

Sugarbowl CGM Analyzer

- ▶ JEN BALASI
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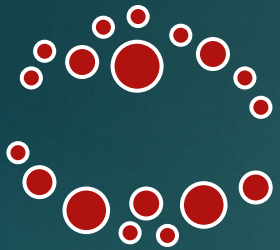
What is a Continuous Glucose Monitor?



Project Vision

Problem statement

Which of my foods are the most costly?



For each log
entry calculate
glycemic
increment (G+)



Tokenize meal entries



Perform
regression:
Vocabulary
predicts
glycemic
increment



Which foods
are most
costly?

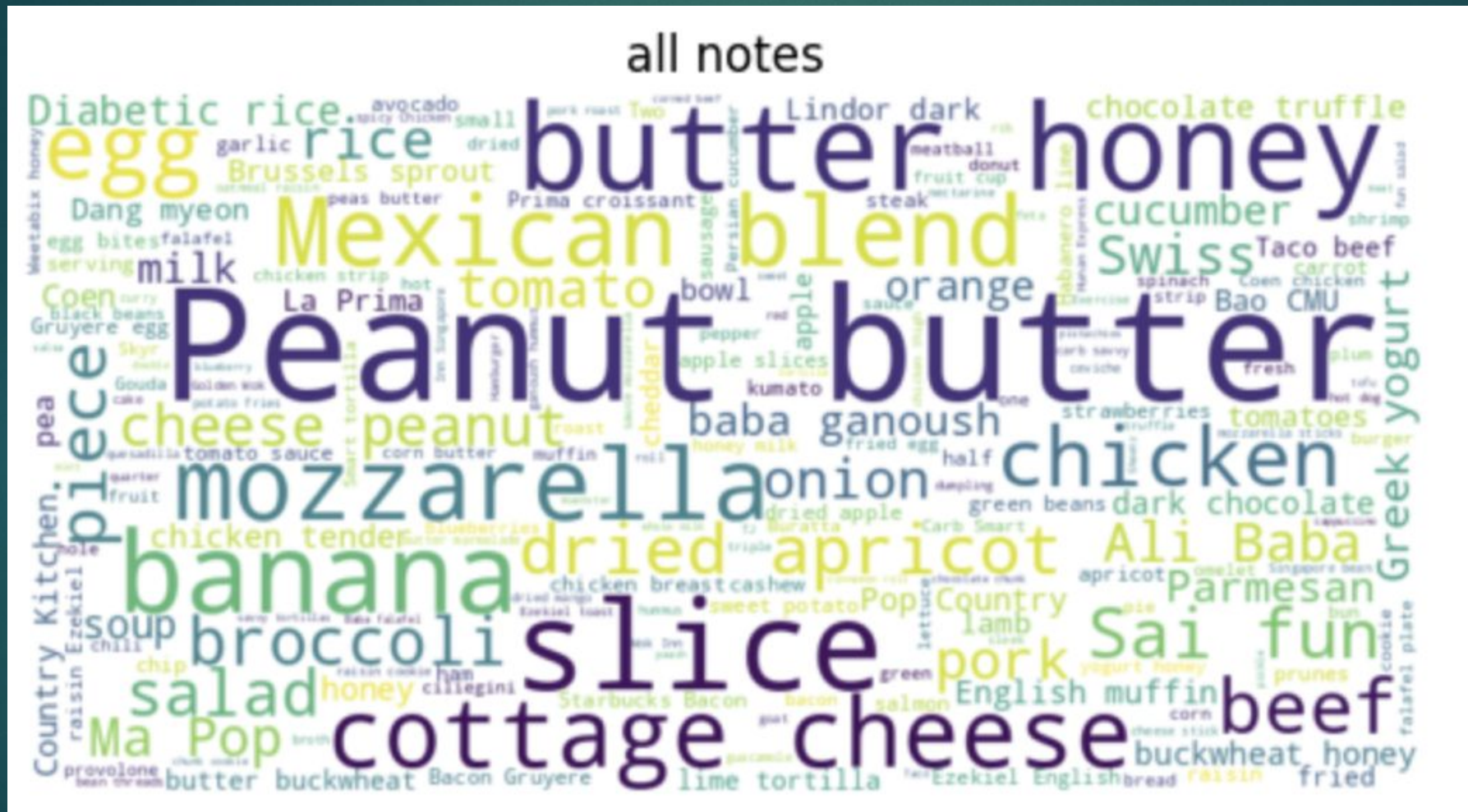
Tokenization research

- unigrams
- bigram & trigrams
- Comma-separated fields
- Restaurant as a separate feature
- Units (servings, bowls, spoonfuls)
- Multipliers (n servings of...)

Dataset

- ▶ Our dataset is a near-continuous record of glucose levels every 5 minutes for 2 years, along with free-form text descriptions of most of the meals.

