Decomposing Creativity: The Case of Writing Humor

Lydia Chilton
University of Washington, Stanford University
\[ E = mc^2 \]
\[ E \quad mc^2 \]
What type of creative artifact should we decompose first?
Humor
Properties of Humor

• Creative
  – Novel - something you’ve never seen before
  – Hard - not something you’d obviously think of

• Suited for Experimentation
  – Short - can iterate on it quickly
  – Expert examples to learn from
Approach To Decomposing Humor

Examples + Theory

Model + System + Study
“I can’t believe people would just walk into an Apple store and start breaking things like it’s a Best Buy.”
Books on humor by philosophers, linguists, comedians

1. Associations
2. Expectation Violation
Satisfy a Constraint by searching a space of associations

Model

Headline

Associations

Expectation Violation

Bait-and-Switch

Unexpected Angle

Sarcasm

Apple

Best Buy

Alternative

Insult

Broken Displays

Joke
Association:
Alternative Thing

UConn Holding Football 101 Clinic for Female Fans

Sure, I guess UConn’s course is fine if you couldn’t get into Yale’s football clinic.
Alright, how many ‘Summer Savannah’ Backyard Garden Lion Pedestals do I have to order to turn this thing around?
Association: Personality Flaw

Poll: Elite Colleges Don’t Produce Happier Graduates

Just tell me what to do and where to go to guarantee happiness forever.
Satisfying a Constraint by searching a space of associations

Headline

Expectation Violation

Model

Expectation

Bait-and-Switch

Apple

Best Buy

Broken Displays

Alternative

Insult

Unexpected Angle

Sarcasm

Joke
I can’t believe people would just walk into an Apple store and start breaking things like it’s a Best Buy.
Expectation Violation #2

Stephen Hawking: AI Could Spell the End for Mankind

Inspired by the film Transcendence, Stephen Hawking wrote that is a mistake to dismiss the threat of AI.

**Expected Focus:** End for Mankind

**Unexpected Focus:** Transcendence

“So did he think Transcendence was good, or what?”
Expectation Violation #3

Mick Jagger Blamed for Brazil’s World Cup Defeat

“There is absolutely no other explanation.”
HumorTools
Adaptive Workflow

- Apply microtasks to the headline
- Until you can find a way of violating an expectation
- Follow your train of thought, until you get stuck, then backtrack

- Not yet crowdsourced
- But it is decomposed into microtasks
Justin Bieber was baptized this weekend in an attempt to wash away his sins following a scandal in which the singer appears in videos using racial slurs.
Justin Bieber Baptized In NYC Bathtub

Joke
Justin Bieber Baptized In NYC Bathtub

Headline

Aspects

Justin Bieber

Baptized

Bathtub

Joke
Justin Bieber Baptized In NYC Bathtub

Headline Aspects

Justin Bieber
Baptized
Bathtub

Expected Reactions

Bad.
His music sucks.

Joke
Justin Bieber Baptized In NYC Bathtub

Aspects
Bad.
His music sucks.

Joke
Justin Bieber Baptized In NYC Bathtub

Headline Aspects

- Justin Bieber
- Baptized
- Bathtub

Associations

- Bieber’s PR people
- Bad. His music sucks.

Joke
Justin Bieber Baptized In NYC Bathtub

Headline:

Justin Bieber Baptized In NYC Bathtub

Headline Aspects:

- Justin Bieber
- Baptized
- Bathtub

Aspects:

- Bieber's PR people
- Associations
- Bad. His music sucks.

Violation Mechanism:

Bieber’s PR people

Unexpected Angle:

- Expected Reaction: Bad
- Angle: PR people are clever
- Angle Reaction: Good.
Justin Bieber Baptized in NYC Bathtub

Headline Aspects

Bad. His music sucks.

Associations

Bieber's PR people

Violation Mechanism

Unexpected Angle:
Expected Reaction: Bad
Angle: PR people are clever
Angle Reaction: Good.

Prototype

Test

Joke

Never let it be said that Bieber’s PR people aren’t bringing new ideas to the table.
Never let it be said that Bieber’s PR people aren’t bringing new ideas to the table.
Justin Bieber Baptized In NYC Bathtub

Aspects

- Bieber’s PR people: Bad.
- His music: Sucks.

