analyzers vs.
Oscilloscopes
Keith R. Tinsley
Performance Marketing
Application Engineer

Presented by **testforce**

Electromagnetics Signals: ... in 3 Dimensions



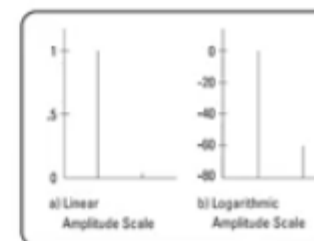
Electromagnetics Signals: ... aka Radio Freq. (RF)

Important Terms *Log Scale*

- Scopes use a linear scale, usually Volts / div
- Spectrum analyzers use a log scale in dBx (more on 'x' on the next slide)
- What's a dB?
 - dB is an expression of the ratio between two numbers
 - 0dB is a ratio of 1 to 1
 - 10dB is a ratio of 10:1
 - 20dB is a ratio of 100:1
 - 30dB is a ratio of 1000:1
- Why use a log scale instead of a linear scale?
 - Enables the viewing of very small signals on the same scale as very large signals (high dynamic range)

$$\text{dB} = 10 \log (P_2 / P_1)$$

where P_1 and P_2 are power in Watts



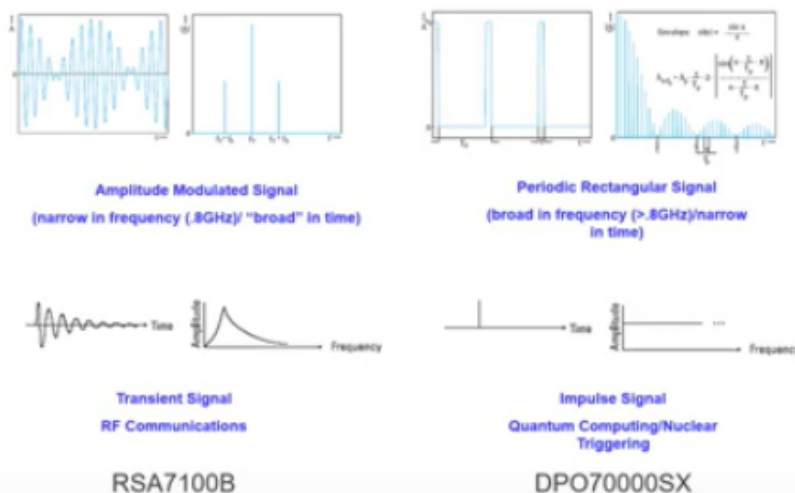


Webinars – Oscilloscope-b

VALENCIA
November 2023

- <https://www.youtube.com/watch?v=NBjCv0ONPnw>

Different Equipment for Different Task/Measurements



Why choose the DPO? A: FastFrame Averaging

"VERTICAL AVERAGING OF MULTIPLE FRAME SETS"

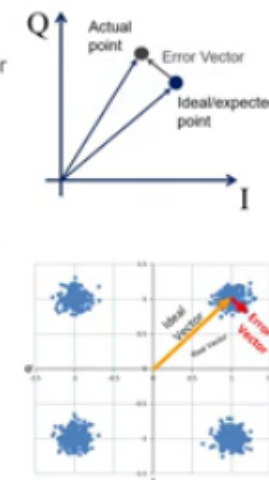
- Example application: Study processes reactions on a step-by-step basis



- The Average Frame Set is produced by the acquisition system hardware, making very efficient.
- "Orthogonal Averaging" is now a standard feature on 70k scopes. Requires ver 10.8 or later firmware
- Note: Constituent Frame Sets are not available in this mode; only the "Average Frame Set" is available for analysis

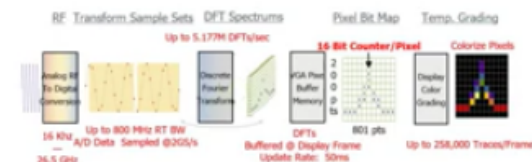
5G: Modulation Quality (high SFDR case, RSA7100B)

