
H2O
WORLD
2017

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NLP with H2O

Supervised Learning with Unstructured Text Data

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Our Use Case

The Data

The Amazon Fine Food Reviews dataset consists of 568,454 food reviews Amazon users left up to October 2012

- J. McAuley and J. Leskovec. From amateurs to connoisseurs: modeling the evolution of user expertise through online reviews

Column	Example
Product ID	B006K2ZZ7K
User ID	A1UQRSCLF8GW1T
Helpfulness Numerator	1
Helpfulness Denominator	1
Score	5
Time	1350777600
Summary	Great taffy
Text	*“Great taffy at a great price. There was a wide assortment of yummy taffy. Delivery was very quick. If your a taffy lover, this is a deal.”*

The Goal

Predict whether a food product has a good rating based on the reviews

“Great taffy at a great price. There was a wide assortment of yummy taffy. Delivery was very quick. If your a taffy lover, this is a deal.”

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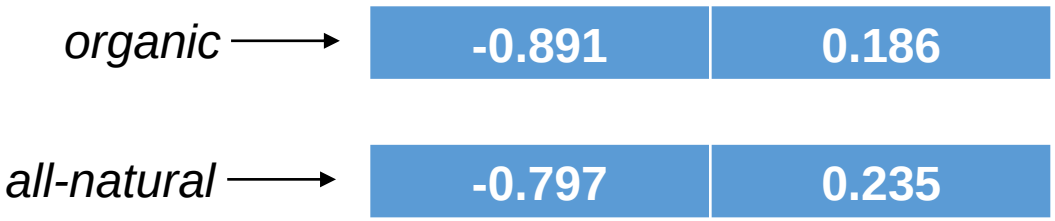
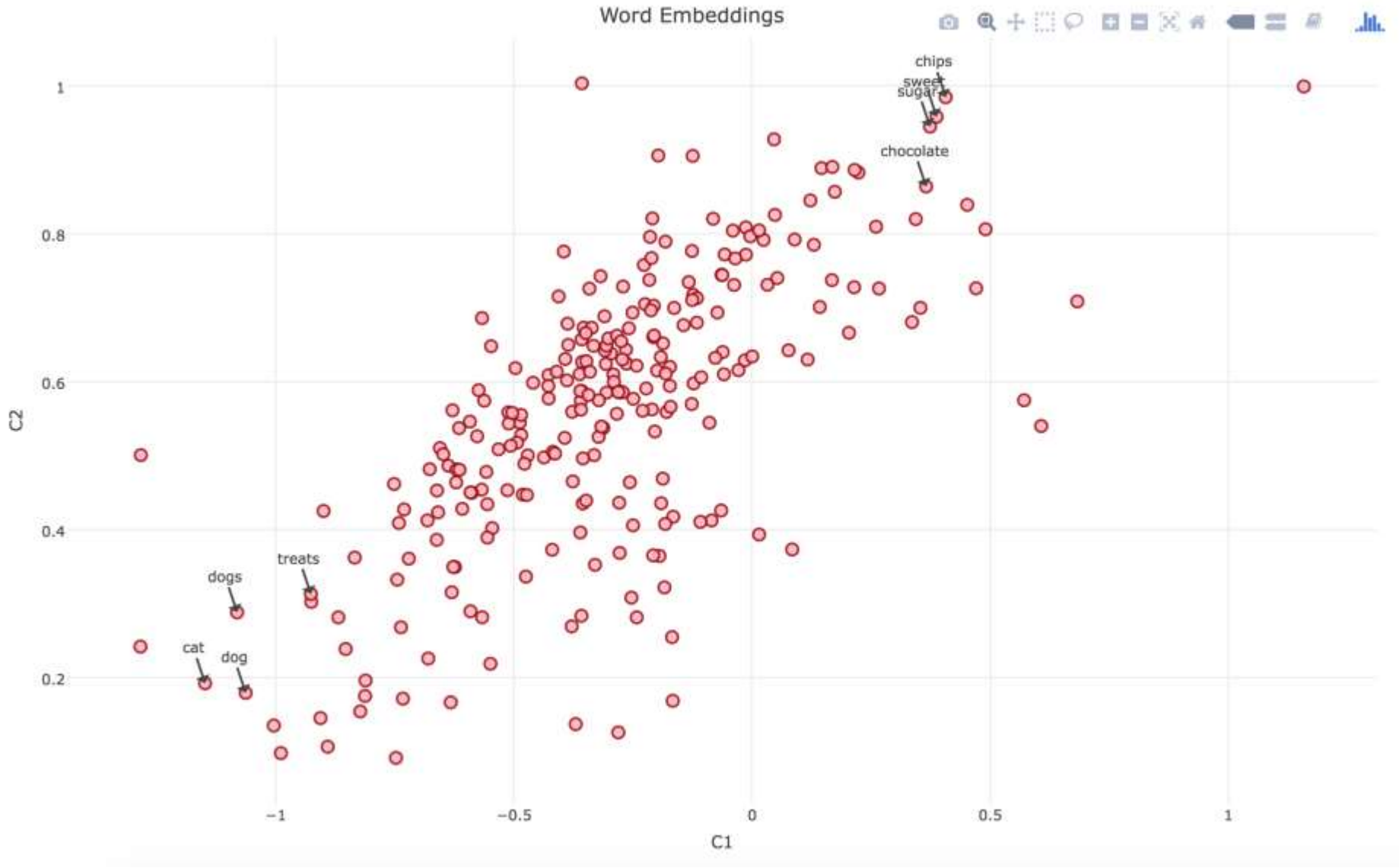
Natural Language Processing

