Striving for likability
(always empathic, never biased)

Wolf Paulus
Intuit Inc. Technology Futures

Type • Click • Touch

Experience Talk

Wolf Paulus - Intuit Inc.
3D Virtual Reality
2D WIMP (windows, icons, menus, pointer)
1D Texting / ChatBOT UI
0D Voice User Interface
immersive

frictionless

3D Virtual Reality

2D WIMP (windows, icons, menus, pointer)

1D Texting / ChatBOT UI

0D Voice User Interface
Frictionless 0D VUI

Likability becomes the ultimate differentiator in an otherwise un-differentiable experience.

In this new environment of ambient-computing, form factor or looks hardly matter. Not only what, but equally important how a virtual assistant says it, will determine success.
Validate that a response carries the intended attitude.

Apply techniques and off the shelf tools, originally created to analyze user input, like customer feedback.
There are still $70 left in your restaurants budget, but you also significantly over spent in all other categories.

---

You still have $70 in your restaurants budget, but please understand, in all other categories you are in the red.
Dictionary of Affect in Language

“I love you, but hate your cold sister.”
Quantified Synonyms

<table>
<thead>
<tr>
<th>Term</th>
<th>Positive</th>
<th>Objective</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>faithful</td>
<td>0.625</td>
<td>0.375</td>
<td>0</td>
</tr>
<tr>
<td>hateful</td>
<td>0.333</td>
<td>0</td>
<td>0.667</td>
</tr>
<tr>
<td>honorable</td>
<td>0.625</td>
<td>0.125</td>
<td>0.25</td>
</tr>
</tbody>
</table>
Quantified Synonyms

Please realize, overall you are in the red.

SYNONYMS:
create [+]
sell
acquire
recognize (+)
understand (+)
earn
appreciate [+]
perceive (+)
Hi Sam,

It’s been a pleasure working with you and your manager, 
that your leadership has been outstanding. Would you like me, or manage
Voice-only communication is more accurate than visual alone or voice + visual, when it comes to determining a speaker’s emotions.
Speech Synthesis Markup Language to impact affect

SSML - Speech Synthesis Markup Language (SSML) Version 1.1

<emphasis level=""..""> enclosed text be spoken with emphasis
<br> <prosody pitch=""..""> modifies the baseline pitch e.g., low / high
<br> <prosody rate=""..""> change in the speaking rate, e.g., slow / fast
<br> <prosody volume=""..""> modifies the volume, e.g., soft / loud
<br> <prosody range=""..""> modifies pitch range (variability) e.g., low / high
<br> <prosody contour=""..""> sets the actual pitch contour for the contained text. (time position, target)

“Voice Transformation SSML”

<glottal_tension pitch=""..""> tense or lax speech quality e.g. low / high (low value is perceived as more breathy and generally more pleasant.)
<br> <breathiness level=""..""> perceived level of the aspiration noise (drawing breath) e.g., low / high

“Expressive SSML”

<express-as type="GoodNews"> expresses a positive, upbeat message.
<br> <express-as type="Apology"> expresses a message of regret.
<br> <express-as type="Uncertainty"> conveys an uncertain, interrogative message.

“Amazon:Emotion”

<amazon:emotion name="excited" intensity="medium">Congrats, …
<br> <amazon:emotion type="disappointed" intensity="high">I'm so sorry …
You have still $70 in your restaurants budget, but please recognize overall you are in the red.

SPEECH SYNTHESIS MARKUP LANGUAGE (SSML)

```xml
<speak>
  <p>
    <amazon:emotion intensity="medium" name="excited">You have still $70 in your restaurants budget</amazon:emotion>,
    but please recognize overall you are in the red.</p>
  </speak>
```
Identifying emotion in a speaker's voice

Speech Synthesis

A COUSTICAL ANALYSIS

ANALYSIS OVER TIME

Neutral
Happiness
Sadness
Anger
Fear

Neutral
Happiness
Sadness
Anger
Fear

Wolf Paulus - Intuit Inc.
Riddle ...
Who is the doctor?
Who is the doctor?
**Bias** is disproportionate weight in favor of or against an idea or thing, usually in a way that is closed-minded, prejudicial, or unfair.

Biases can be innate or learned. People may develop biases for or against an individual, a group, or a belief.
HUMAN BIASES BECOME COMPUTER BIASES
Content design at Intuit

Use gender-neutral language

Inclusive gender-neutral alternatives

There are other ways to be gender neutral and inclusive:

- Instead of “ladies and gentlemen,” use something like “distinguished guests” or be more specific and say “customers” or “developers.”
- Instead of “men” or “women,” use “everyone.”
- Instead of “the lady or man in the green shirt,” say “the person in the green shirt.”
- Instead of “guys,” try “folks” or “friends” or “team.” These are all better choices in communications such as Slack messages.
- Instead of “boys and girls,” simply say “children.”
- Instead of “brothers and sisters,” try “siblings.”

https://contentdesign.intuit.com/
Hunting for an engineer who will tackle our toughest problems and smashing bugs in our huge code base.
A Word Embedding format generally tries to map a word using a dictionary to a vector.

**Vocabulary:**
Man, woman, boy, girl, prince, princess, queen, king, monarch
**Task**: Given a specific word in the middle of a sentence (the input word), look at the words nearby - a typical **window-size** might be 5, meaning 5 words behind and 5 words ahead (10 in total). The network is going to tell the probability for every word in the vocabulary of being a “nearby word”. The output probabilities are going to relate to how likely it is find each vocabulary word nearby the input word.

For example, if you gave the trained network the input word “Soviet”, the output probabilities are going to be much higher for words like “Union” and “Russia” than for unrelated words like “watermelon” and “kangaroo”.

The neural network is trained by feeding it word pairs found in the training documents (corpus).

The example shows some of the training samples (word pairs), taken form a training sentence, using a small window size of 2, with the word highlighted word being the input word.

---

**Source Text**

The quick brown fox jumps over the lazy dog.

---

**Training Samples**

(the, quick)

(quick, the)

(quick, brown)

(quick, fox)

(brown, the)

(brown, quick)

(brown, fox)

(brown, jumps)

(fox, quick)

(fox, brown)

(fox, jumps)

(fox, over)
Neural word embeddings

A simple neural network with a single hidden layer is trained to perform a certain task. However, the goal is not to use the neural network once it's trained, but to learn the weights of the hidden layer, i.e. “word vectors”.
Neural word embeddings

Hunting for an engineer who will tackle our toughest problems and smashing bugs in our huge code base.

AFFINITY RADAR
Mumbler consists of two docker containers, which are stored in AWS ECR and deployed as Fargate Tasks in AWS ECS.
Summary & conclusion

• Most tools & techniques mentioned were created to analyze customer feedback.
• Re-use them, to validate that responses carry only the intended attitude/sentiment and bias.
• Smart-speakers may hear "Please" and "Thanks" less often than before, let’s make sure the skills or bots we are building responds kindly, considerately and empathically if warranted, and thereby deserve a user’s politeness.
Striving for likability
(always empathic, never biased)

Thank You!

Slides: https://wolfpaulus.com/talks/
Mumbler: https://expo.futures.a.intuit.com/mumbler/