



Artificial Intelligence for Ham Radio Operators

An exploration of benefits and opportunities
July 2025 Update

Alan Skerker KC4ZA

The Main Take-Aways

AI is becoming an increasingly important commodity with far reaching geopolitical and social consequences. In the words of Henry Kissinger and Eric Schmidt we are in the “Age of AI.” We will talk about little about how we got here.

The power of AI derives from a few key computer technologies and the ability to access vast amounts of data: Large Language Models, Neural Networks, Computer Vision.

AI applications are starting to emerge that have the potential to dramatically change our hobby. You will listen to clips by Gerald, OE1QAG using AI in SSB contesting, and hear the AI application RM Noise in action.

1956 Dartmouth Conference: The Founding Fathers of AI



John MacCarthy



Marvin Minsky



Claude Shannon



Ray Solomonoff



Alan Newell



Herbert Simon



Arthur Samuel



Oliver Selfridge



Nathaniel Rochester



Trenchard More

Source: <https://indiaai.gov.in>

“The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it.”

A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence J. MacCarthy, M. Minsky, C. Shannon, N. Rochester, Aug 31, 1955

What is Artificial Intelligence?

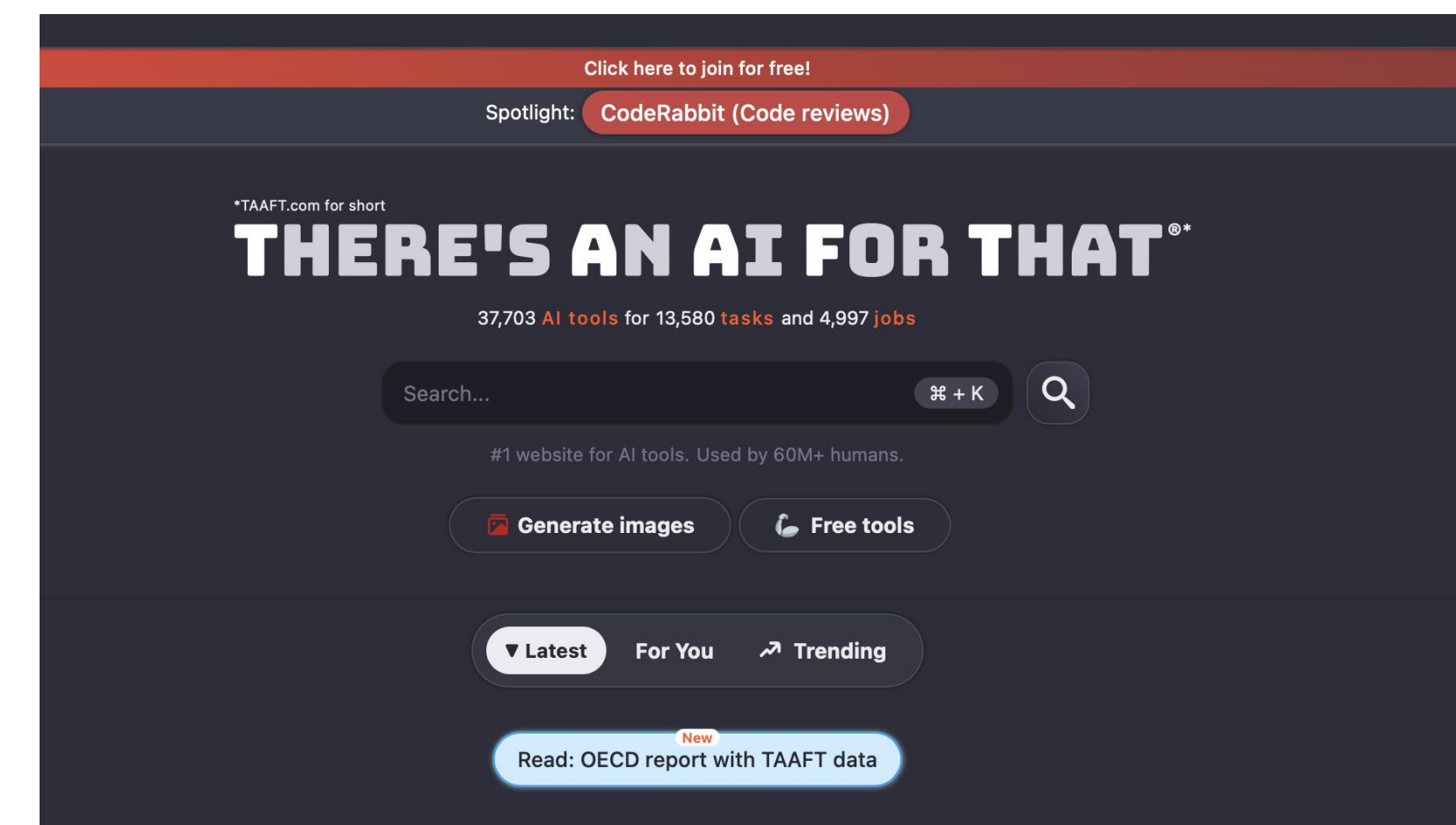
Artificial Intelligence refers to computer systems that perform tasks associated with human intelligence such as learning, problem solving, and decision making.

AI systems may appear to mimic how we think and solve problems; however, these systems work in a very different manner than the inner workings of the human brain.

AI is Prevalent Throughout Our Daily Lives

- Chatbots: Alexa, Hey Google, ChatGPT
- Ride Share apps: Uber, Lyft, Curb
- Self driving cars, package delivery and restaurant robots
- Computer search engines
- Banking and Credit Card fraud detection
- E-commerce: connect social media users to products, inventory, secure payment portals
- Email apps: automated categorization, auto-reply
- Facial Recognition
- Generative image applications
- Streaming TV/Video services
- Smart watches, body worn health monitors
- Robot vacuum cleaners, smart door locks, smart thermostats...
- Google Maps, Apple maps, WAZE - real time traffic updates, navigation...
- Real estate - Zillow

<https://theresanaiforthat.com/>



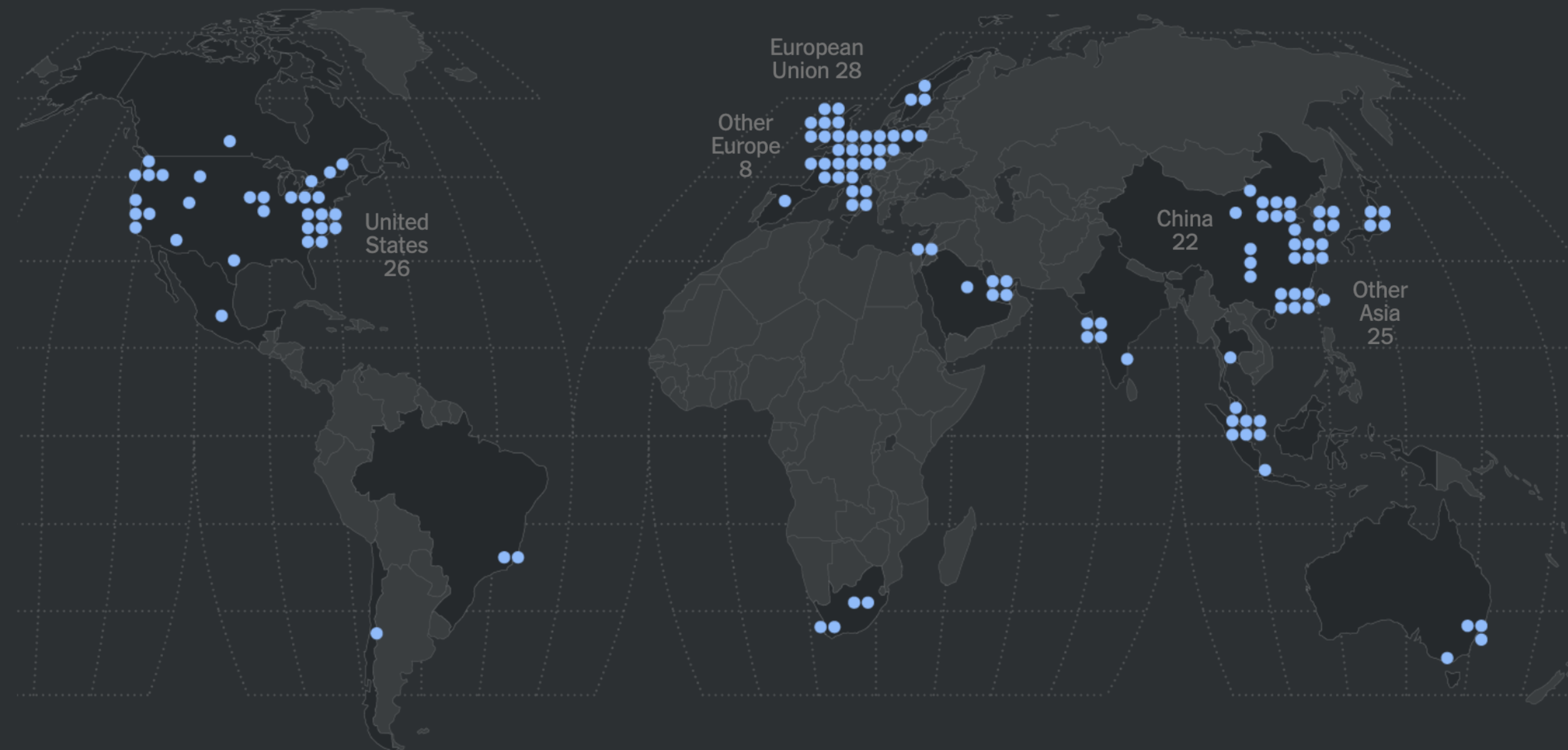
37,703 tools 13,580 tasks 4997 jobs

The New York Times

The Global A.I. Divide

WHERE A.I. DATA CENTERS ARE LOCATED

Only 32 nations, mostly in the Northern Hemisphere, have A.I.-specialized data centers.