Unexpected Angle: Expected Reaction: Bad
- Angle: PR people are clever
- Angle Reaction: Good.
Justin Bieber Baptized In NYC Bathtub

Justin Bieber

Baptized

Bathtub

Headline

Headline Aspects

Expected Reactions

Joke

Bieber’s PR people

Bad. His music sucks.

Bad. Dirty, Gross

Unexpected Angle: Expected Reaction: Bad Angle: PR people are clever Angle Reaction: Good.
Justin Bieber Baptized In NYC Bathtub

Headline

Expected Reactions
Bad. His music sucks.

Violation Mechanism
Bieber’s PR people

Unexpected Angle: Expected Reaction: Bad Angle: PR people are clever Angle Reaction: Good.

Unrelated

Justine Bieber

Joke
Justin Bieber Baptized In NYC Bathtub

**Headline Aspects**

- Justin Bieber
- Baptized
- Bathtub

**Expected Reactions**

- Bad. His music sucks.

- Bieber’s PR people
  - Bad. Dirty, Gross

- Unexpected Angle:
  - Expected Reaction: Bad
  - Angle: PR people are clever
  - Angle Reaction: Good.

- Unexpected Angle:
  - A Bieber fan who’d worship his dirty bathtub

**Violation Mechanism**

**Prototype**

**Test**

**Joke**
Justin Bieber Baptized In NYC Bathtub

**Headline Aspects**
- Justin Bieber
- Baptized
- Bathtub

**Expected Reactions**
- Bad.
  - His music sucks.

**Violation Mechanism**
- Bieber’s PR people
  - Unexpected Angle: PR people are clever
  - Angle Reaction: Good.

**Prototype**
- Unexpected Angle: A Bieber fan who’d worship his dirty bathtub

**Test**

**Joke**

Oh my God! Can I lick the tub?
HumorTools Study

• 20 users: Stanford undergraduates
• Humor novices
• 60-80 minutes:
  – Tutorial on 20 microtasks
  – Humor Writing
• Write jokes for 3 headlines
• Rate jokes against The Onion (21 people)
HumorTools Study Headlines

PETA Seeks Copyright for Primate
A lawsuit filed by PETA claims that “monkey selfies” snapped by a macaque who stole a photographer’s camera should be considered the legal property of the macaque himself.

Can users synthesize humor?

Liquid Water Found on Mars
NASA revealed Monday that they have found evidence of liquid water on the Mars, pointing to the possibility of life on the red planet.
PETA Seeks Copyright for Primate

A lawsuit filed by PETA claims that “monkey selfies” snapped by a macaque who stole a photographer’s camera should be considered the legal property of the macaque himself.

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HumorTools Evaluation

• 75% of participants were able to synthesize humor

• 25% of the HumorTools jokes were rated funny
PETA Seeks Copyright for Primate

This is why you always get the macaque to sign a release.

This is great news for animal rights. Now my neighbor can take my dog to court instead of me the next time he deposits some of his “legal property” in their front lawn.
PETA Seeks Copyright for Primate

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Liquid Water Found on Mars

- I think it’s more convenient for me to get it from the tap.
- In other news, Pluto has been called even less of a planet now.
- Sounds refreshing!
Liquid Water Found on Mars

HumorTools

I think it’s more convenient for me to get it from the tap. 45% Funny

In other news, Pluto has been called even less of a planet now. 45% Funny

Sounds refreshing! 15% Funny
“[Associations] helped me think of jokes in a wider conceptual space than I previously had.” (p9)

Before this, I never really knew where to start with joke writing I just kind of sat and thought until I came up with something. (p5)
Future: Continuous Improvement

Theory + Examples

Model + System + Study
Grant: Be funnier than the Onion
Future Work
Crowdsourcing Humor Tools

Headline

Associations

Expectation Violation

Joke
Automate Some Microtasks

Train ML system with user collected data

- Entity extraction
- Sentiment analysis
- Semantic parsing

Headline

Justin Bieber Baptized In NYC Bathtub
Population star Justin Bieber was baptized in a friend’s bathtub this weekend after weeks of Bible study and church services, with celebrity blogs reporting that the 20-year-old sought spiritual guidance in an attempt to wash away his sins following a scandal in which videos emerged of him using racial slurs.

