Witscript: Computational methods for generating contextually integrated jokes

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Witscript is a new approach to computational humor.

Research shows that people often prefer to communicate with an artificial intelligence (AI) that has a sense of humor.

But existing conversational AIs have limited comedic ability:

- They only deliver jokes prewritten by humans.
- They mostly just babble and need human editing.
- They only tell jokes on request.
- They tell jokes unrelated to a context.

Witscript is the first AI to improvise original, contextually integrated jokes.

Here's a sample exchange with Witscript:

> Yesterday Microsoft unveiled new eyewear that uses holograms.

> Microsoft eyewear? Ha, watch Google goggle.

Witscript was created by a humor expert.

- Joseph E. Toplyn is a four-time Emmy-winning comedy writer.
- He wrote the book *Comedy Writing for Late-Night TV*.
- He transformed techniques in his book into algorithms for Witscript.
- So Witscript mimics the way a human humor expert writes jokes.

Witscript is based on the Surprise Theory of Laughter.

This theory says that we laugh when we're surprised that an incongruity turns out to be harmless.

## Witscript generates jokes that have three parts.

- **TOPIC**: The sentence that the joke is based on
- **ANGLE**: A word sequence extending from the topic to the punch line
- **PUNCH LINE**: The words that trigger a laugh by surprising the audience with an incongruity that turns out to be harmless

Witscript generates punch lines based on wordplay, which are currently the easiest type to compute.

Witscript generates a joke in six steps.

STEP 1: Get the topic sentence.

Take it from a text source or from a conversation with a User. Here's an example from a User:

> Now they're selling a pizza topped with roasted grasshoppers.
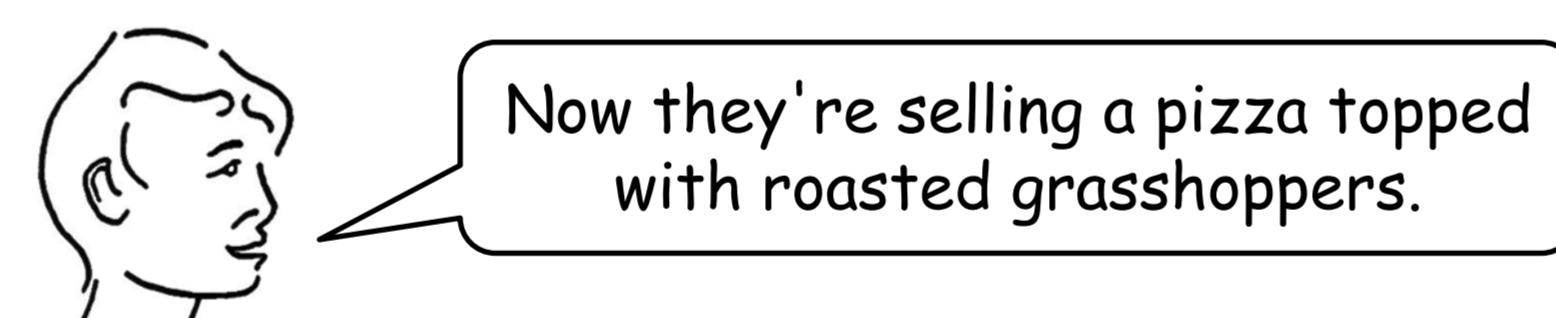
STEP 2: Select two topic handles.

Use natural language processing tools to extract named entities, nouns, and noun chunks. These become the handle candidates.

Then use word embeddings to select the two handle candidates that are the least similar in a relevant vector space.

These become the topic handles because they are the elements of the topic that are most likely to be useful in creating a joke.

In our example , the two topic handles are "pizza" and "grasshoppers."

STEP 3: List associations for each handle.

Associations are words most similar to a topic handle in a relevant vector space.

For each topic handle, list the top K associations.

In our example, here are some associations for each of the two topic handles:

pizza	grasshoppers
sandwich	caterpillars
burger	**pests**
burrito	insects
pasta	mosquitoes
etc.	etc.

STEP 4: Link an association from each list to create a punch line.

- Pair up all possible combinations of the associations, one from each list.
- Score each pair of associations for wordplay.
- Link the two associations that have the best wordplay score.

In our example, link "pasta" with "pests" to create the punch line "pasta pests."

STEP 5: Generate an angle.

Fine-tune a pre-trained language model on a dataset of 37,000 suitable jokes.

Use that model to fill in the blank between the topic and the punch line with an angle, so that the result reads like natural speech.

Or pick an angle template from a prewritten list.

In our example, pick the angle template "Pizza grasshoppers? Or here's something…"

STEP 6: Output the joke response.

The joke response is the angle joined to the punch line, in that order. Only output joke responses that have a wordplay score above a preset threshold.

> Now they're selling a pizza topped with roasted grasshoppers.

> Pizza grasshoppers? Or here's something…pasta pests.

Witscript wrote these jokes.

USER: The Guggenheim Museum is installing a solid gold toilet.
WITSCRIPT: Gold toilet? Right, and a bullion bathtub.

⬥ ⬥ ⬥

USER: Walmart is recalling thousands of defective axes.
WITSCRIPT: Walmart axes? Okay, but I prefer Sears spears myself.

⬥ ⬥ ⬥

USER: A company is selling a plush toy of a giant Ebola virus.
WITSCRIPT: Ebola plush? Yeah, we got the cholera carpeted.

⬥ ⬥ ⬥

USER: They're tearing down the house where Adolf Hitler was born.
WITSCRIPT: Adolf Hitler house? Yup, and the Gestapo garage.

⬥ ⬥ ⬥

USER: A man who claims he was bitten by a spider on an American Airlines flight is now suing.
WITSCRIPT: Spider flight? That's…wait for it… a flyder.

⬥ ⬥ ⬥

USER: I read that humans and Neanderthals may have had sex for millennia.
WITSCRIPT: Neanderthals sex? Yeah, thanks to a Pleistocene prostitute.

Witscript can make an AI more like a friend.

- Chatbots can be more relatable.
- Personal robots can be better companions.
- Human beings can be less lonely.