Source: Oxford University • Note: Count of data centers in China excludes facilities in Hong Kong and Taiwan.

As countries race to power artificial intelligence, a yawning gap is opening around the world.

By Adam Satariano and Paul Mozur Graphics by Karl Russell and June Kim

June 21, 2025

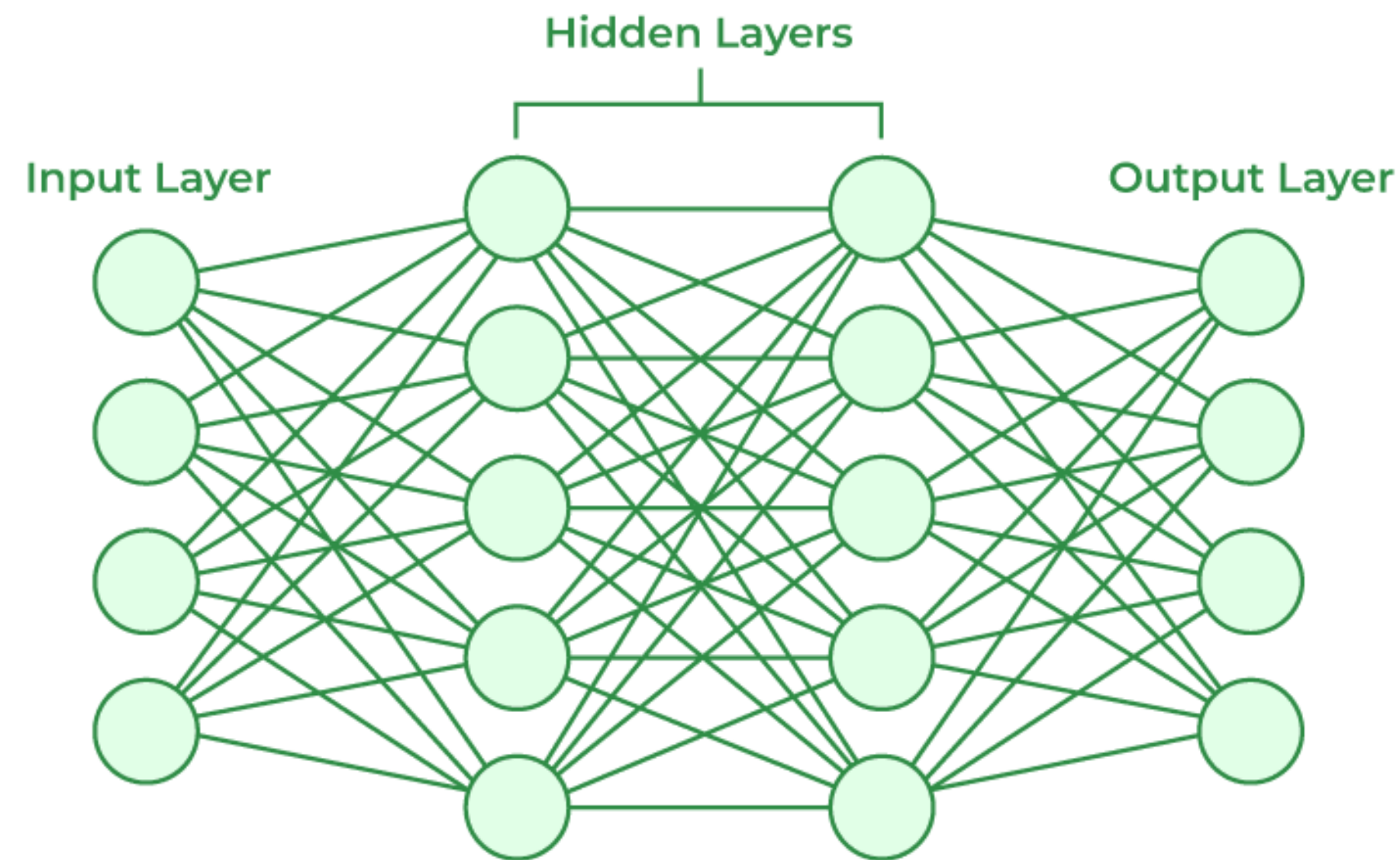
NIMBY... The Data Center quandary!

The US, Europe, and China are positioning to own the data that AI depends upon.

Underlying Technologies

- Machine and Deep Learning... Neural Networks
 - Neural networks are trained to identify hidden patterns in complex data that lead to solving problems
 - Training, which involves the adjustment of weights between neurons to give accurate responses involves 10's to 100's of billions of parameters.

Inputs process data...
sensor, numerical, images,
text, audio

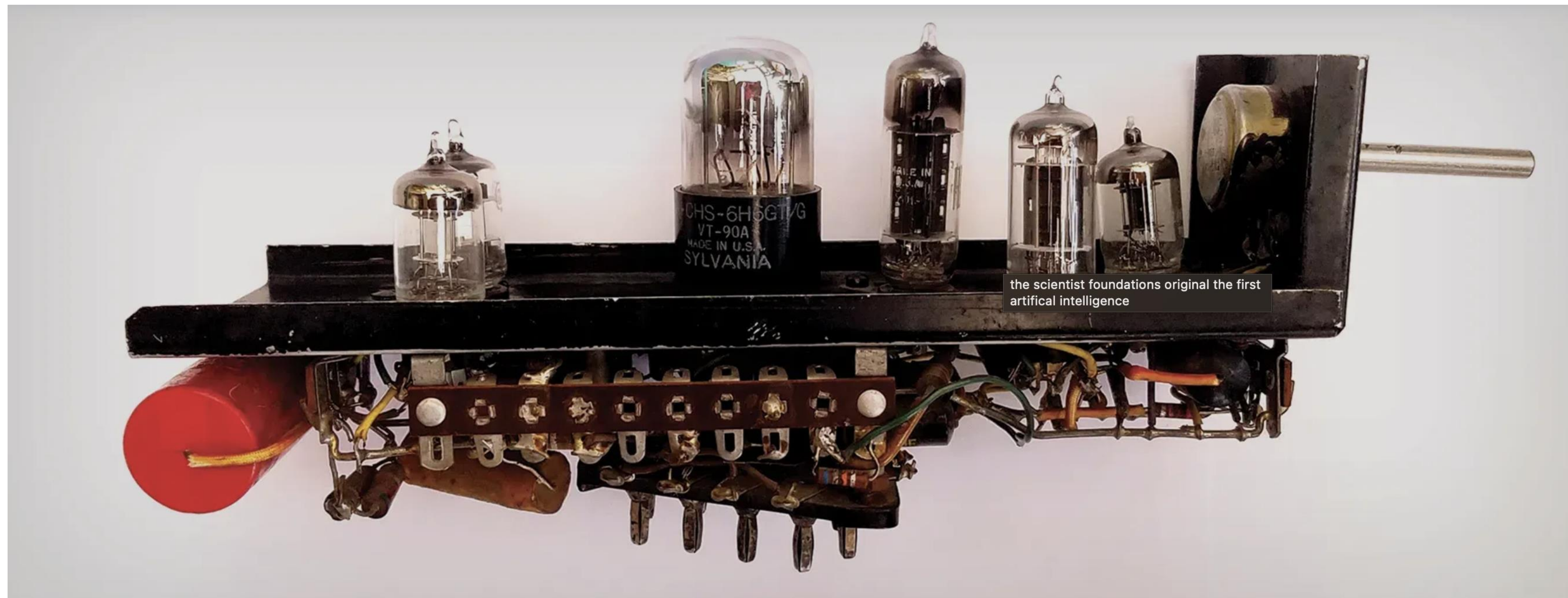


Output layer provides a
response

Hidden layers (software “neurons”) transform the inputs into something that the output layer can use. These layers and connections are the “brain” of the network, responsible for “deep learning”