Word Embeddings

- What?
  - Mapping of words to vectors from a high dimensional space (100-1000)
- Why?
  - Embeddings capture the meaning of the word
  - Semantically similar words are close to each other



Word Embeddings



Word2Vec Algorithm

How do we use a neural network to capture the semantic meaning of words?

- Frame the problem as a supervised learning problem
  - Given an input word predict the neighboring words

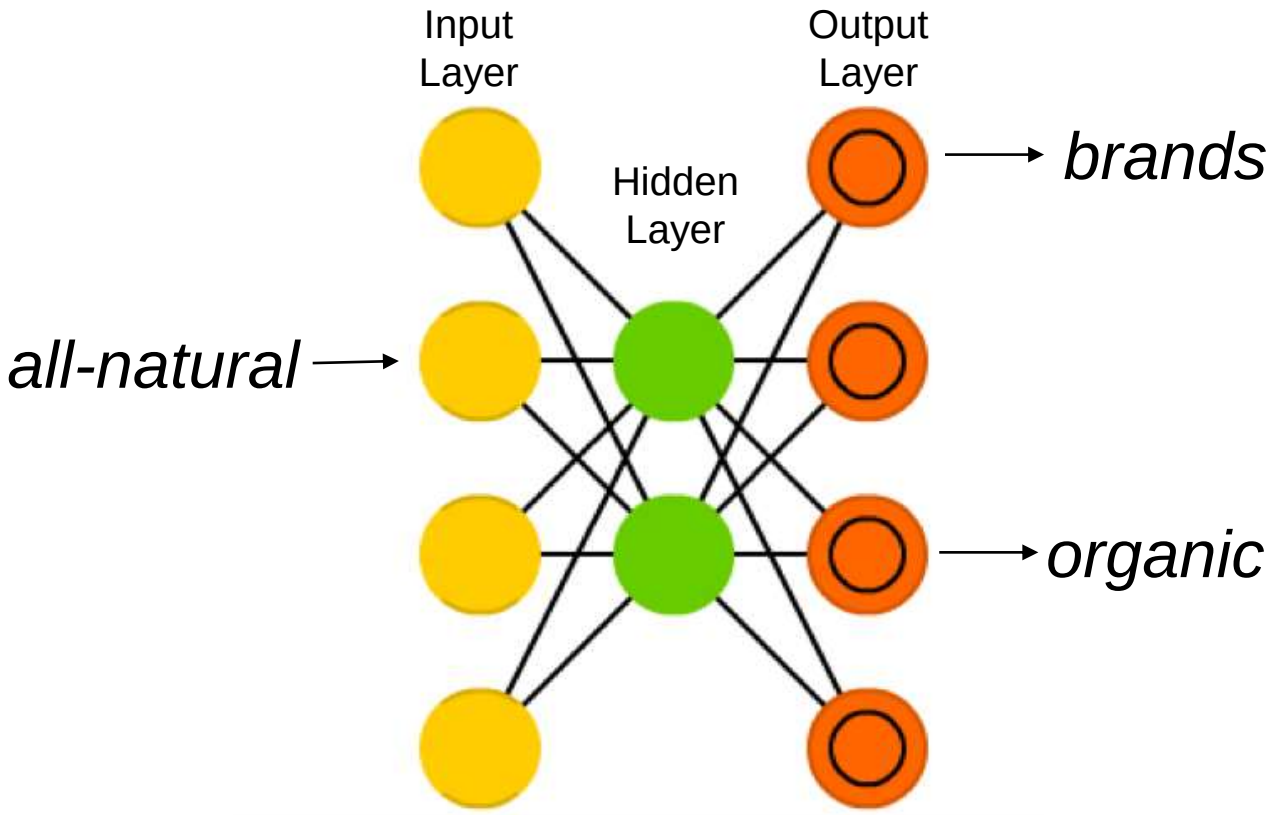
*“It's even better than the **organic, all-natural brands** I have tried.”*