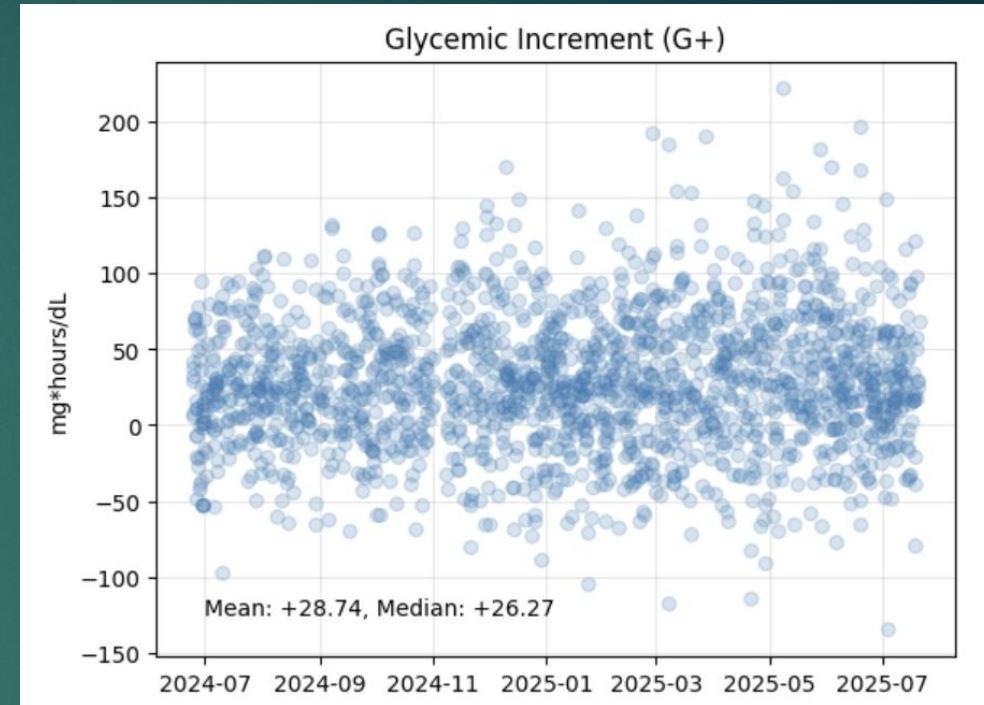
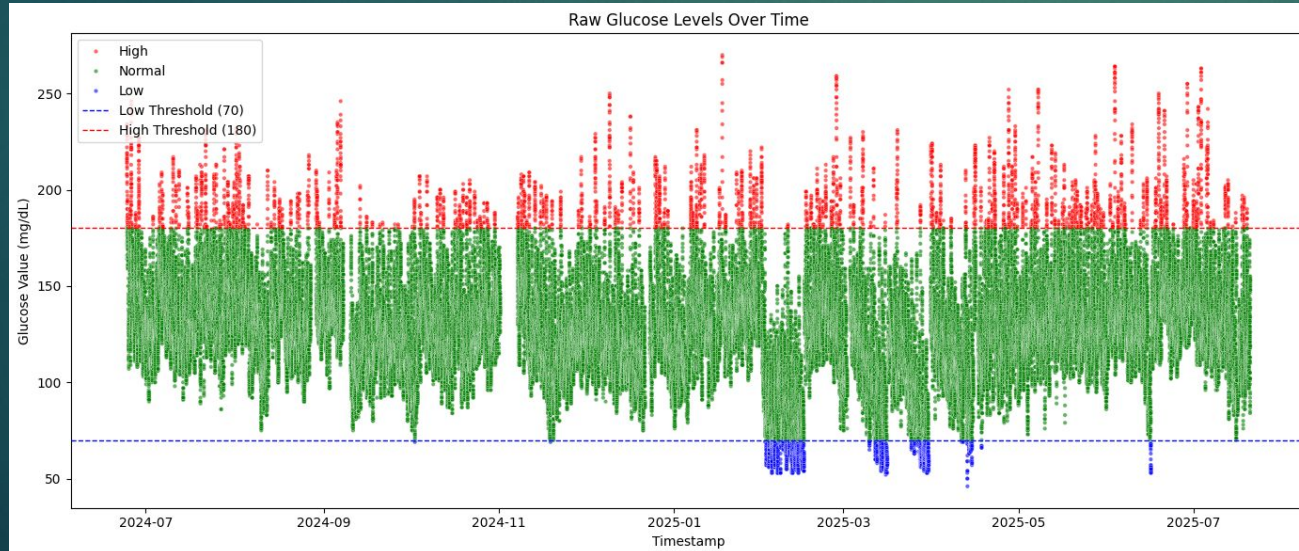
```
Glucose Data,Generated on,07-20-2025 10:36 PM UTC,Generated by,La Monte Yarroll
Device,Serial Number,Device Timestamp,Record Type,Historic Glucose mg/dL,Scan Glucose mg/dL,Non-numeric Rapid-Acting Insulin,Rapid-Acting Insulin (units),Non-numeric Food,Carbohydrates (grams),Carbohydrates (servings),Non-numeric Long-Acting Insulin,Long-Acting Insulin (units),Notes,Strip Glucose mg/dL,Ketone mmol/L,Meal Insulin (units),Correction Insulin (units),User Change Insulin (units)
...
[brand],[sensor id],06-24-2024 03:42 PM,0,194,,,,,,,,,,,,,
[brand],[sensor id],06-24-2024 03:47 PM,0,195,,,,,,,,,,,,,
[brand],[sensor id],06-24-2024 03:52 PM,0,194,,,,,,,,,,,,,
[brand],[sensor id],06-24-2024 03:57 PM,0,186,,,,,,,,,,,,,
[brand],[sensor id],06-24-2024 04:02 PM,0,178,,,,,,,,,,,,,
...
[brand],[sensor id],07-16-2025 12:01 PM,6,,,,,,,,,"Konjac pad Thai, mozzarella.",,,,,,
[brand],[sensor id],07-16-2025 01:39 PM,6,,,,,,,,,"Ma & Pop's Country Kitchen: cup of chili, Reuben omelet.",,,,,,
[brand],[sensor id],07-16-2025 07:13 PM,6,,,,,,,,,"2 dosa, 3 pieces of lamb, spiced masoor dal.",,,,,,
[brand],[sensor id],07-16-2025 10:14 PM,6,,,,,,,,,"1 slice of prosciutto, large bowl of cottage cheese, honey.",,,,,,
[brand],[sensor id],07-17-2025 12:00 AM,6,,,,,,,,,"5 baby bananas, 6 dried apricots.",,,,,,
[brand],[sensor id],07-17-2025 11:53 AM,6,,,,,,,,,"Ma & Pop's Country Kitchen: Capi omelette, strawberries.",,,,,,
...
```



Initial Exploration

Initial Statistics

- **Total Records: 124907**
- **Total Readings: 119484**
- **Total meals: 1874**
- **Meals with sufficient data to calculate G+: 1848**



