

Beer Recipes, Part II: Model and Results

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Model

Results

Improvements

Bibliography

Model

Recurrent Neural Networks

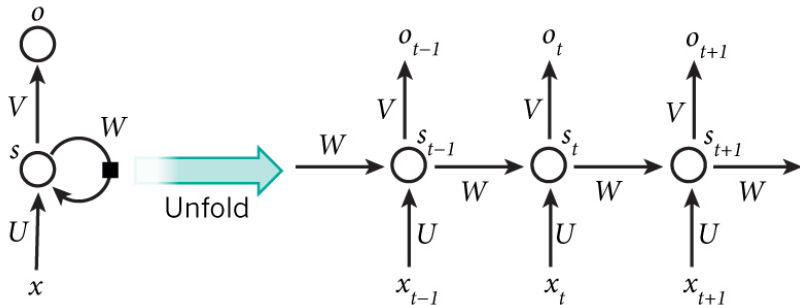


Figure 1: <http://www.wildml.com/2015/09/recurrent-neural-networks-tutorial-part-1-introduction-to-rnns/>

- Great for sequential data

Long Short-Term Memory

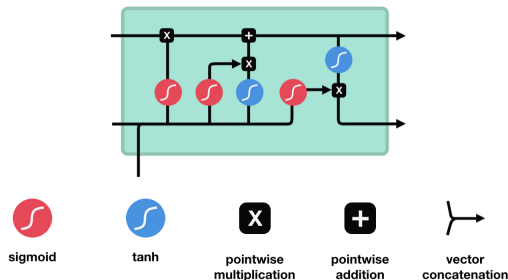


Figure 2: <https://towardsdatascience.com/illustrated-guide-to-lstms-and-gru-s-a-step-by-step-explanation-44e9eb85bf21>

- Better at processing longer sequences

Our Model

- RNN with LSTM
- Trained its own embeddings
- Ran for 4 hours
 - 100 steps per epoch for 68 epochs

Results

A Lot of Caramel

Attempt: Outlet IPA + 0.2

NAME

Outlet IPA

STYLE

American IPA

METHOD

All Grain

INGREDIENTS

FERMENTABLES

3 lb American - Pale 2-Row

1 lb American - Caramel / Crystal 20L

0.50 lb American - Caramel / Crystal 120L

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HOPS

1.50 oz Columbus, Pellet, Boil, 60 min

1 oz Citra, Pellet, Boil, 15 min

1 oz Citra, Pellet, Boil, 10 min

1 oz Citra, Pellet, Boil, 5 min

1 oz Citra, Pellet, Boil, 1 min

3 oz Citra, Pellet, Dry Hop, 13 days

3 oz Citra, Pellet, Dry Hop, 14 days

OTHER

1 tsp Irish Moss, Fining, Boil, 15 min.

Ingredients Discrepancies

HOPS

1.50 oz Columbus, Pellet, Boil, 60 min
 1 oz Citra, Pellet, Boil, 15 min
 1 oz Citra, Pellet, Boil, 10 min
 1 oz Citra, Pellet, Boil, 5 min
 1 oz Citra, Pellet, Boil, 1 min
 3 oz Citra, Pellet, Dry Hop, 13 days
 3 oz Citra, Pellet, Dry Hop, 14 days

OTHER

1 tsp Irish Moss, Fining, Boil, 15 min.

YEAST

Wyeast - American Ale 1056

2. THE BOIL

Bring the wort to a rolling boil. Hold there for 60

With 60 min left, Boil 1 oz of Columbus hops.

With 10 min left, Boil 1 oz of Citra hops.

With 10 min left, Boil 1 oz of Citra hops.

With 5 min left, Boil 1 oz of Citra hops.

With 1 min left, Boil 1 oz of Citra hops.3. THE

Chill the wort to around room temperature. The

4. FERMENTATION

Pour the wort into your fermentation vessel. Add

Add your Wyeast - London Ale III 1318 to the wort

Cover your fermenter, fill the airlock to the li

Fermentation times vary by style of beer. Make s

With 5 days left, Dry Hop 1 oz of Citra hops.

With 3 days left, Dry Hop 1 oz of Citra hops.

With 3 days left, Dry Hop 1 oz of Citra hops.

With 3 days left, Dry Hop 1 oz of Citra hops.

With 3 days left, Dry Hop 1 oz of Mosaic hops.

With 3 days left, Dry Hop 1 oz of Citra hops.

With 3 days left, Dry Hop 1 oz of Mosaic hops.

Extract Recipe

1. THE MASH

Heat 7.5 gallons of water to about 160 degrees in your brew kettle.

Add your grains to your grain bag.

Once the water reaches the desired temperature, add the grains to the water, and turn off the heat. Stir gently to remove clumping, and cover with a lid.

Monitor the heat, making sure that it does not get too low.

After about 60 minutes, slowly remove the bag from the wort, letting it drain into the kettle.

- These are mash instructions for brew in bag

Varying Temperature

2. THE BOIL

Bring the wort to a rolling boil. Hold there for 60 min.

With 10 min left, Boil 0.50 oz of Amarillo hops.

With 5 min left, Boil 1 oz of Willamette hops.

With 5 min left, Socondath 30 min of Phalerid Pumerins.

With 14 min left, Secondary 3 tsp of Vanilla Extract.

With 0 min left, Secondary 3 lb of Vanilla extract.

With 0 min left, Secondary 4 lb of Rums, Spice, Secondary - ST03 dapse ou the swerelouf ftre the fromes (ld whtirs Stin 1.50 titer the water for asthe top of the grain bed white shen
Once the water is at the desired temperature, turn off the heat, and add the grain bag. Stir the grain bag around the water. Cover and insulate the kettle, letting the mash steep for
In another pot, heat about as much water as used for the mash to 170 degrees.

Once the mash is done steeping, place the grain bag on a colander on top of the kettle. Slowly pour the water from the second pot over the grains, sparging them until you reach 3 gal

Begin heating the kettle until the water reaches 180 degrees. Now, add your malt extract, stirring to make sure it infuses.

2. THE BOIL

Brillite the wort to a roul frome tol 18.7 le ter whor - Saaz Nugrien Flavo WLP842 to the wort, following the instructions given by the yeast manufacturer.

Cover your fermenter, fill the airlock to the line with water, and place the airlock in hole in the fermenter lid.

Fermentation times vary by style of beer. Make sure that you are fermenting for enough time.

- Literal nonsense

Improvements

Training

- Only used 3,119 out of ~200,000 recipes
 - Took days to get this, with scalable computing and more time, could train more data
- Hyperparameter tuning
 - Did not have time to tune hyperparameters as model training took 4 hours

Output Cleaning

- Remove duplicates in ingredients section.
- Repair disconnect between ingredients and intructions.

Model

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Results

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Improvements

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Bibliography

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Bibliography

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