ITAI 1370
Richard Rodriguez & Spencer Van Horne Team: Automation Learners

L05 Computational Humor

Part 1: Exploration of Computational Humor Models

HAHAcronym

Purpose: To generate humorous acronyms. Basic Mechanism: Uses linguistic templates and semantic relations. Strengths & Limitations: The system produces clever acronyms yet falls short when tasked with delivering humor in intricate jokes.

Linguistic Templates:

Predefined templates in the model organize the acronym structure to deliver a humorous effect. These templates function as patterns which direct the creation of the acronym, so it remains within a known structure.

Semantic Relations:

The model identifies words or phrases that fit the template by examining semantic relations while creating an unexpected or surprising result. The model generates acronyms by exploring word meanings and their connections to develop unexpected and incongruous combinations.

Example:

Let’s use an acronym that stands for the phrase "World's Best Coffee." Through semantic relations the model could transform "World's Best" into a humorous alternative such as "Worst" or "Weird" to create an acronym like "Worst's Best Coffee."

Strengths & Limitations:

Strengths: The model demonstrates exceptional speed in creating acronyms which maintain grammatical correctness while delivering humorous results. The model has the ability to create numerous jokes just by altering words in template1.

Limitations: Due to its dependency on predefined templates and available semantic relations within its database the humor produced can become predictable and superficial. The model faces difficulties when generating sophisticated humor that depends on specific contextual knowledge.

https://cdn.aaai.org/AAAI/2006/AAAI06-278.pdf

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STANDUP (System To Augment Non-speakers Dialogue Using Puns)

Purpose: To aid children with communication impairments through punning riddles.

Basic Mechanism: Interactive system that generates and evaluates riddles.

Strengths of STANDUP:

1. **Interactive Riddle Builder**: The system allows children to generate and tell novel punning riddles. It provides appropriate functionality for users with physical, speech, and language impairments1.
2. **Augmentative and Alternative Communication (AAC)**: STANDUP is particularly useful for children who use AAC devices, as it offers them a way to engage in language play and joke creation.
3. **Customizable Complexity**: The system can generate riddles at different levels of complexity, making it accessible to children with varying communication abilities.
4. **Positive Impact on Communication Skills**: Studies have shown that using STANDUP can have a favorable impact on general AAC use and potentially improve social and pragmatic skills.

Limitations of Standup:

1. **Complexity of Riddles:** The system faces challenges creating riddles that children can understand while still remaining engaging enough to maintain their interest. Balancing this can be challenging.

2. **Limited Vocabulary:** The system's effectiveness becomes limited when its vocabulary database does not include enough size and variety. A restricted vocabulary database limits both the diversity and creativity of the generated riddles.

3. **User Engagement**: Punning riddles might not appeal to every child. Different users will experience varying effectiveness from the system because of their unique humor styles and preferences.

4. **Technical Barriers:** The system presents interaction challenges for children with severe physical impairments when it demands precise control through fine motor skills.

5. **Contextual Understanding:** The system's ability to interpret the context of a riddle does not always function correctly impacting the humor's relevance and appropriateness.

STANDUP continues to be beneficial for improving communication abilities in children who have communication challenges despite existing limitations. The system serves as an enjoyable interactive method for language practice that contributes positively to their overall development.

The system has been evaluated with children who have conditions like cerebral palsy. Results indicate that participants were able to generate and tell jokes with minimal or no support, suggesting that STANDUP can be an effective tool for enhancing communication skills.

https://www.academia.edu/126109330/The_STANDUP_interactive_riddle_builder?form=MG0AV3

JAPE (Joke Analysis and Production Engine)

Purpose: JAPE was developed as a computational system to generate pun-based jokes, specifically in the form of question-answer riddles. Its goal was to explore automated joke generation using structured linguistic rules.

Basic Mechanism: The JAPE system operates through a rule-based approach that relies on lexical databases and predefined joke structures. It identifies words with multiple meanings, phonetic similarities, or homophones to create puns. The joke generation follows a structured process:

1. **Lexical Selection:** JAPE searches a lexical database for words that can form puns through homophony or polysemy.
2. **Template Matching:** It fits the selected words into predefined joke templates, ensuring coherence in structure.
3. **Joke Construction:** The system combines the wordplay elements with a structured setup and punchline.

Strengths and Limitations:

- **Strengths:** JAPE was one of the first successful attempts to systematically generate structured jokes. It demonstrated that humor could be partially automated using

lexical and phonetic databases. The system's ability to create puns showcases the potential of computational humor generation.