Underlying Technologies

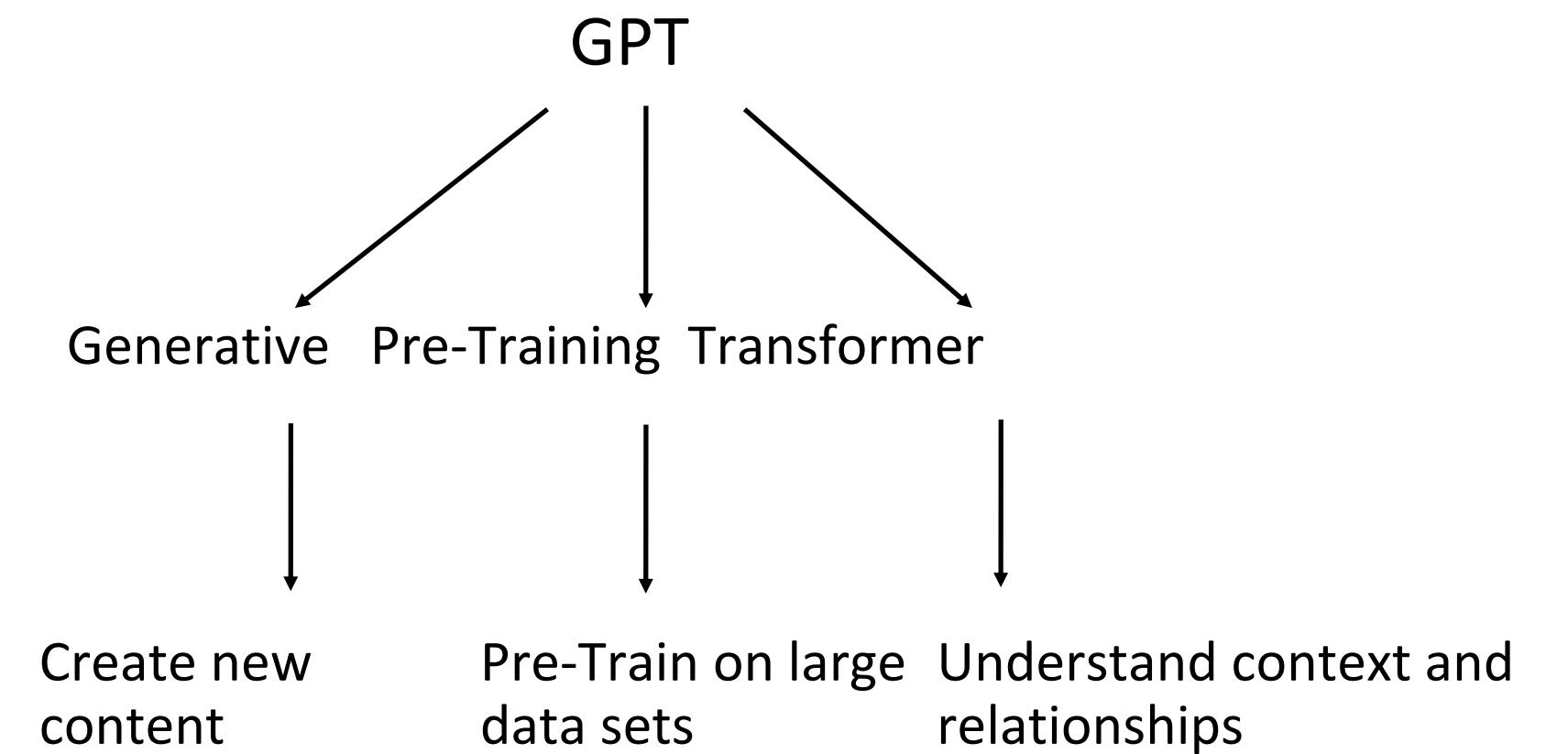
- Machine and Deep Learning... Neural Networks
 - Marvin Minsky 1951 developed the first randomly wired neural network learning machine: Stochastic Neural Analog Reinforcement Calculator (SNARC)
 - Solved the problem of a rat negotiating a maze



One of 40 SNARC neurons... the assembled machine was about the size of a grand piano

Underlying Technologies

- Large Language Models
 - Parse and generate language and code: may be domain specific or generalized
 - Domain-specific: Med-PaLM2 (medical), BloombergGPT (finance), ChatLaw
 - Generalized: Meta AI LLaMa (Large Language Model Meta AI), OpenAI's GPT-3/4
 - Utilize Natural Language Processing (NLP) and Natural Language Understanding (NLU) algorithms to accomplish multilingual classification, translation, free-text generation, sentiment analysis, and entity recognition
 - Very fast information retrieval and semantic searches



ELIZA the First Chatbot

```
Welcome to
EEEEEE LL      IIII  ZZZZZZ  AAAAA
EE      LL      II    ZZ    AA  AA
EEEEEE LL      II    ZZ    AAAAAA
EE      LL      II    ZZ    AA  AA
EEEEEE LLLLLL IIII ZZZZZZ AA  AA

Eliza is a mock Rogerian psychotherapist.
The original program was described by Joseph Weizenbaum in 1966.
This implementation by Norbert Landsteiner 2005.

ELIZA: Is something troubling you ?
YOU:   Men are all alike.
ELIZA: What is the connection, do you suppose ?
YOU:   They're always bugging us about something or other.
ELIZA: Can you think of a specific example ?
YOU:   Well, my boyfriend made me come here.
ELIZA: Is it important to you that your boyfriend made you come here ?
YOU:   He says I'm depressed much of the time.
ELIZA: I am sorry to hear that you are depressed.
YOU:   It's true. I am unhappy.
ELIZA: Can you explain what made you unhappy ?
YOU:
```

Not an LLM in the modern sense, but a precursor that demonstrated computer processing of natural language.

Was the first AI ChatBot. Developed in 1966 by Joseph Weizenbaum at MIT. Named after Eliza Doolittle, the protagonist in George Bernard Shaw's play Pygmalion and in the theatrical production, My Fair Lady by Lerner and Loewe.

Most famous of the Eliza scripts, "Doctor" simulated the Rogerian school of psychotherapy (Carl Rogers); the therapist reflects the patient's words to stimulate conversation.

Here are two versions of "Doctor" on the web that you can try:

<https://web.njit.edu/~ronkowitz/eliza.html>

<https://sites.google.com/view/elizaarchaeology/try-eliza>

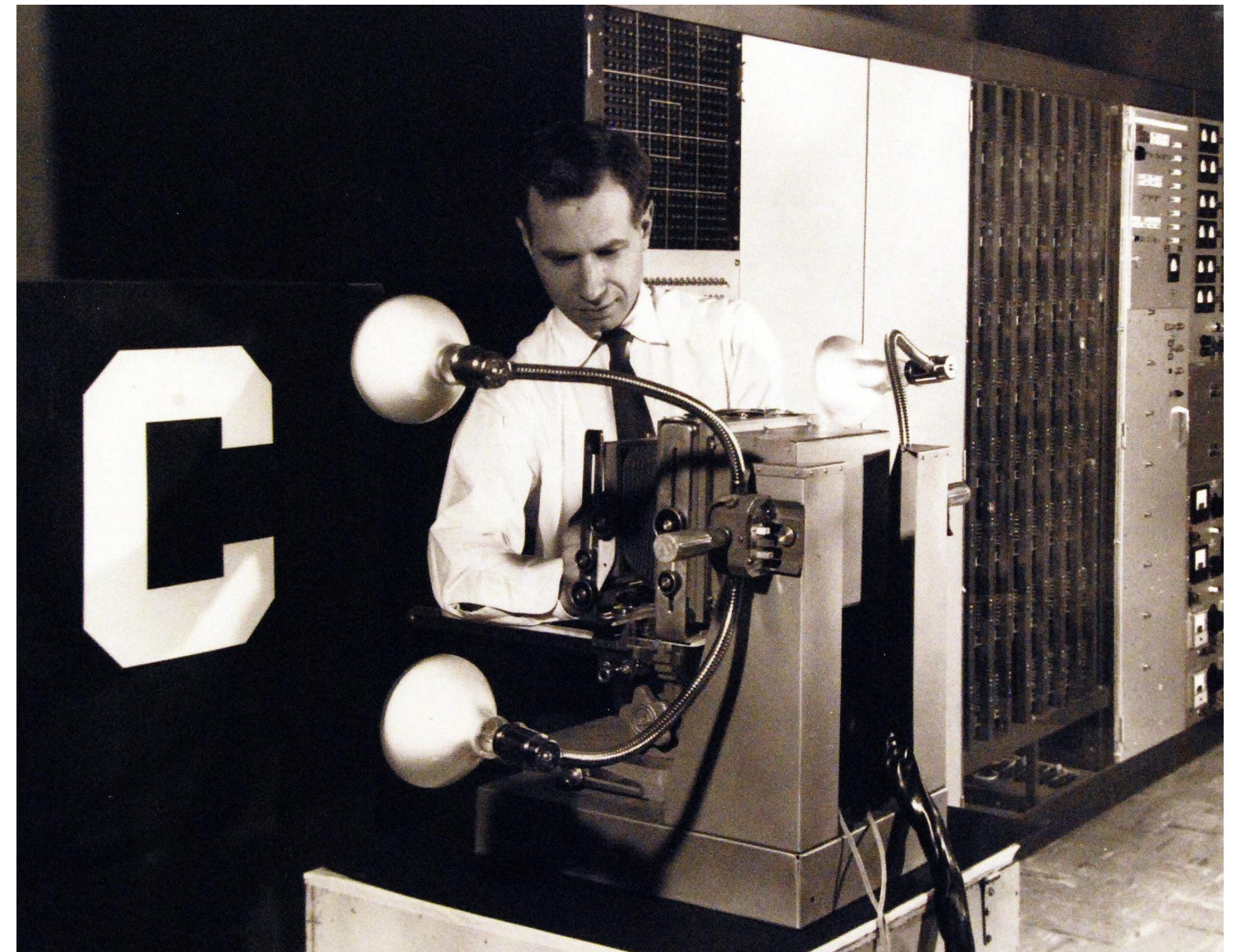
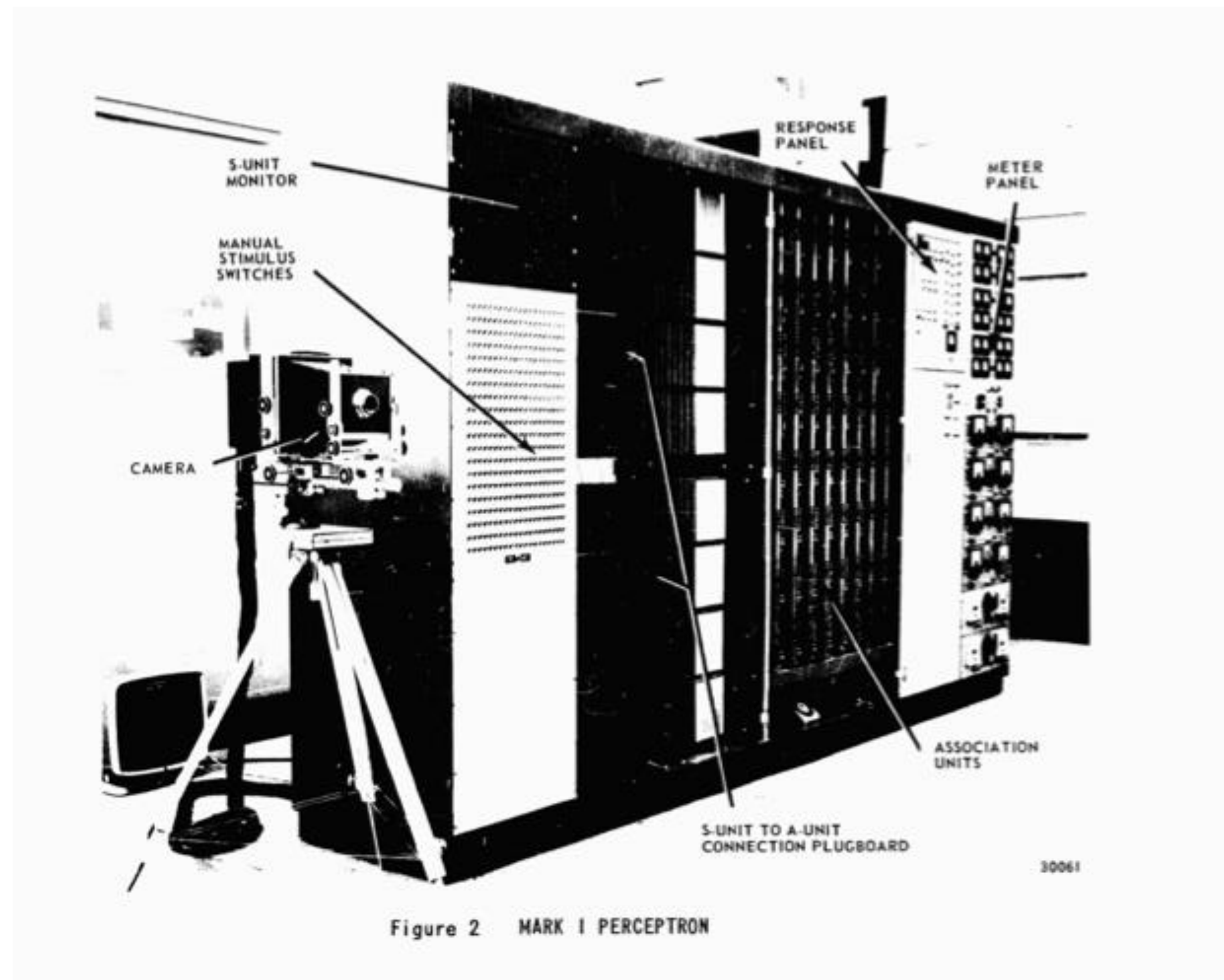


