

Artificial Intelligence Voice Station in the EU DX Contest

I have been working on an OE1GAQ voice station that is automated with artificial intelligence (AI) for some time. On February 1, 2025, I will be using it for the first time in a competition

tested on shortwave. I'll tell you about my first experiences in the EU DX Contest.

The key data: Location TU Vienna (OE1XTU), SteppIR DB36, ICOM IC-7300, laptop with Microsoft Windows, Python, Google Speech-to-Text API (paid), ChatGPT API (paid), Google Text-To-Speech. Nickname Talos.

I set the modulation, transmission power and QRG on the transceiver myself. The program only accessed the ICOM's push-to-talk (PTT) function via Computer Aided Transceiver (CAT) commands.

It works

I had some 59+ QSOs in the competition where the speech could be received well, was converted into readable text and the AI also gave meaningful answers.

The first clean QSO in the competition was with M0JND:

CQ contest, CQ contest, this is Oscar Echo One Golf Alpha Quebec, calling CQ contest.
Over.

Mike zeroh Juliet November Delta

Please repeat your call sign. Over.

zero Juliet November Delta

I copy your call sign as Mike Zero Juliet November Delta. You are five nine AT01. My name is Talos. Thank you for the contact. Over.

Roger 5927

Thank you, Mike Zero Juliet November Delta.

Please copy my report as 59 AT01. Good luck in the contest. 73. OE1GAQ, clear.

CQ contest, CQ contest, this is Oscar Echo One Golf Alpha Quebec, Oscar Echo One Golf Alpha Quebec, contest. Over.

ON6EC:

CQ contest, CQ contest, this is Oscar Echo One Golf Alpha Quebec calling. Over.

Oscar November 6th Echo Charlie

Please repeat your full call sign. Over.

Oscar November 6th Echo Charlie Oscar November
ber 6th

Thank you for the repeat. You are 59, AT01.

Your call sign is Oscar November Six Echo Charlie. This is Oscar Echo One Golf Alpha Quebec. QSL? Over.

01 059 Bravo Echo 05 Bravo Echo 0

Please clarify your call sign. Over.

the goal sign is Oscar November 6th Echo charging enter November

Thank you for the clarification. You are Os-car November Six Echo Charlie. You are 01 059

Bravo Echo 05 Bravo Echo 0. You are 59, AT01.

This is Oscar Echo One Golf Alpha Quebec.

Thank you for the contact. Over and out.

CQ contest, CQ contest, this is Oscar Echo One Golf Alpha Quebec calling. Over.

PD0R:

CQ contest, CQ contest, this is Oscar Echo One Golf Alpha Quebec calling. Over.

Delta zero Romeo

Please confirm your full call sign. Over.

Papa Delta zero Romeo

Papa Delta Zero Romeo, I copy. Your signal report is 59 AT01. Please copy my signal re-port 59 AT01. Over.

59 November 1

Negatives. Please confirm: Papa Delta Zero Romeo, your signal report is 59 Alpha Tango Zero One. Over.

59 November

Roger that, Papa Delta Zero Romeo. Your signal report is 59 Alpha Tango Zero One. Thank you for the contact. This is Oscar Echo One Golf Alpha Quebec, clearing. 73. Good luck in

the contest. Over and out.

thank you very much bye bye

You're welcome! Bye bye.

GX3WTP:

CQ contest, CQ contest, this is Oscar Echo One Golf Alpha Quebec calling. Over.

golf x-ray 3 Whiskey Tango Papa

Please confirm your full call sign. Over.

take off x-ray 3 Whiskey Tango Papa

Roger, Golf X-ray 3 Whiskey Tango Dad. Your signal report is 59 AT01. Please copy my signal report: 59 AT01. Over.

qsl may I have your name please

My name is Talos. What is your name? Over.

my name is James Iva

Roger, James. Thank you for the contact. This is Oscar Echo One Golf Alpha Quebec, clear ring. 73. Good luck in the contest. Over and over

out.

73

73. Goodbye!

I don't know why the chatbot asked for the callsigns even though they were received correctly. But it happened a few times. Maybe the prompt for questions is too strict. I also don't know why the AI keeps writing over. That wasn't the case in previous tests.