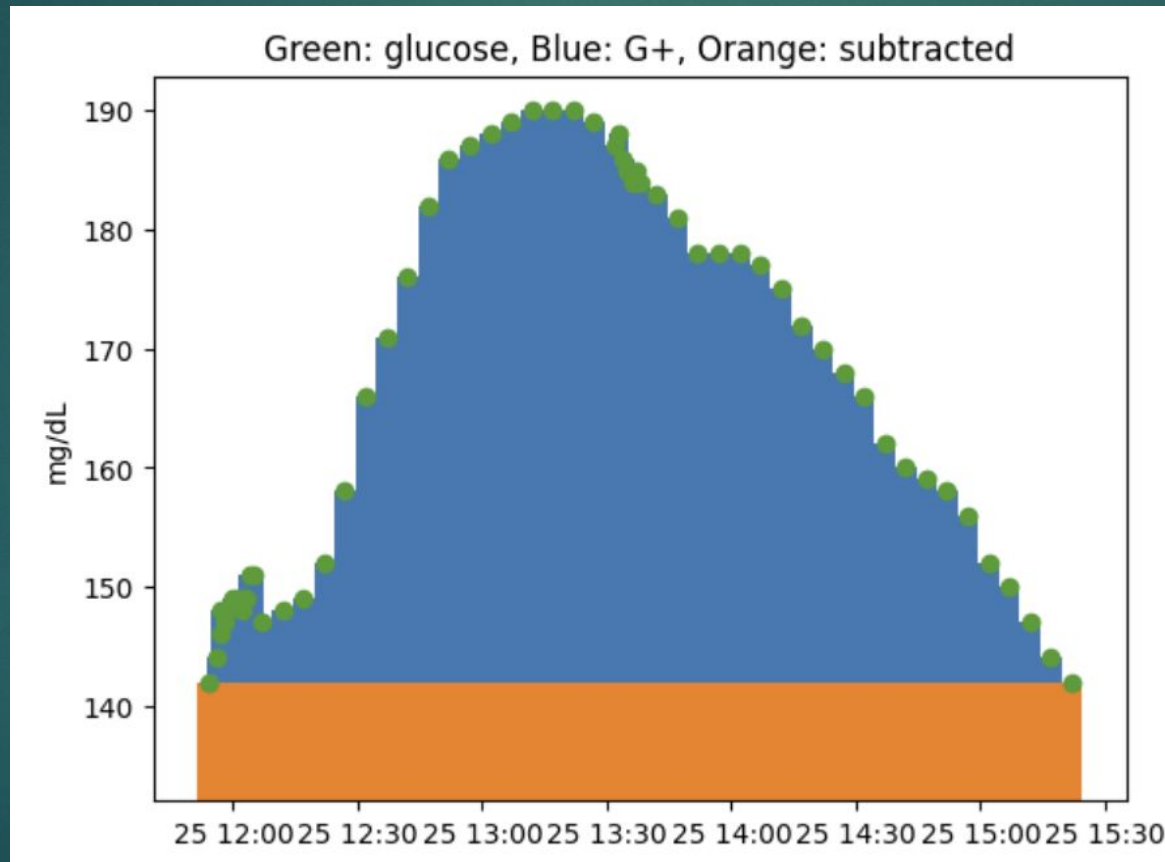
Standard Glycemic Measures

Glycemic Index (GI) is a measure of how quickly 50g of carbohydrates from a particular food are absorbed over 2 hours, normalized against 50g of pure glucose.