Julie Andrews as Eliza Doolittle, 1954

Underlying Technologies

- Computer Vision
 - In general computer vision extracts data through imaging sensors and interprets what it “sees” in order to accomplish some task.
 - In the context of radio, computer vision could detect and interpret features on screen displays, track and interpret operator eye movements or gestures to initiate some tasks.

Underlying Technologies



- Frank Rosenblatt's Perceptron Mark I (1957). Used supervised learning to classify images; first experiment to distinguish whether a mark on a paper was on the left or right. Later experiments learned to classify letters and other simple images

Ham Specific AI Tools are Emerging

- Gerald Artner, OE1GAQ experimented with AI automated contest exchanges (with AI generated requests for repeats as needed) during the Feb 1, 2025 EU DX ssb contest. The experiment succeeded in establishing a proof of concept but some QSOs did require Gerald's manual intervention and was more useful in the contest run mode than search and pounce.

<https://www.geraldartner.at/files/GX3WTP.mp4>

<https://www.geraldartner.at/files/PD0R.mp4>

<https://www.geraldartner.at/files/G1ZHD.mp4>

- RM Noise, a Windows client application that dramatically reduces noise while in QSO. The app communicates in real time (delay on order of .3 ms) to the RM Noise project server to remove noise.

<https://www.youtube.com/watch?v=YxIc5AIUVL4>

- Morse Decoder AI uses neural network technology to decode 10-40 wpm with 200-900 Hz tone

<https://www.kvasha.us/product/morse-decoder-ai/>

AI Can Help Improve our Operating Skills and Knowledge

Chatbots: personalize learning, operating and maintenance assistance

Intelligent radio interfaces that transform voice commands and prompts into radio-specific codes to perform tasks.

Improve signal reception. Manage modes and bandwidth utilization.

Improve propagation forecasts and prediction.

Hands-free logging and QSL management through natural language processing and AI understanding of the exchange.

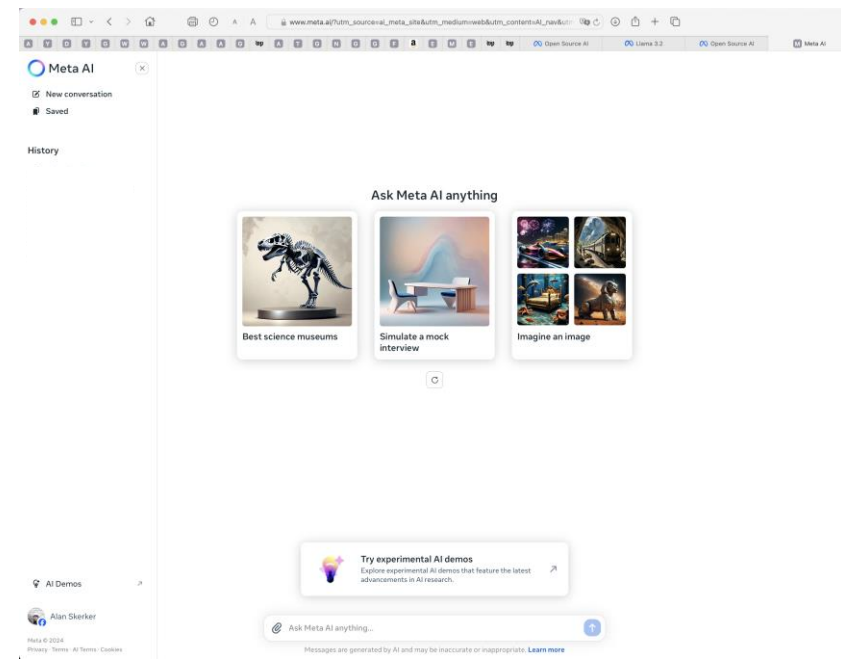
Improve accessibility for operators with disabilities. Use of sensory operated radio interfaces such as sign language, eye movements

Enhance emergency communications and situation awareness.