Overall, the AI chatbot works very well. The wording fits the amateur radio context and the conversation flow is consistent. If the received language is not recognized correctly, the chatbot asks for clarification.

Prompt

An input to an AI is called a prompt . You can use it to ask the AI questions, for example, or ask it to translate a text. In a broader sense, you can also use it to tell AI chatbots how they should behave. You can program AI directly in language - it is a chatbot that understands open language. What a good command set looks like still needs to be explored. I experimented a lot during the competition . In the end, my prompt looked like this:

- You are an amateur radio SSB station.
- Your call sign is OE1GAQ.
- Call CQ: CQ contest Oscar Echo One Golf Alpha Quebec, Oscar Echo One Golf Alpha Quebec, contest.
- You send the exchange 59 AT01 (five nine, alpha tango zero one).
- Your name is Talos.
- Use the International Radiotelephony Spelling Alphabet to spell call signs.
- You are in a contest, keep QSOs short.
- If you can't understand their callsign, then keep asking until you have the full callsign and their report.

The received signals converted into text are then sent as a prompt to the AI chatbot.

How do I get these prompts? The AI chatbot needs to know that it should behave as an amateur radio station, it needs to know the call sign, name and report. The remaining commands are intended to prevent unwanted output, otherwise pseudo-Morse confusion occurs or ChatGPT generates the entire conversation. These outputs usually occur immediately after the program starts and can be resolved by restarting.

Dah-dit-dah-dit Dah-dah-dah-dit-dah-dit-dit-dit-dah-dah-dit-dit-dah-dit-dit (OE1GAQ listening)

Beep-ka-chk-chk-chk-chk (Station calling)

Dah-dit-dit-dit-dah-dit-dit-dit-dit (OE1GAQ listening)

Chk-chk-dit-dah-dit-dah-dit-dah (Station calling)

(Station calling: *Alpha Bravo Zero Two*)

CQ contest, CQ contest, this is OE1GAQ, over.

[...Waiting for a response from another station...]

Assuming there is a reply from another station:

[Station's Call Sign], this is OE1GAQ, you are 59 AT01, over.

[Wait for the received report from the other station...]

Assuming the other station acknowledges the report:

Roger, thanks for 59 also, 73 and good luck in the contest. OE1GAQ QRT.

[End transmission]

challenges

A well-known problem with artificial intelligence is that it sometimes simply invents statements. The phenomenon now has a name: hallucinations. They

have often been noticeable in that the AI suddenly invented an answer during longer CQ calls, even though the output of the speech-to-text function was empty:

CQ CQ contest, this is Oscar Echo One Golf Alpha Quebec, Oscar Echo One Golf Alpha Que-bec, contest. Looking for any station to come back. Over.

Please repeat your call sign slowly using the International Radiotelephony Spelling Alphabet. Over.

Calling CQ worked reasonably well. I also intervened manually, mostly because the reception signal was too weak and no speech was recognized. I also ended the QSO manually when the AI was stuck because of poor transcriptions. I had a bad conscience and didn't want to unnecessarily take up the time of the other stations in the competition. The Search and Pounce (S&P) stations, however, adjusted well to the language and speed of the AI station.

I couldn't get Search and Pounce (S&P) to work.

The program took far too long to listen and generate a response . The run station had already worked a whole QSO, or had already asked for the third time. Above all, run stations speak very quickly and do not wait long for a response. I had also changed the prompt to get shorter answers. My S&P prompt set at the end of the day was:

- You are an amateur radio SSB station.
- Your call sign is Oscar Echo One Golf Alpha Quebec.
- You are a search and pounce station. Only say your callsign.
- If they say your callsign then tell them your callsign and the report.
- If you don't receive a reply, then repeat your callsign again.
- You send the report 59 AT01 (five nine, alpha tango zero one)
- Use the International Radiotelephony Spelling Alphabet to spell call signs.