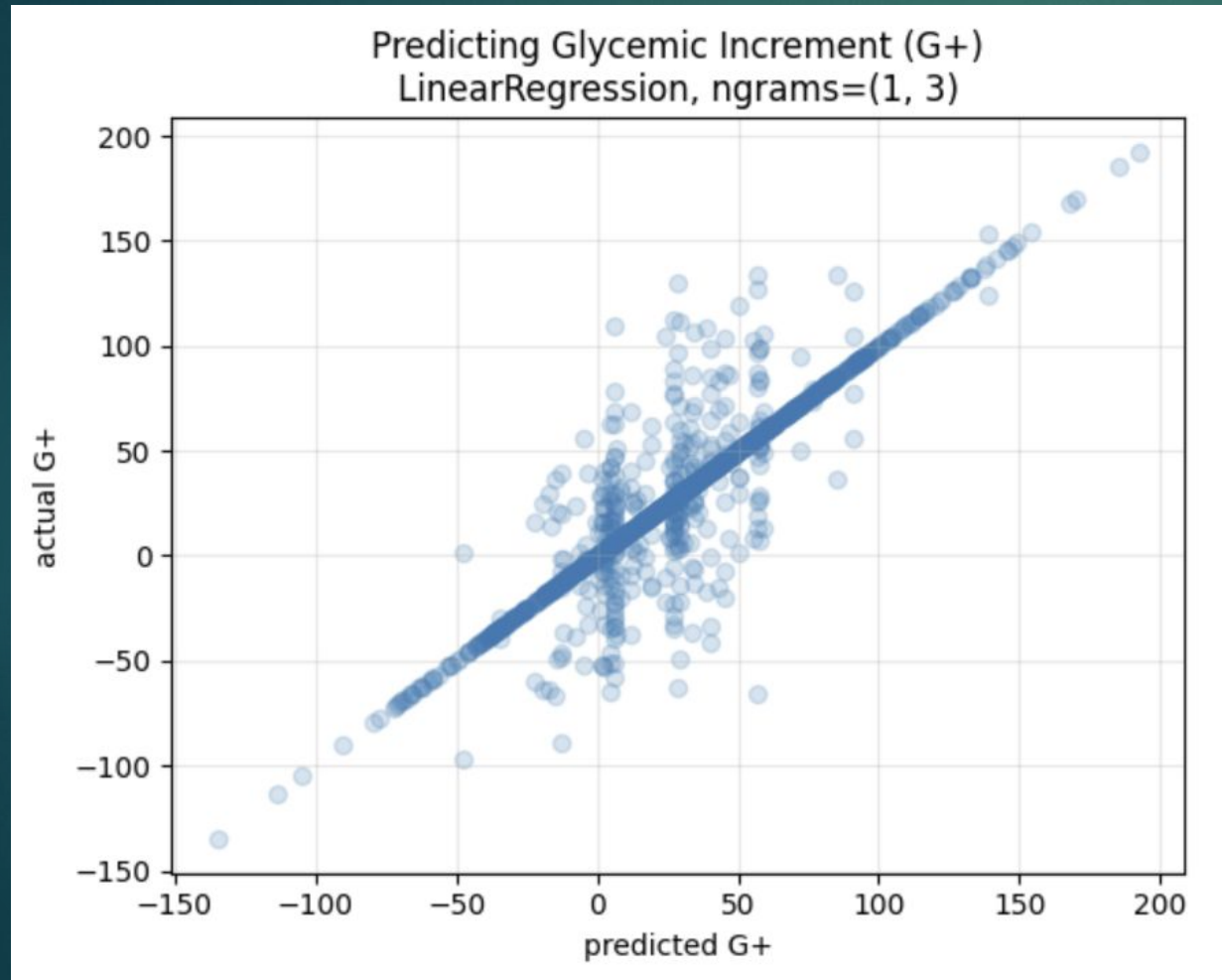
Glycemic Load (GL) is a measure of how quickly a typical serving of a particular food will affect glucose levels over the next 2 hours. It is $GI * \text{carbs in a serving} / 100$.

Glycemic Increment

Glycemic Increment (G+) is new for our study. It's the area under the glucose curve for 2 hours from eating, minus the starting glucose. The unit is mg-hours/dL.