Given: *all-natural*

Predict: *organic, brands*

Word2Vec Algorithm

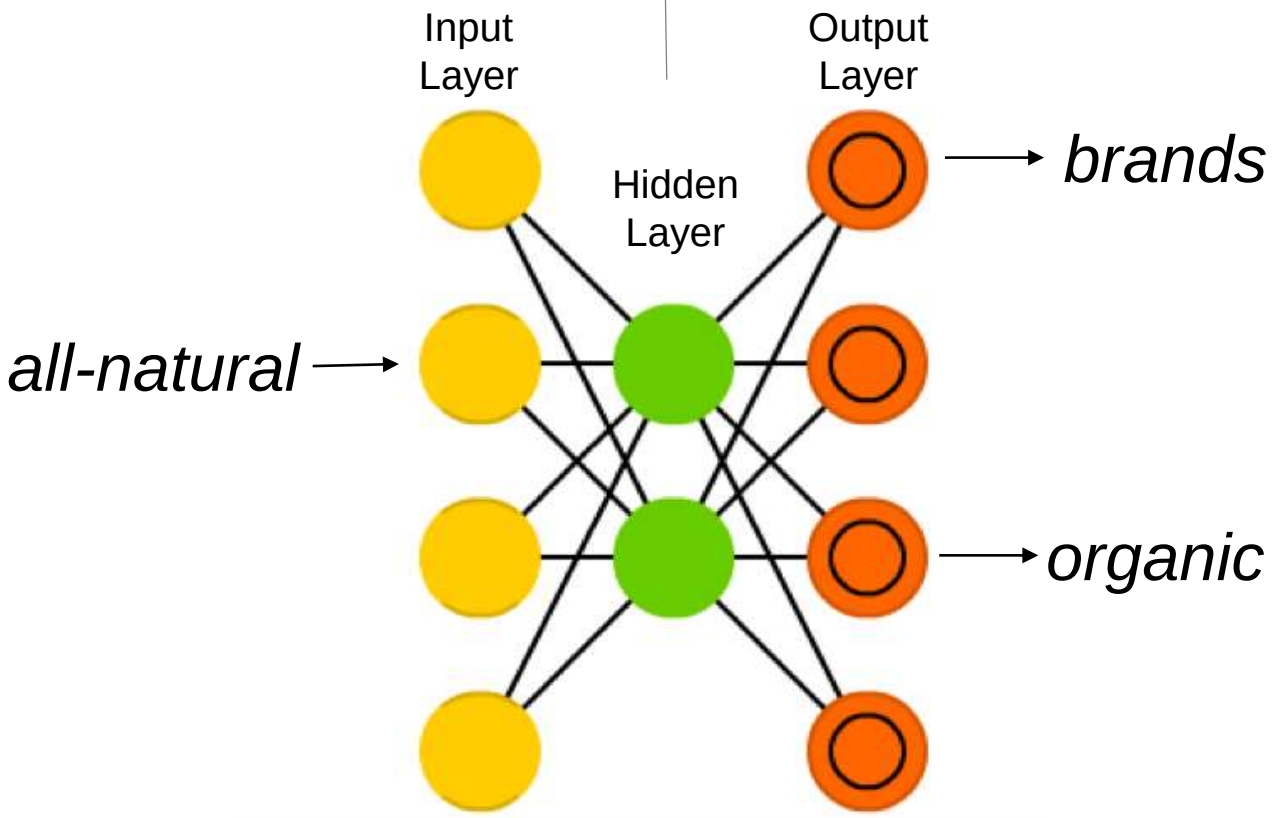
*"It's even better than the **organic, all-natural brands** I have tried."*



Word2Vec Algorithm

Matrix from Hidden Layer = Word Embeddings

Word	C1	C2
brands	0.647	0.235
all-natural	-0.797	0.235
organic	-0.891	0.186
tried	-0.751	0.409



Our Workflow

Use Case: Predict whether a food product has a good rating based on the review.

1. Tokenize Reviews
   - Break up reviews into separate words
   - Filter words: remove stop words like “the” and “if”
2. Train a Word2Vec Model
3. Use model to transform reviews to vectors
4. Train a supervised learning model to predict good rating