- Modulation Quality: ensure that the information contained in the signal can withstand transmission over a complex RF environment
- Indirect test of TX's Linearity
- Different types of Modulation Quality measurements:
 - Error Vector Magnitude (EVM) – used for digital signals
 - Modulation Error Rate (MER): used for digital signals, can be derived from EVM
- Requires that Spectrum Analyzer has ability to demodulate the signal
 - General purpose good
 - Growing list of Wireless Standards support



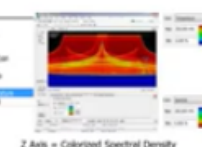
RSA7100B: The DPX™ Transform Engine

REAL-TIME DISPLAY PROCESSING



Bit Map Spectral Density/Colorization

- Pixel Spectral Density calculated in %
 - Pixel Counter Hits / Total Traces SD(%)
 - Called "Signal Frequency of Occurrence"
- Colorization Scales
 - Temperature – Red Assigned to Highest SD(%)





Webinars – Oscilloscope-c

VALENCIA
November 2023

- <https://www.youtube.com/watch?v=NBjCv0ONPnw>

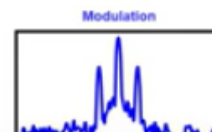
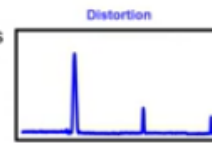
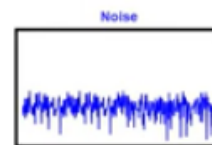
RSA7100B: Time/Freq. Domain Correlation

- Different from DPO70000SX: only available over 1 RF channel
- View signal in RF time domain
 - Amplitude vs. Time: RF envelope with Measurement Filtering to better see signals
- Correlate with Spectrum, Spectrogram for $f_c < 26.5\text{GHz}$

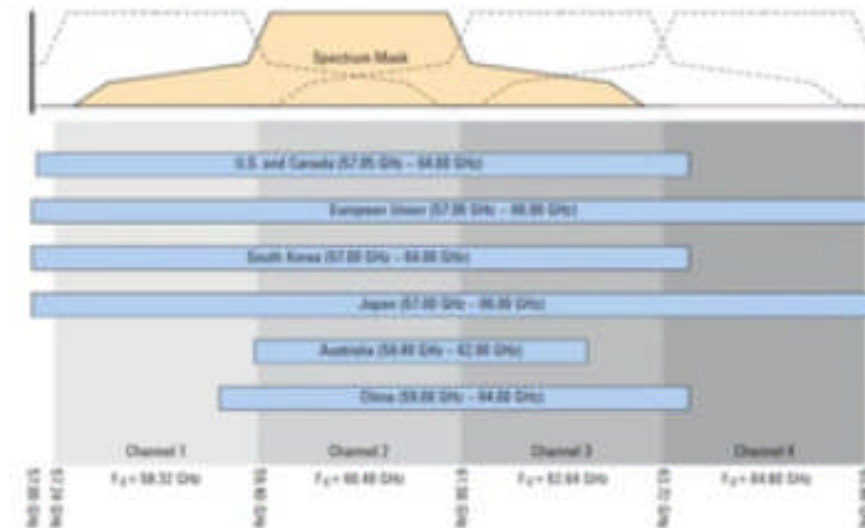


Why choose the RSA7100? A: Greater SFDR is important

- Noise
 - Everything generates noise, how much does it impact the overall design?
 - Where else is noise coming from? (EMI)
 - Signal to noise measurements
- Distortion
 - What appears to be a clean sine wave on an oscilloscope may have harmonic components that aren't readily obvious in the time domain but they are easily seen in the frequency domain
- Communications
 - Modern wireless communication techniques are inherently frequency domain oriented
 - Allocated frequency bands
 - Defined communication channels
 - Need to confirm aspects such as occupied bandwidth, modulation quality, etc.



5G: 802.11ad Landscape WORLDWIDE CHANNEL ALLOCATION



New FCC recommendation to extend the 802.11AD Band up to 72.6 GHz (early 2018) – adding 3 new channels:
Channel 5 centered at 66.96 GHz &
Channel 6 centered at 69.12 GHz
Channel 7 centered at 71.28 GHz

- 4 channels in the 57 GHz to 66 GHz ISM band
- Channel bandwidth is 2.16 GHz [DSP filtering + DPO70000SX]