Initial Exploration First model



	coef	features
0	-147.239743	apricots banana
1	-73.633590	chicken tenders donut
2	-73.633590	tenders donut
3	-52.462827	prunes dried apricots
4	-43.909830	apple banana
...
8005	56.282346	apple plum
8006	73.922804	donut
8007	92.962918	croissant
8008	117.061447	slices raisins peanut
8009	199.154914	dried apricots banana

Path Forward

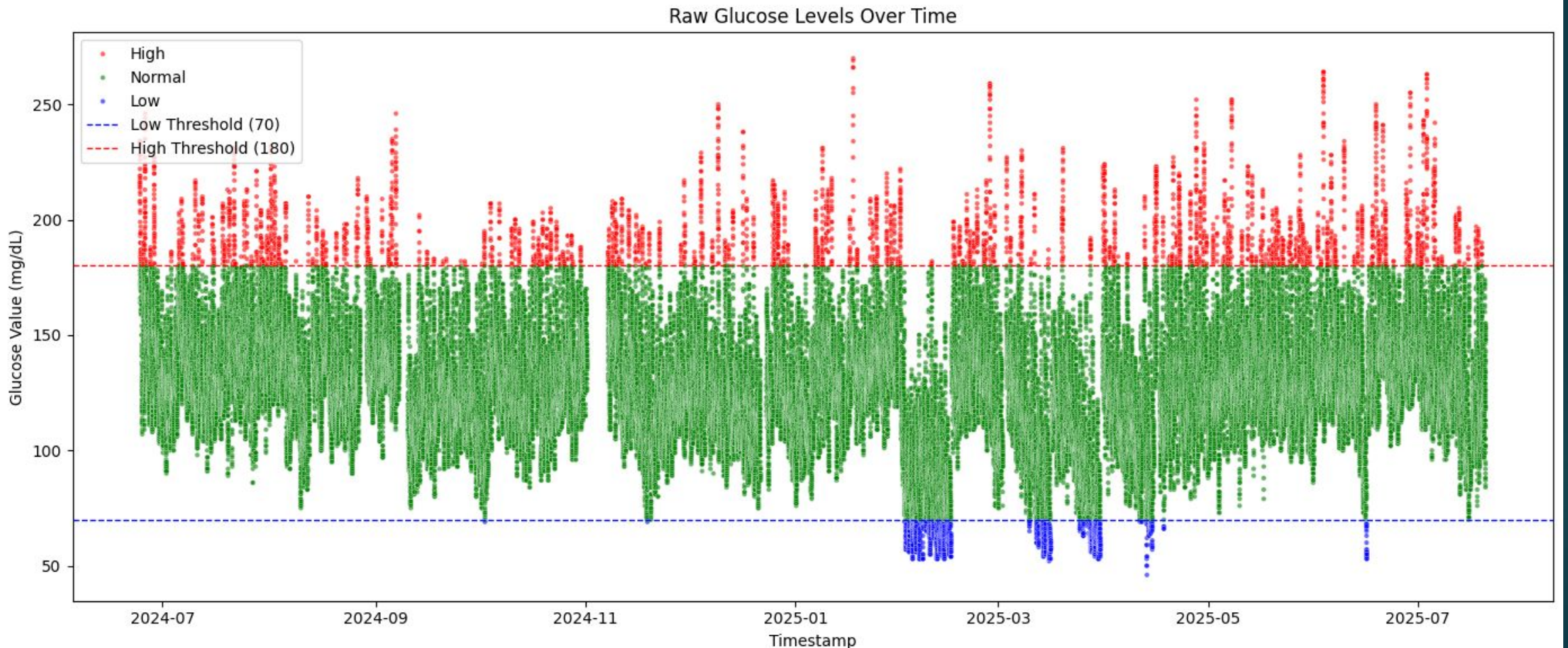
More models

- SVR in addition to LinearRegression (rmse to evaluate best model)
- Tune the G+ metric—deal with negative values
 - Ignore
 - Make meal groups
- Increasing levels of structure from the text:
 - unigram, bigram, trigram
 - choose appropriate stop words
 - split on commas
 - pull out restaurants separately
 - decode units and quantities



Questions?

ADA Target Levels for Blood Glucose



Glucose over time regressed