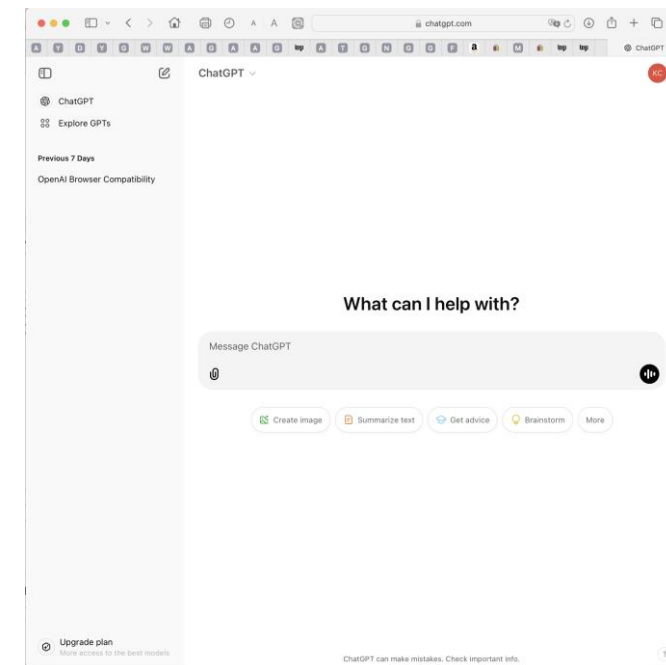


Chatbots are Everywhere

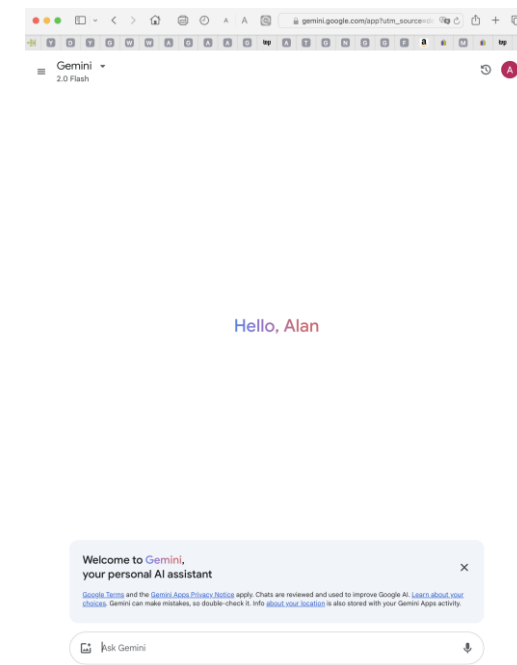
Web Browsers



Meta AI Search Page

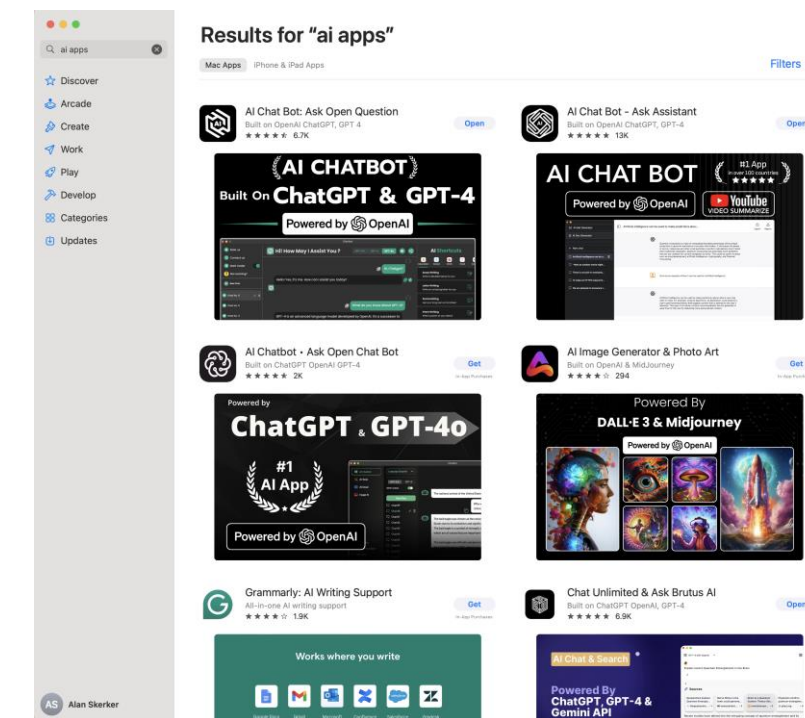


ChatGPT Search Page

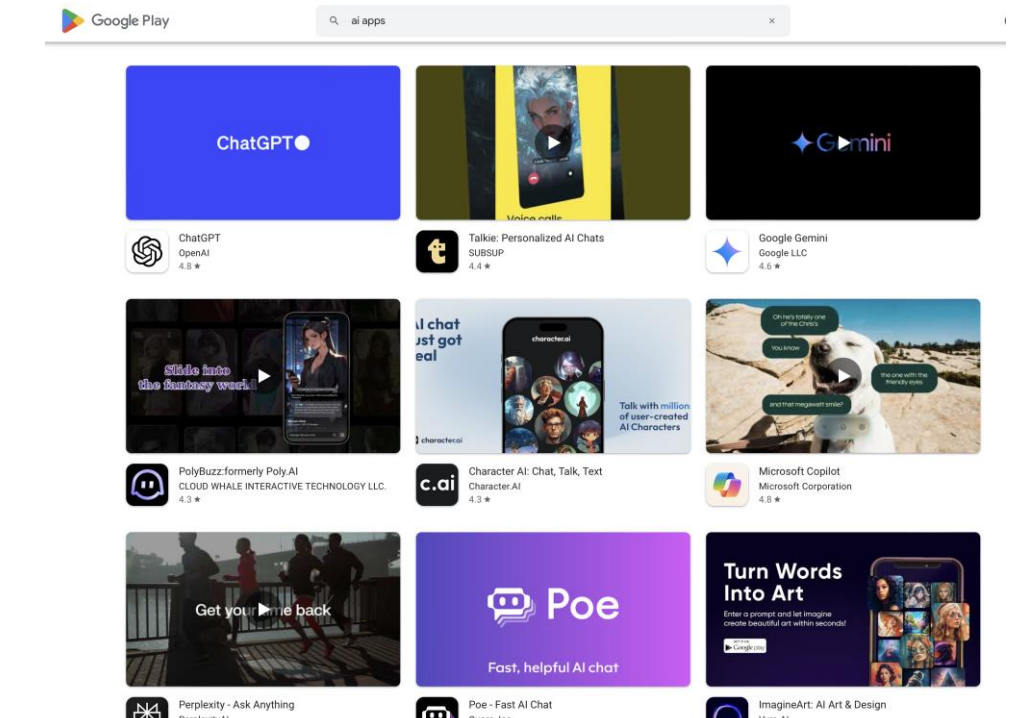


Deep Mind - Gemini

App Stores



Apple



Google Play

All of the latest search engines on current web browsers incorporate AI to improve search results, provide content summaries, offer personalized recommendations based upon your browsing history, and services such language translation, phishing and malware detection.

Personalized Assistance, Individualized Learning

How to setup an IC7300 for ft8



Setting up an Icom IC-7300 for FT8 involves several steps. Here's a step-by-step guide to help you get started:

Hardware Requirements

- Icom IC-7300 transceiver
- Computer with internet connection
- Interface cable (e.g., USB-to-Serial adapter or Icom's CI-V interface)
- Antenna suitable for HF operation

Software Requirements

- WSJT-X software (free download from [WSJT-X website]((link unavailable)))
- Icom's CI-V driver (if using CI-V interface)

Setup Steps

1. Install WSJT-X Software

- Download and install WSJT-X on your computer.
- Follow the installation instructions and ensure the software is installed correctly.

2. Configure IC-7300 for Digital Mode

- Press the [MODE] button and select "DIG-USB" mode.
- Set the digital mode to "USB" (not "LSB" or "CW").
- Ensure the IC-7300 is set to the correct frequency for FT8 operation (e.g., 14.074 MHz for 20m).

3. Connect Interface Cable

- Connect the interface cable to the IC-7300's USB port (or CI-V port if using CI-V interface).
- Connect the other end of the cable to your computer.

4. Configure WSJT-X for IC-7300

- Launch WSJT-X and select "File" > "Settings" > "Radio" tab.
- Select "Icom" as the radio type and choose the correct COM port (if using USB-to-Serial adapter) or CI-V interface.
- Set the CI-V address to "94h" (default for IC-7300).
- Set the baud rate to 19200 (default for IC-7300).
- Ensure the "PTT Method" is set to "CAT" (not "VOX" or "DTR/RTS").

5. Test the Setup

- Press the [TX] button on the IC-7300 to transmit a test signal.
- In WSJT-X, select "File" > "Test" > "TX Test" to verify the setup is working correctly.

6. Start FT8 Operation

- In WSJT-X, select the "FT8" mode and choose the desired frequency.
- Set the "TX" and "RX" frequencies to the same value (e.g., 14.074 MHz).
- Start the FT8 decoder by clicking the "Start" button.

You should now be able to transmit and receive FT8 signals using your IC-7300 and WSJT-X software. Good luck with your FT8 adventures!

A Response From Meta AI

Compare Chatbot Response with Manual

Previous view

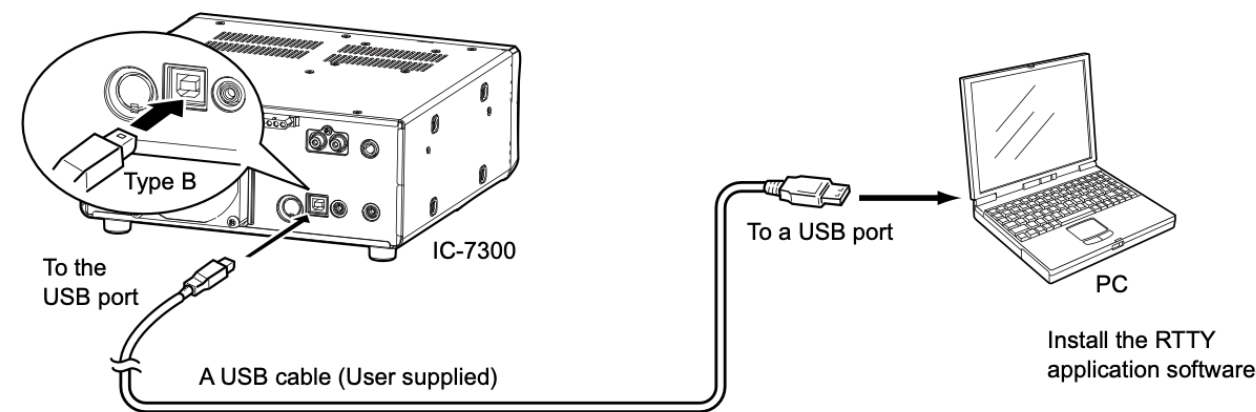
2 INSTALLATION AND CONNECTIONS

FSK and AFSK connections

The transceiver has a mode key for RTTY. You can use a PC and an application software to operate SSTV, RTTY, AFSK, PSK31, JT65, or **FT8** using a USB cable. However, if you want to operate RTTY or other digital modes, you can use the ACC socket on the rear panel through an interface unit. Refer to the software application's instruction manual for setup details.

Ⓜicom does not guarantee performance of the application software, PC, network device or network settings.

(1) When using the USB port



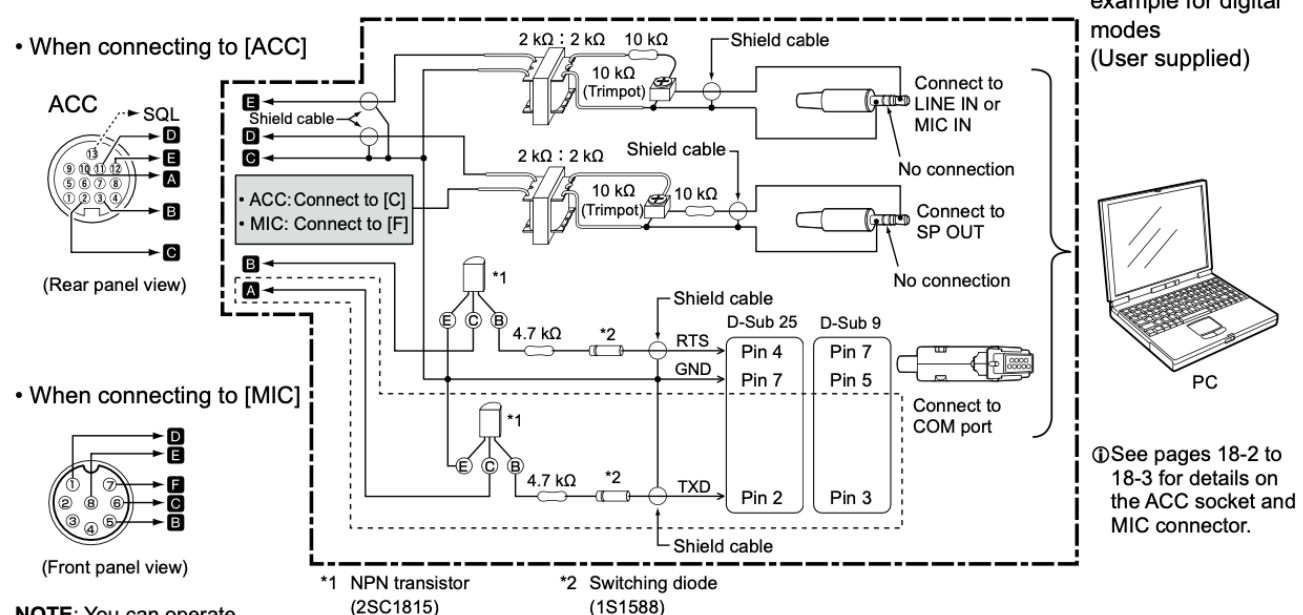
TIP:

• If you set the "USB Serial Function" item to "RTTY Decode," the decoded RTTY signals are output from the USB port.