This meant that the AI usually first responded with "Oscar Echo One Golf Alpha Quebec" and then, after listening, with "Os-car Echo One Golf Alpha Quebec your report AT01" or something like that. The second time, the AI actually always sent a report,

even if she hadn't understood anything. Most of the time the voice recording was not synchronized with the language actually spoken. As a run station it worked better because the human counterparts could listen long enough and then respond in a timely manner.

For us humans it sounds trivial that we listen to the end and then answer, for my AI program this is still a problem. Or the AI is simply rude, hi. I suspect that speaking quickly in competitions is the

Detection is made even more difficult (in addition to noise, splatter, clicking sounds and pileup).

Overall, the AI station worked quite well in the first test in the shortwave competition, but there is still a lot to do. Speech-to-text needs to better recognize distorted speech with interference, the AI chatbot needs to respond faster, and we need to learn prompt engineering for amateur radio applications.

vy 73, Gerald Artner OE1GAQ



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Results of the Austrian Amateur Radio Direction Finding Championships 2024

All 12 planned target practice competitions were held last year . Together with the introductory competitions at the TU Graz, in the Vienna Prater and in Weinburg am Saßbach as part of the Styrian State Field Day, as well as participation in the Region1 Championship in Bulgaria, there were around 215 participants in the results list. Fortunately, the venues in Carinthia and especially Tyrol seem to have established themselves. We thank all the organizers and hope that they will continue to be available for competitions and perhaps also again in Salzburg.

In this cup ranking, the four best results from each male and female runner from the whole of Germany count, whereby one result each must be achieved for 80 m and 2 m. However, only two events from each state are counted. The points are awarded for the rankings as follows: 15 - 12 - 10 - 8 - 6 for places 1 to 5. For places 6 - 9 there are 5 - 4 - 3 - 2 points and from place 10 onwards there is one point each.

Austrian Championship – ÖVSV class

Rank	Name	Call sign	Rated Events	Points
1	Andreas J.	OE6AJF	60	4
2	Gerhard L.	OE6TGD	48	4
3	Hermann F.	OE1HFC	46	4
4	Attila M.	OE1LTS	42	3
5	Reinhard S.	OE3NSC	31	4
6	Alexander H.	OE6GRD	28	3
7	Stefan Z.	OE2SZM	24	3
8	Horst T.	OE6STD	20	2
9	Egon W.	OE6EWF	12	2
10	Richard L.	OE1CLC	11	4
11	Mario K.	OE5MKE	10	3
12	Harald G.	OE6GC	10	2
13	Siegfried D.	OE1SSA	8	2
14	Werner V.	OE6VWG	6	2

Austrian Championship – Guest Class

Rank	Name	Call sign	Rated Events	Points
1	14 Stefan R.	OE6/SWL		2

Results of the Styrian Amateur Radio Direction Finding Championships 2024

All six of the planned competitions for the Styrian Peil Championships were also able to take place. The results of the cup ranking can be found in the table.

In the Styrian Cup ranking, the five best results from each runner from all competitions held in OE6 count; thus, one result is discarded. The same points are awarded for the placings as in the Austrian Championship.

The location of the award ceremonies for both championships will be announced after this year's competitions have been finalized . The planning for the events is almost complete , you can find the provisional calendar below or, as always, on the Internet at ardf.oevsv.at

Styrian Championship – ÖVSV class

Rank	Name	Call sign	Rated Events	Points
1	Andreas J.	OE6AJF	75	5
2	Horst T.	OE6STD	51	5
3	Alexander H.	OE6GRD	51	4
4	Gerhard L.	OE6TGD	48	4

Styrian Championship – Guest Class

Rank	Name	Call sign	Rated competitions	Points
1	Hermann F.	OE1HFC	2	40
2	Joze O.	S51T		31
3	Attila M.	OE1LTS	3	27
4	Miroslav K.	S52KK	5	16
	Richard L.	OE1CLC	4	15

start of the ARDF season

Nine competitions for the Austrian ARDF Championship in five federal states have been fixed so far. Some dates, see the ARDF homepage, are still available for possible further events. There is also the ARDF World Championship in Lithuania (<http://ardf2025.lt>). Interested parties, but also guests, are welcome to register by email (peilen@oevsv.at) by April 15, 2025.