- **Limitations:** Since JAPE relies solely on predefined rules and linguistic structures, it lacks an understanding of humor's deeper context, such as cultural and emotional nuances. Additionally, while the system can generate grammatically correct jokes, many outputs may feel formulaic or lack the creativity of human-generated humor.

BERT-Based Humor Detection

Purpose: To identify humor within text using advanced NLP models.

Basic Mechanism: Utilizes BERT embeddings to detect humorous elements.

Strengths & Limitations: High accuracy in humor detection but may require extensive training data.

Google developed BERT as a cutting-edge language model which analyzes word context by taking into account preceding and succeeding words in a sentence. The BERT model performs exceptionally well in multiple natural language processing tasks because it includes humor detection among them.

How Does BERT-Based Humor Detection Work?

Preprocessing: A preprocessing step eliminates noise from the text while ensuring the format remains standardized.

Embedding Generation: BERT produces vector representations for words and sentences within textual data.

Classification: The classifier receives these embeddings as input for determining the humor status of the text.

Scoring: The model includes an additional layer dedicated to predicting funniness scores from the embeddings when humor scoring tasks are performed.

Applications and Benefits

Social Media: The process of identifying humorous content within tweets and social media posts helps to filter information and improve user interaction.

Content Creation: BERT helps writers and comedians refine their work by evaluating and providing feedback on how humorous their content is.

Sentiment Analysis: The process of sentiment analysis improves when models detect humor since it affects text sentiment.

Challenges

Context Sensitivity: Detection of humor presents difficulties for models because humor depends on cultural and contextual details.

Multilingual Support: Creating models that detect humor across various languages presents significant complexity yet remains essential for worldwide applications.

Example Study

The research paper "A BERT-based Approach for Automatic Humor Detection and Scoring" used BERT to determine whether tweets were jokes and to assign funniness scores to them. The research demonstrated that BERT has potential for humor detection tasks by producing competitive results.

https://ceur-ws.org/Vol-2421/HAHA_paper_8.pdf?form=MG0AV3

Part 2 - Design of a Manual Joke Algorithm:

1. Develop a straightforward, step-by-step manual algorithm for constructing jokes, detailing each phase from the initial idea to the final punchline.
2. Validate your algorithm by generating a sample joke and explaining how each step of your algorithm contributed to its creation.

Our Step-by-Step manual algorithm for constructing jokes:

Manual Joke Algorithm:
Identify the Topic:

Select a main topic or theme that your joke will be based on. The topic of your joke can originate from aspects of daily life or from animals and professions as well as elements within popular culture.

Brainstorm Keywords:

Identify key terms that relate to your subject matter which might help form unexpected punchline components. Consider words which have different interpretations or which can be used in creative ways.

Establish the Setup:

Build an introduction line which sets the scene yet allows space for a surprising turn. The setup should be engaging and relatable.

Create the Punchline:

Write a punchline that surprises with an unexpected turn or clever wordplay. Your punchline needs to be brief while simultaneously surprising the listener with humor.

Test for Flow:

Read the joke aloud to make sure it sounds natural when spoken. Edit timing and delivery elements to achieve optimal performance.

Validate Humor:

Present the joke to friends or use it in conversations to evaluate responses and improve it if necessary.

Identify the Topic:

Topic: Technology

Brainstorm Keywords:

Keywords: computer, bytes, keyboard, mouse, virus, bug

Establish the Setup:

Setup: Why did the computer need to see a doctor?

Create the Punchline:

Punchline: "Because it had a virus!"

Test for Flow:

Read the joke out loud: What led the computer to visit a doctor? Because it had a virus!" The sequence flows smoothly and the delivery timing works well.

Validate Humor:

Share the joke: Present the joke to friends or during conversations to test if it produces laughter. Success belongs to the joke if it generates laughter.

Sample Joke:
What made the computer visit the doctor? Because it had a virus!"

These steps will help you develop jokes about different subjects.

Part 3 - Human Evaluation:

1. Present your sample joke to a diverse demographic, considering variations in age, gender, and cultural background.
2. Compile and analyze their feedback, focusing on how the joke was received and identifying any trends in the humor's impact or cultural adaptability.

While the joke was overall a themed joke targeted for the computer tech crowd over all it fell a bit flat. The crowd found it too predictable and suggested it was too well known a topic and was in need a greater punchline. The human subjects the joke was disseminated to a wide range of individuals of both male and females from 13 to 73. The Joke generated groans, mild chuckles and a single hand clap. Due to the varied results we have reworked the joke to change the delivery to garner a possible better overall reaction.

Reworked Joke:

Setup: "Why did the computer go to the doctor?" **Punchline:** "Because it had a terminal illness!"

This version retains the technology theme but introduces a bit more wordplay and a twist that might be less predictable.