MENU » **SET** > **Connectors** > **USB Serial Function**

• You can download the USB driver and the installation guide from the Icom website.
<https://www.icomjapan.com/support/>

(2) When using the ACC socket or the microphone connector



NOTE: You can operate ONLY AFSK RTTY when you connect the circuit to the microphone connector.

ⓂThe sections shown in short dashes are required only when Baudot RTTY is used in the FSK (RTTY) mode. (Not required for other digital modes such as SSTV or PSK)

2-5

Compare the Meta AI explanation with the results of searching for FT8 in the ICOM 7300 manual.

“FT8” only appears twice in the full manual.

Need to have known other terms to identify details that Meta AI found

Previous view

4 RECEIVING AND TRANSMITTING

Data mode operation

You can operate the data mode using AFSK (Audio Frequency Shift Keying).

ⓂWhen operating RTTY in the AFSK mode, PSK31, SSTV, JT65, or **FT8** with a PC application software, refer to the software's instruction manual.

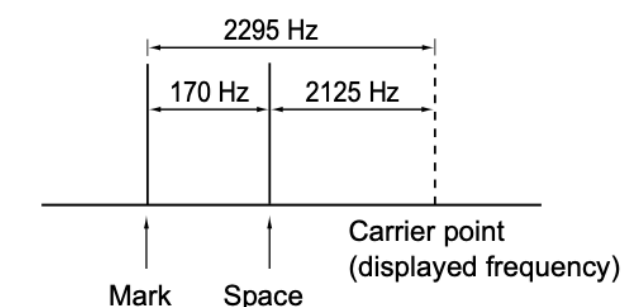
1. Connect a PC or other device to the transceiver.
 ⓂSee "FSK and AFSK connections" (p. 2-5) for connection details.
2. Select the operating band.
 (Example: 51 MHz)
3. Set the data operating mode to LSB-D, USB-D, AM-D or FM-D.
 (Example: FM-D)

Data mode



4. Refer to the application software for communication details.
 ⓂWhen operating in the SSB data mode, adjust the device's output level within the ALC zone.

TIP: The carrier point is displayed when operating AFSK in the SSB data mode. See the illustration below for a tone-pair example.



Personalized Assistance, Individualized Learning

How to use an antenna analyzer to determine if a coax cable is okay



Using an Antenna Analyzer to Test a Coax Cable

An antenna analyzer is a valuable tool for testing and tuning antennas, but it can also be used to determine if a coax cable is functioning properly. Here's a step-by-step guide on how to use an antenna analyzer to test a coax cable:

Equipment Needed:

- Antenna analyzer
- Coax cable to be tested
- Coax connectors (e.g., BNC, N, or PL-259)

Testing Procedure:

1. **Connect the coax cable to the antenna analyzer:** Attach one end of the coax cable to the analyzer's input port. Make sure the connector is securely attached.
2. **Set the analyzer to "Cable Test" or "Cable Loss" mode:** This mode is usually denoted by a "CBL" or "LOSS" button on the analyzer. Consult your analyzer's manual if you're unsure.
3. **Select the frequency range:** Choose a frequency range that covers the operating frequency of your antenna system. A common range is 100 kHz to 1 GHz.
4. **Perform a sweep:** Start the sweep function on the analyzer. This will measure the coax cable's characteristics across the selected frequency range.
5. **Observe the results:** The analyzer will display a graph or table showing the coax cable's:
 - **Return Loss (RL):** Measures the amount of signal reflected back to the analyzer. A lower RL indicates better cable performance.
 - **Insertion Loss (IL):** Measures the amount of signal lost as it passes through the cable. A lower IL indicates better cable performance.
 - **VSWR (Voltage Standing Wave Ratio):** Measures the ratio of the maximum to minimum voltage along the cable. A lower VSWR indicates better cable performance.



6. Interpret the results:

- If the RL, IL, and VSWR values are within the acceptable limits (usually specified in the analyzer's manual or on the manufacturer's website), the coax cable is likely functioning properly.
- If the values exceed the acceptable limits, the coax cable may be damaged, faulty, or not suitable for the intended application.

Acceptable Limits:

- Return Loss (RL): typically < -20 dB
- Insertion Loss (IL): typically < 1 dB (depending on the cable length and type)
- VSWR: typically $< 1.5:1$

Tips and Considerations:

- Use a high-quality coax cable that is suitable for the intended frequency range and power level.
- Ensure all connectors are securely attached and not damaged.
- Keep the coax cable away from sources of interference, such as power lines or other RF sources.
- If you're unsure about the results or the testing procedure, consult the analyzer's manual or seek guidance from a qualified RF engineer.

By following these steps, you can use an antenna analyzer to determine if a coax cable is functioning properly and suitable for your antenna system.

From Meta AI

Diagnose Station Issues

My yaesu ft710 shows no transmit power on SSB but transmits full power on CW what could be wrong



That's a puzzling issue! I'm here to help you troubleshoot. Since your Yaesu FT-710 transmits full power on CW but not on SSB, here are some potential causes:

1. Mic Gain Setting

Ensure the mic gain is set correctly for SSB mode. Try adjusting the mic gain to see if it affects the transmit power.

2. Speech Processor

Check if the speech processor is enabled for SSB mode. If it's enabled, try disabling it to see if it resolves the issue.

3. SSB Carrier Level

Verify that the SSB carrier level is set correctly. If the carrier level is too low, it may not transmit any power.

4. AF Gain

Ensure the AF (Audio Frequency) gain is set correctly for SSB mode. If the AF gain is too low, it may not transmit any power.

5. Mic Wiring or Connection

Inspect the microphone wiring and connection for any damage or corrosion. Ensure the mic is securely connected to the transceiver.

6. Transceiver Settings

Double-check the transceiver settings for SSB mode. Ensure that the transmit power is set correctly and that there are no other settings that might be limiting the transmit power.

7. Faulty Mic or Transceiver

If none of the above steps resolve the issue, it's possible that there's a fault with the microphone or the transceiver itself. You may want to try using a different microphone or have the transceiver serviced by a qualified technician.

I hope these steps help you identify and resolve the issue with your Yaesu FT-710. If you're still unsure or need further assistance, feel free to ask!



My LC tuner suddenly stopped matching my end fed antenna on all ham bands what should I look for



That's frustrating! An LC tuner (also known as an antenna tuner or transmatch) suddenly failing to match your end-fed antenna on all ham bands can be caused by several factors. Here's a step-by-step troubleshooting guide to help you identify the issue:

LC Tuner Issues

- 1. Check the tuner's capacitors:** Verify that the capacitors are not damaged or faulty. Look for signs of physical damage, such as cracks or burn marks.
- 2. Inspect the tuner's inductors:** Check the inductors for any signs of damage, such as broken wires or physical distortion.
- 3. Clean the tuner's contacts:** Corrosion or dirt on the tuner's contacts can prevent proper matching. Clean the contacts with a soft brush or contact cleaner.

End-Fed Antenna Issues

- 1. Check the antenna's feedpoint:** Verify that the antenna's feedpoint is secure and not damaged. Make sure the feedpoint is properly connected to the tuner.
- 2. Inspect the antenna's wire:** Check the antenna's wire for any signs of damage, such as cuts, abrasions, or corrosion.
- 3. Verify the antenna's length:** Ensure that the antenna's length is correct for the frequency you're trying to match.

Coaxial Cable and Connectors

- 1. Check the coaxial cable:** Verify that the coaxial cable is not damaged or faulty. Look for signs of physical damage, such as cuts, crushes, or corrosion.
- 2. Inspect the connectors:** Check the connectors for any signs of damage, corrosion, or wear. Make sure they are securely attached.

Power and Signal Issues

- 1. Verify the transmitter's power output:** Ensure that the transmitter's power output is within the tuner's specified range.
- 2. Check for RF interference:** Verify that there are no sources of RF interference nearby that could be affecting the tuner's ability to match the antenna.

Additional Troubleshooting Steps

- 1. Try a different antenna:** If possible, try connecting a different antenna to the tuner to see if the issue persists.
- 2. Use an antenna analyzer:** An antenna analyzer can help you identify any issues with the antenna or coaxial cable.
- 3. Consult the tuner's manual:** Refer to the tuner's manual for troubleshooting guides specific to your model.

If you're still unable to resolve the issue, feel free to provide more details about your setup, and I'll do my best to help you troubleshoot the problem!



Your Personal Radio-Electronics Handbook

How do I read the codes on Ceramic Capacitors?

Reading codes on ceramic capacitors can be a bit tricky, but I'll break it down step by step:

1. Identify the Code Format

Ceramic capacitors typically use one of two code formats:

- **Three-digit code:** XX XY (e.g., 104K)
- **Four-digit code:** XXXX (e.g., 1004)

2. Decode the Value

For three-digit codes:

- First two digits: significant figures (10, 22, 47, etc.)
- Third digit: multiplier (0 = 1, 1 = 10, 2 = 100, etc.)

