food2vec

Embedding & Recommendation

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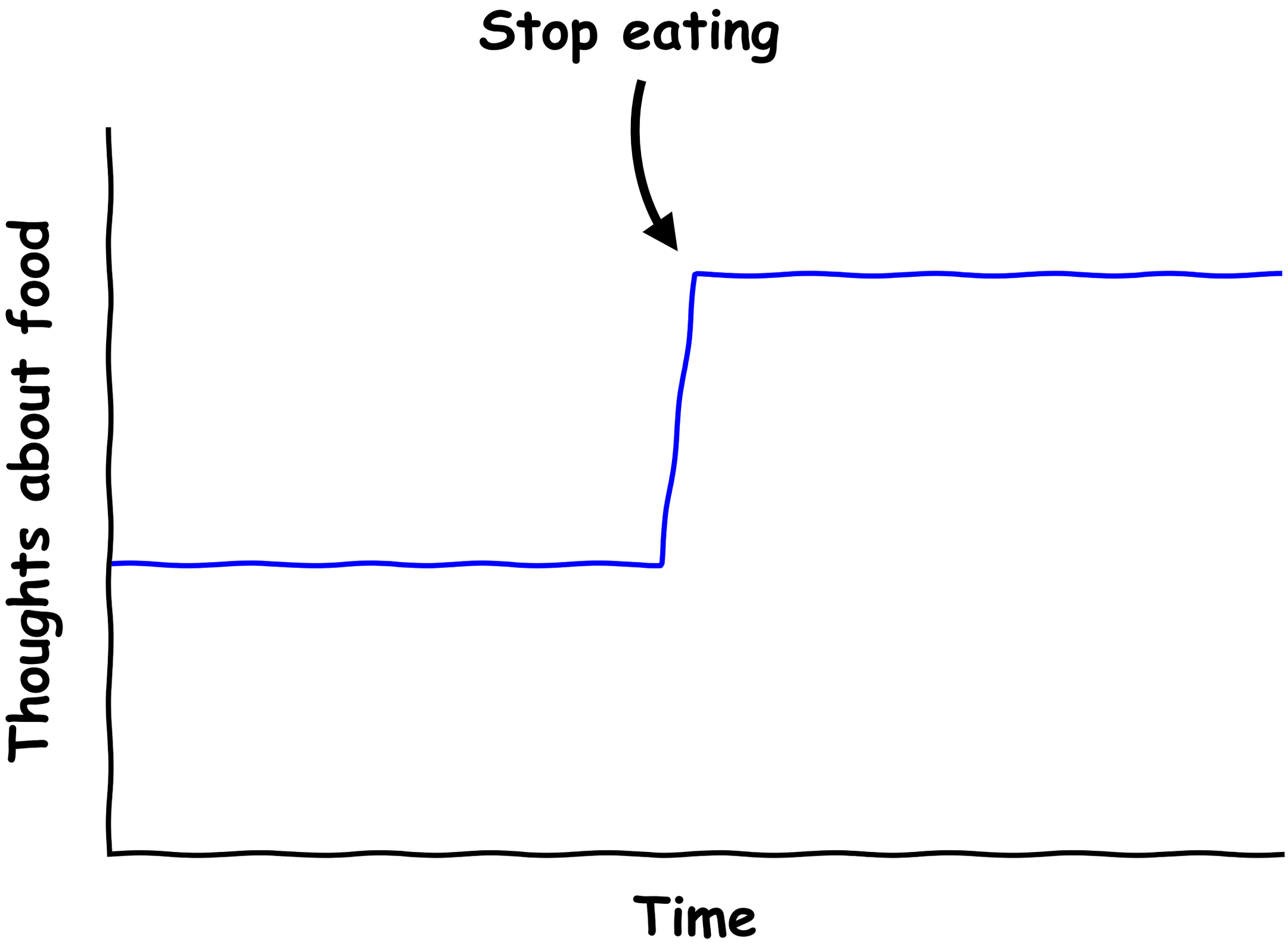
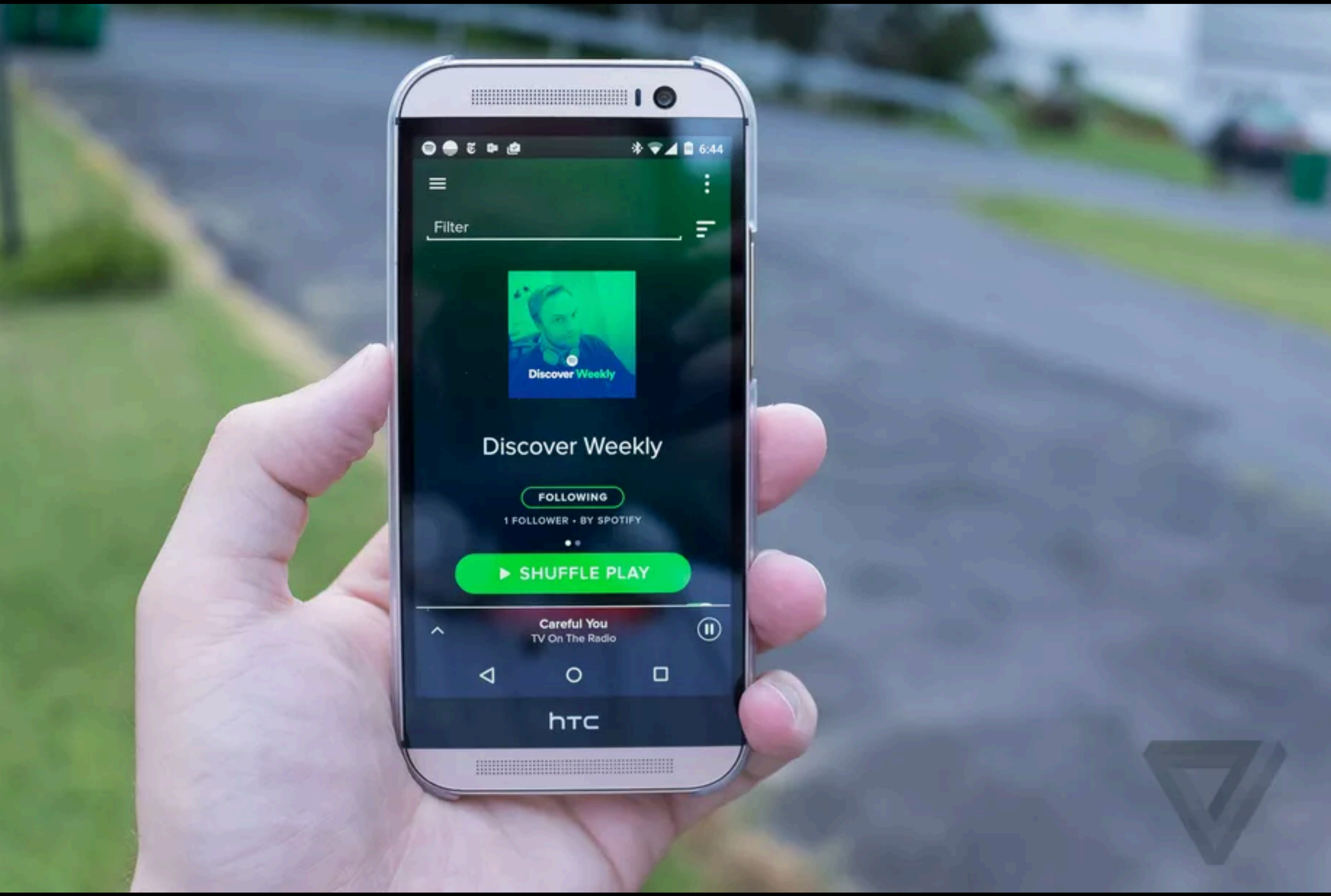