Aspects

<table>
<thead>
<tr>
<th>Justin Bieber</th>
<th>person</th>
</tr>
</thead>
<tbody>
<tr>
<td>baptized</td>
<td>action</td>
</tr>
<tr>
<td>NYC</td>
<td>thing?</td>
</tr>
<tr>
<td>an attempt to wash away sins</td>
<td>reason</td>
</tr>
<tr>
<td>scandal</td>
<td>thing</td>
</tr>
</tbody>
</table>
Extend HumorTools Approach to Other Creative, Open-Ended Domains

Step 1  Synthesize theories

Step 2  Analyze examples for concrete mechanisms

Step 3  Identify microtasks that define the search space

Step 4  Define Constraints
New Domain: Persuasive Argumentation

STEM shortage? Computer science is where the jobs are

By EDWARD D. LAZOWSKA
Special to The Times

TECHNOLOGY workforce issues are much in the news these days, stimulated by proposed changes to the nation’s H-1B guest worker visa policy. A recent report by the Economic Policy Institute on science, technology, engineering, and mathematics (STEM) workforce supply and demand was covered last week by The Seattle Times, The Washington Post and others. The report argued that there is no shortage of graduates in STEM fields overall, and that this applies to all of the various subfields of STEM, including computer science.

“Allow me to inject a few facts into the conversation. As politician Daniel Patrick Moynihan famously said, “Everyone is entitled to his own opinion, but not his own facts.” It’s indeed the case, both nationwide and in our state, that there is no overall shortage of STEM graduates. But this is not news — it has been the case for many years. This does not mean you should not major in a STEM field if that is your passion, any more than grim job prospects mean you should not major in journalism.

However, nationwide there is a well-documented shortage of graduates in computer science. The Bureau of Labor Statistics projects that 70 percent of all new jobs across all STEM fields during this decade, across engineering, the physical sciences, the life sciences, and the social sciences, will be in computer science. More than three-quarters of a million new jobs. The field is booming.

In Washington state there is a well-documented shortage in the health professions, engineering and in computer science. A 2011 study by the Higher Education Coordination Board carefully examined the gap between supply and demand for all fields, identifying the fields with significant gaps at the two-year, four-year and graduate education levels.

Computer science has by far the widest gap, with the health professions and engineering next. At the bachelor’s degree level, the gap between supply and demand in computer science is nearly twice as large as the gap in engineering, and three times as large as the gap in the health professions. In comparison, other fields barely move the needle.

While students educated in one field do sometimes take jobs in other fields, and while many employers require a diverse range of employee skills, preparation and skills vary significantly from field to field. STEM graduates are not interchangeable.

Most civil engineers are not prepared to design biomedical implants. Most biomedical engineers are not prepared to design bridges. Most computer scientists are not prepared to practice surgery. And most chemists are not prepared to design complex software systems.

To drive this point home: During the most recent year, 85 percent of all students hired from the University of Washington by Microsoft, Google, Amazon.com and Facebook for internships and permanent positions had degrees from a single academic program: Computer Science & Engineering on the Seattle campus.

I do not take a position here on the wisdom of H-1B visa expansion. Nor do I deny that there are some individuals in the information-technology field who, unfortunately, are unemployed or underemployed.

However, anyone in the computer-science education business, or attempting to recruit for the IT field, is well aware of the extraordinary competition for both new graduates and seasoned professionals with state-of-the-art experience and skills, and of the incredible change-the-world opportunities that this field affords.

I do take a position on the wisdom of expanding enrollment in Computer Science & Engineering at the University of Washington. Due to staffing and facilities limitations, our program—ranked among the top 10 in the nation, along with the likes of Stanford, MIT, Carnegie Mellon and Berkeley — can accommodate only about 25 percent of the students who successfully fulfill prerequisite courses and apply to the major.

This is a critical issue for Washington’s economy, but more important for Washington’s students. 60 percent of our Computer Science & Engineering undergraduates are Washington residents, and the vast majority remain here after graduation.

Computer science: It’s where the jobs are. It’s also where the future is.

Edward D. Lazowska is the Bill & Melinda Gates chair in the Computer Science & Engineering program at the University of Washington.
New Domain: Persuasive Argumentation

Step 1: Synthesize theories
Rhetoric

Step 2: Analyze Op-Eds for mechanisms
Metaphor

Step 3: Identify microtasks that define the search space
Find facts to support arguments

Step 4: Define constraints
Thesis Statement
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