Examples:

- 104 = $10 \times 10^4 = 100 \text{ nF}$ (or $0.1 \mu\text{F}$)
- 225 = $22 \times 10^5 = 2.2 \mu\text{F}$

For four-digit codes:

- First three digits: significant figures (100, 220, 470, etc.)
- Fourth digit: multiplier (0 = 1, 1 = 10, 2 = 100, etc.)

Examples:

- 1004 = $100 \times 10^4 = 100 \text{ nF}$ (or $0.1 \mu\text{F}$)
- 2205 = $220 \times 10^5 = 22 \mu\text{F}$

3. Identify the Tolerance

The tolerance is usually indicated by a letter:

- C: $\pm 0.25 \text{ pF}$
- D: $\pm 0.5 \text{ pF}$
- F: $\pm 1\%$
- G: $\pm 2\%$
- J: $\pm 5\%$
- K: $\pm 10\%$
- M: $\pm 20\%$
- Z: $\pm 80\%$ (not common)

4. Check for Voltage Rating (Optional)

Some ceramic capacitors have a voltage rating code:

- 1: 100 V
- 2: 200 V
- 4: 400 V
- 6: 600 V

Example

Suppose you have a ceramic capacitor with the code "104K".

- Value: $10 \times 10^4 = 100 \text{ nF}$ (or $0.1 \mu\text{F}$)
- Tolerance: K = $\pm 10\%$
- No voltage rating code is present.

By following these steps, you should be able to read the codes on most ceramic capacitors.

Ask Meta AI anything...

Messages are generated by AI and may be inaccurate or inappropriate. [Learn more](#)

How does a transistor work?

A transistor is a semiconductor device that plays a crucial role in modern electronics. It's essentially a switch or amplifier that controls the flow of electrical current. Here's a simplified explanation of how it works:

Basic Structure

A transistor consists of three layers of a semiconductor material, typically silicon. These layers are:

1. **Base:** The middle layer.
2. **Collector:** One of the outer layers.
3. **Emitter:** The other outer layer.

How it Works

The transistor works by controlling the flow of current between the collector and emitter. Here's a step-by-step explanation:

1. **No Base Current:** When there's no current flowing into the base, the transistor is in its "off" state, and no current flows between the collector and emitter.
2. **Base Current Applied:** When a small current is applied to the base, it creates a "channel" for current to flow between the collector and emitter.
3. **Collector-Emitter Current:** As the base current increases, the channel widens, allowing more current to flow between the collector and emitter.
4. **Amplification:** The transistor can amplify the base current, allowing a small input signal to control a much larger output current.

Types of Transistors

There are two main types of transistors:

1. **Bipolar Junction Transistor (BJT):** Uses both positive and negative charge carriers.
2. **Field-Effect Transistor (FET):** Uses only one type of charge carrier.

Applications

Transistors are used in a wide range of applications, including:

- Amplifiers
- Switches
- Logic gates
- Microprocessors
- Power management systems

In summary, a transistor is a semiconductor device that controls the flow of electrical current by creating a channel between two layers. Its ability to amplify or switch electronic signals makes it a fundamental component in modern electronics.

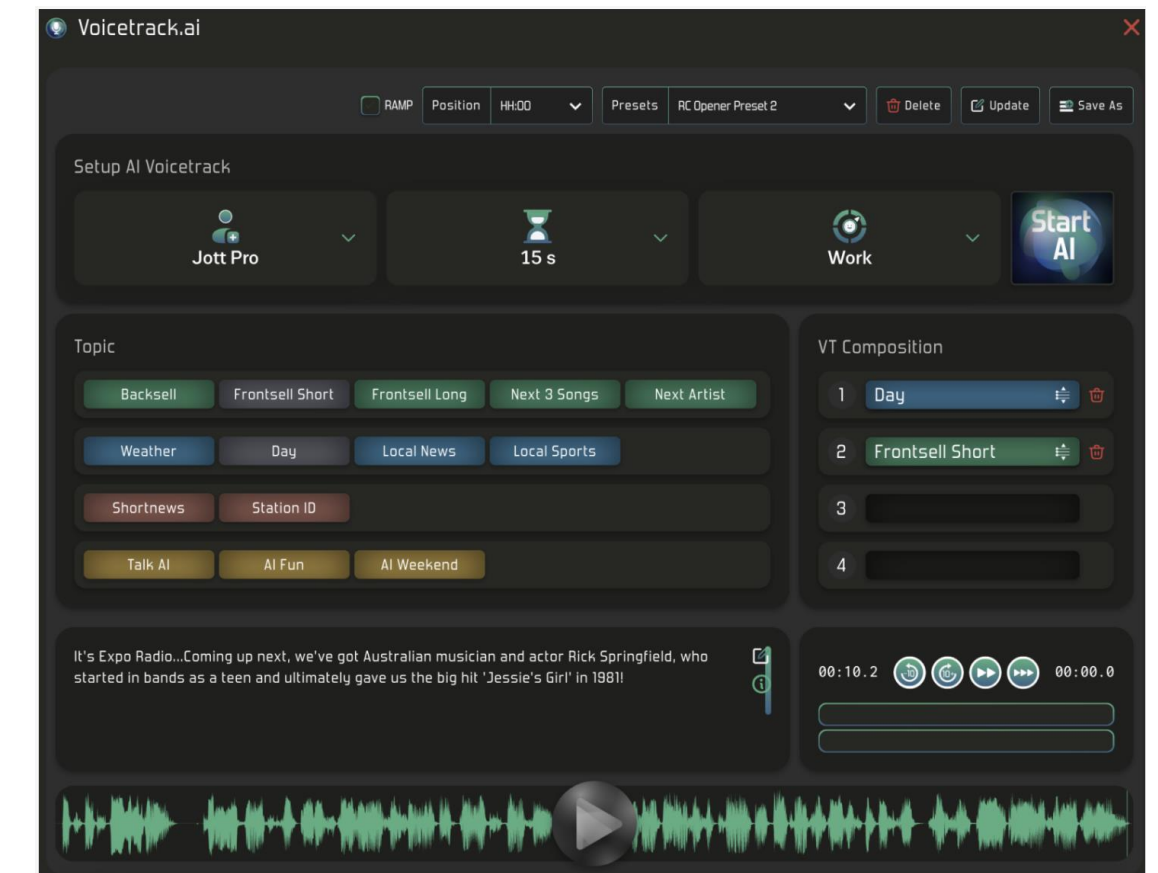
Ask Meta AI anything...

Messages are generated by AI and may be inaccurate or inappropriate. [Learn more](#)

Get Easy to Understand Answers

AI Powered Radio Interfaces

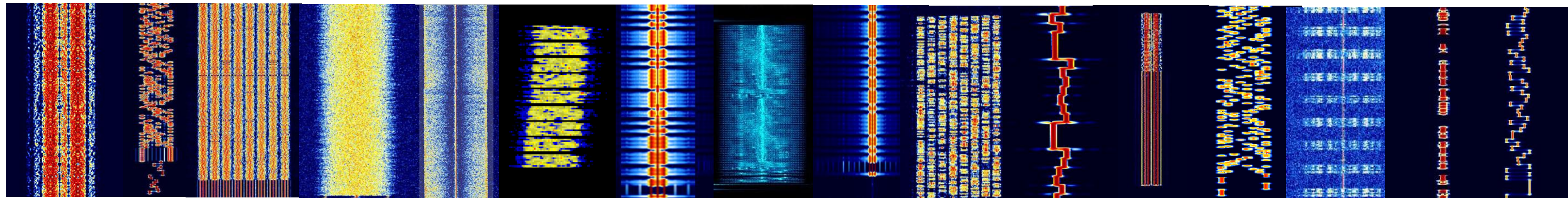
- Hams already use and experience digitized voice:
 - digital voice technologies (e.g., D-Star, DMR, System Fusion, FreeDV (open-source DV standard))
 - devices that annunciate such as talking SWR and power meters, repeater time and station info
- Unattended Commercial Radio:
 - In 1995 the FCC enabled commercial radio to run unattended
 - DJ's using computers could manually setup a voice track that would air automatically.
 - AI is now in its wide-spread use in commercial radio to automate voice tracks and create the illusion of a live broadcast
 - Enable stations to run through the night and early morning without a live DJ
 - SmartFM, SPECai, SuperHiFi, RadioGPT, Voicetrack.ai etc. provide AI assisted operation of commercial radio and TV. For example, AI has changed voice tracking from a purely manual task to one with minimal manual input.
- AI Powered Voice Interface for Radio:
 - Motorola developed ViQi ("Vicki"), an AI powered voice interface for Police radios.
 - Officer can change the radio zone and channel by voice (i.e., CAT control); check license plates and driver's licenses.
- AI powered interfaces would be capable of providing hams with:
 - Voice operated CAT
 - Voice controlled operating parameters
 - AI with translation and understanding could do voice to CW/digital modes and CW/digital modes to voice transmission/reception substituting abbreviations such Morse DE, QTH for natural language or otherwise format or modify our language for intelligibility.
 - AI assisted rapid tuning of signals that can be challenging to tune manually such as snippets of SSB in noise.



AI radio apps can select and assemble a voice track of pre-recorded audio segments based upon various parameters to create the illusion of a live broadcast.

Improve Signal Reception and Understanding

- Use predictive and natural language processing capabilities to fill-in errors (e.g., missing pieces of a conversation, words in text, characters in CW) due to the operating environment.
- Using machine learning to classify signals and create fingerprints for immediate identification of a signal within a complex environment. Automate digital communications.