Stop eating
Thoughts about food
Time

99¢
99 Thanks...!
99
DAILY
99¢ EVERY
11 11
99¢

Neilson
Neilson
NOG


6:44
Filter
Discover Weekly
Discover Weekly
FOLLOWING
1 FOLLOWER · BY SPOTIFY
SHUFFLE PLAY
Careful You
TV On The Radio
htc

Filipino pork BBQ

vinegar, 7_up, pork, soy_sauce, pepper, brown_sugar, lemon, garlic

PREDICT REST OF INGREDIENTS (CONTEXT)

vinegar → 7_up, pork, soy_sauce, pepper, brown_sugar, lemon, garlic

DON'T PREDICT RANDOM INGREDIENTS (OUT-OF-CONTEXT)

vinegar ↛ corn, hog_casings, fresh_tomatoes, wonton_wrappers

7_up → vinegar, pork, soy_sauce, pepper, brown_sugar, lemon, garlic

7_up ↛ olive, cheese, all_purpose_flour, toasted_sesame_seeds

pork → 7_up, vinegar, soy_sauce, pepper, brown_sugar, lemon, garlic

pork ↛ ...

soy_sauce → vinegar, 7_up, pork, pepper, brown_sugar, lemon, garlic

soy_sauce ↛ ...

pepper → vinegar, 7_up, pork, soy_sauce, brown_sugar, lemon, garlic

pepper ↛ ...

brown_sugar → vinegar, 7_up, pork, soy_sauce, pepper, lemon, garlic

brown_sugar ↛ ...

lemon → vinegar, 7_up, pork, soy_sauce, pepper, brown_sugar, garlic

lemon ↛ ...

garlic → vinegar, 7_up, pork, soy_sauce, pepper, brown_sugar, lemon

garlic ↛ ...

Recipe embeddings

filipino_pork_bbq
=
average(vinegar, 7_up, pork, soy_sauce, pepper, brown_sugar, lemon, garlic)

User embeddings

jaan

=

average(filipino_pork_bbq, smoked_salmon_sandwich, natto_rice)

Analogies

- Find nearest embedding to: *king - man + woman*
  - King is to man as woman is to *queen*
- Food analogies:
  - Egg is to bacon as orange juice is to *coffee*
  - Bread is to butter as roast beef is to *sage*

Demo

Visualizations:
https://jaan.io/food2vec-augmented-cooking-machine-intelligence/

Similarity, Analogy, Recommendation tools:
https://altosaar.github.io/food2vec/

Complements

- *Complementary items* are good at predicting each other's presence
  - P(cinnamon | ground_cloves) is high *and* P(ground_cloves | cinnamon) is high

Complements

- turmeric | fenugreek
- tamarind | vinegar
- worcestershire_sauce | ketchup
- gochujang_base | kimchi
- mulato_chiles | guajillo_chiles
- soy_sauce | sesame_oil
- coconut | red_curry_paste

Substitutes

- *Exchangeables* induce similar distributions over items
  - Distance(P(· | crushed_ice) || P(· | ice))) is smaller than Distance(P(· | crushed_ice) || P(· | beans)))

Substitutes

- taco_seasoning_mix | taco_seasoning
- ice_cubes | crushed_ice
- picante_sauce | red_enchilada_sauce
- melon | gin
- walnut | pecan
- semisweet_chocolate | bittersweet_chocolate
- cajun_seasoning | creole_seasoning
- boiling_water | hot_water
- miso_paste | konbu

Future ideas

- *Reduce decision fatigue, explore food*

- Expands what you can cook: recommend recipes, using substitutes for what ingredients you have

- Healthy recommendations that are more nutritious

- Recommend foods you are likely to enjoy based on recipes, foods, user ratings, or a combination

What's next?

- *Create new recipes and eat!*
- UI & UX exploration
- Test recommendations with user data from diet app
- More data, better data
- Code at https://github.com/altosaar/food2vec
- Email me at altosaar@princeton.edu

Credits

- Grocery store photo: Andreas Gursky (http://www.andreasgursky.com/)
- Spotify photo: http://www.theverge.com/2016/5/25/11765472/spotifys-discover-weekly-40-million-users-5-billion-streams
- Filipino pork BBQ: http://tastykitchen.com/recipes/main-courses/filipino-pork-bbq-on-skewers/
- Smoked salmon openfacer: http://michaelelliotking.com/
- Me eating: Hanif
- Cloves: http://image.shutterstock.com/z/stock-photo-macro-shot-of-whole-and-ground-cloves-one-in-a-current-series-of-multi-form-spice-macros-8660260.jpg
- Cinnamon: https://en.wikipedia.org/wiki/Cinnamon
- Ice: http://www.kkrv.com/ice-bucket-challenge-helped-find-new-als-gene/
- Crushed ice: http://www.wyzworks.com/media/catalog/product/cache/1/image/9df78eab33525d08d6e5fb8d27136e95/s/h/shaved_ice_1.jpg