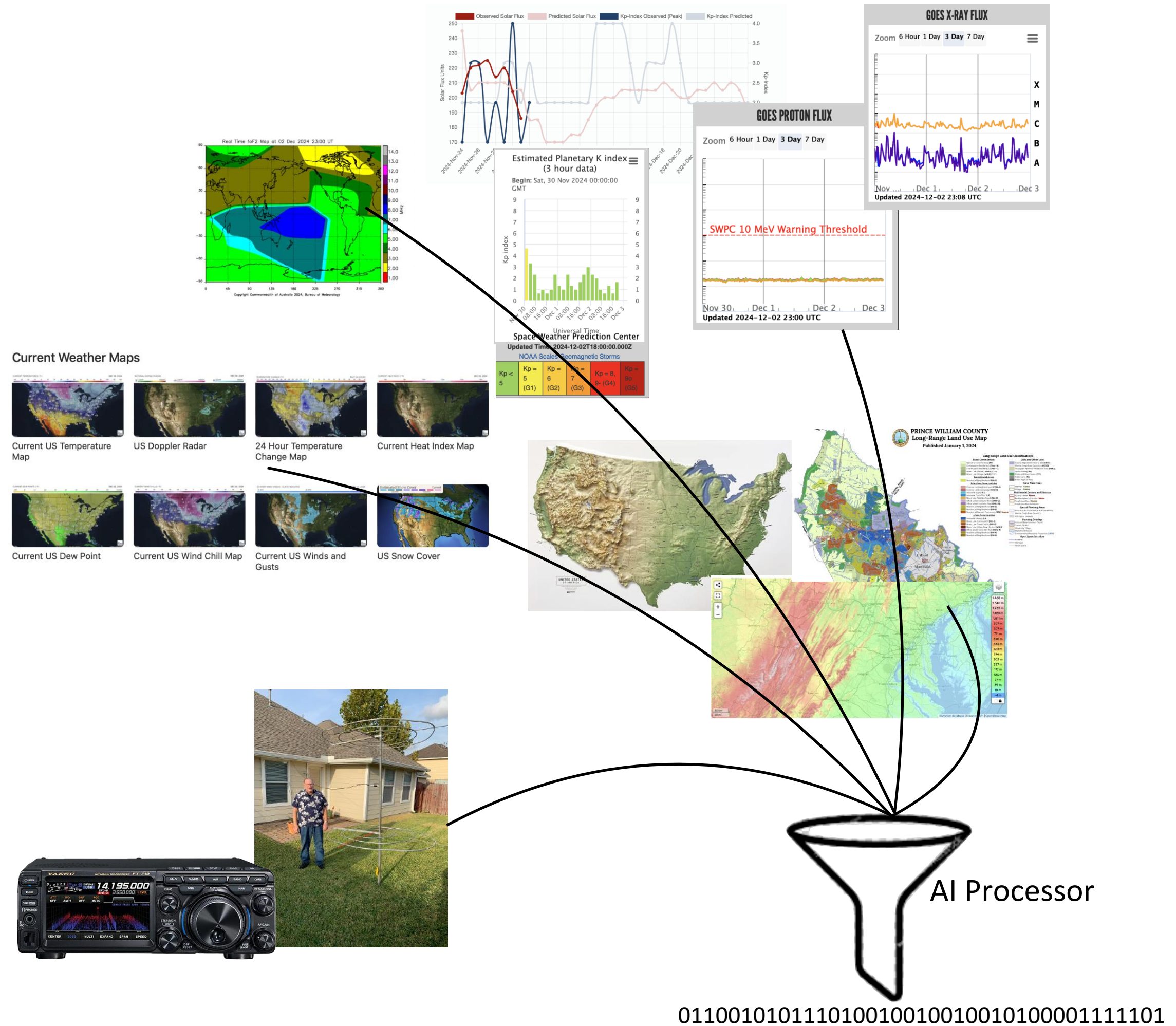


Just a few of the signals that may be seen on a waterfall (without noise, fading, or interference)



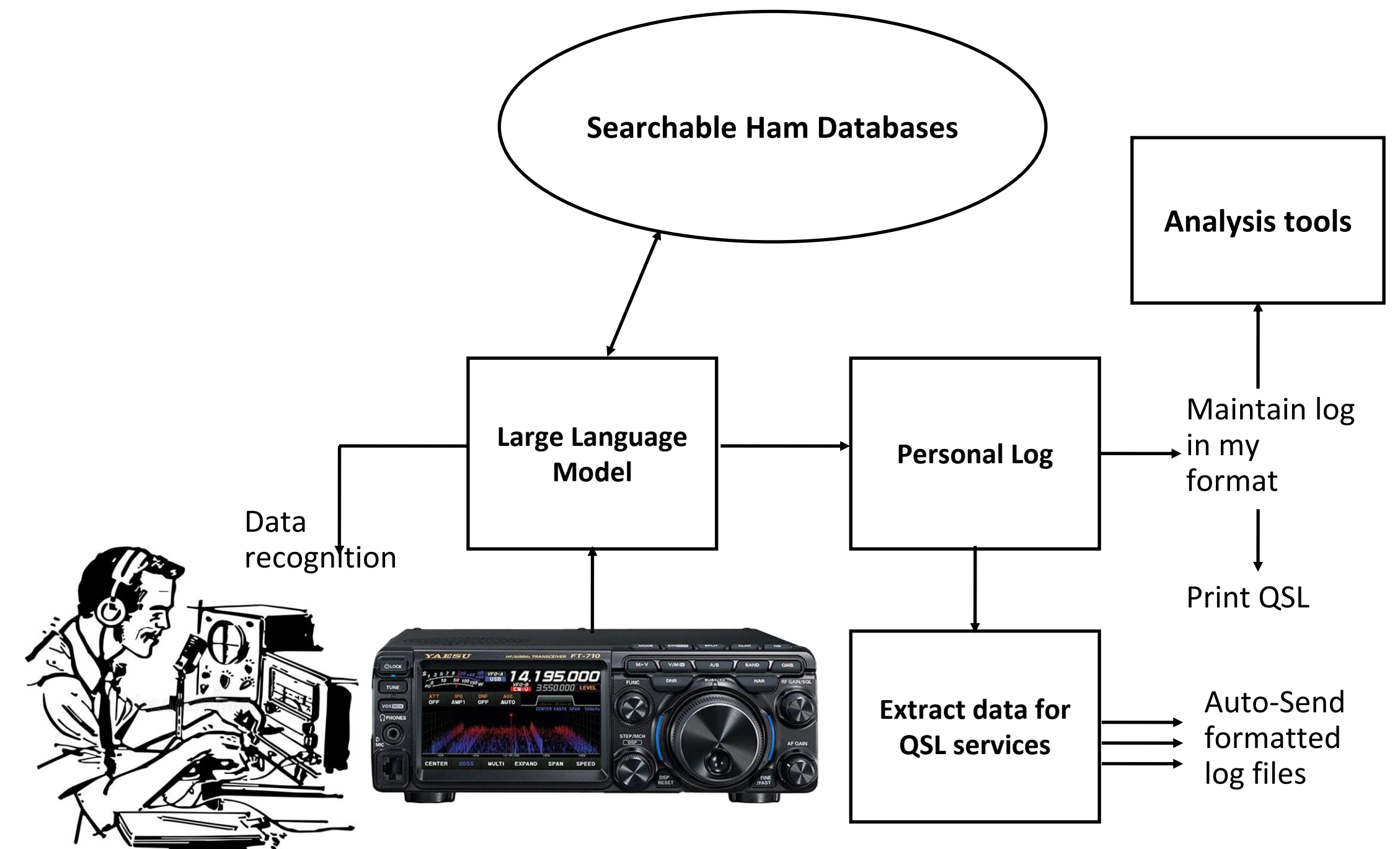
Enhance Propagation and Forecasting

- IEEE Antennas and Propagation Society June 2022: “Special Issue on Artificial Intelligence in Radio Propagation for Communications”
- AI can process and analyze large datasets that relate to personalized radio propagation forecasts
 - Ionospheric and tropospheric conditions
 - Worldwide propagation predictions
 - Solar and geomagnetic conditions
 - Weather patterns
 - Terrain and land use
 - Station radio and antenna characteristics
- Recognize patterns across these datasets and employ machine learning techniques to improve predictions of signal strength, path loss, multi-path and fading effects, and ionospheric and tropospheric delays.



Enhance Automated Logging and QSL Management

- Automatically save information from voice or digital communications that you want to store in a personal retrievable log and, at the same time, extract and save the relevant data for upload to QSL services.
- Assist with callsign, name, QTH, club member number, contact sequence number recognition during difficult conditions.
- Analyze log data to provide insights into operating habits, antenna performance, and propagation trends.
- Design and create QSL cards using generative AI



Improve Accessibility for Operators with Disabilities

- AI powered radio interfaces that combine vision and language assistance would provide an important capability for a broad segment of the ham radio disabled population.
 - AI powered speech processing can help people with limited mobility or dexterity control a radio through voice commands
 - AI vision and language capabilities can translate sign language and other hand or eye movements into radio control operations
 - AI can learn and adapt to people with non-standard speech patterns and other language impediments to enable intelligible communications with other hams.

Emergency Communications and Situation Awareness

- Generation of automatic alerts
 - Changes in conditions affecting communications quality
 - For voice or digital operations generate alerts to appropriate authorities based upon natural language understanding in addition to a pre-programmed dictionary of key words and phrases.
- By providing situation awareness of the communications systems, AI can dynamically allocate resources and frequencies to optimize the flow of communications during emergency event
- AI can provide situation awareness of logistics and other aspects of operations to optimize management of emergency resources



An AI-generated image of a Ham operating indoors with various types of antennas and what looks like a magic wand or conductors baton in his hand (from the lesson/course generation app “Mindsmith”)

As we've seen today, AI can potentially transform Ham Radio in many ways

Existing Chatbots offer personalized assistance, individualized learning, and help with understanding and resolving station issues

AI is beginning to drive useful applications for ham radio such as the client-server noise removal tool RM Noise and the ability to decode CW under less than ideal conditions.

73, and we'll catch you on the airwaves!