Empowering Natural Language to Visualization Neural Translation using Synthesized Benchmarks

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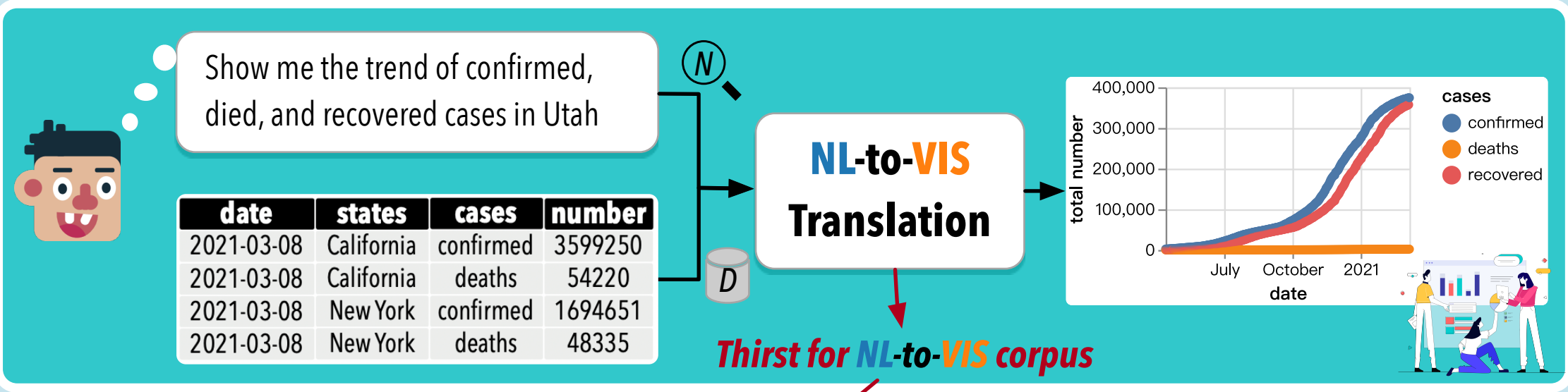
Natural Language to Visualization Translation



nvBench: NL-to-VIS Benchmark

Statistics of nvBench

#-Domains	#-Databases	#-Tables
105	153	780
Categorical (%)	Temporal (%)	Quantitive (%)
68.78 %	11.58 %	19.64 %
Avg (#-Rows)	Max (#-Rows)	Min (#-Rows)
1309.65	183,978	1

VIS Types	#-VIS	#-(NL, VIS)
Bar Chart	5523	19407
Pie Chart	520	1750
Line Chart	380	1562
Scatter Chart	226	1041
Stacked Bar	359	1172
Grouping Line	72	271
Grouping Scatter	127	547
All Types	7247	25750

Sample (NL, VIS) examples in nvBench

Database: products_for_hire

Table: payments

...	payment_type_code	amount_paid_in_full_yn	payment_date	aoumnt_due	amount_paid
...	Check	1	2018-03-09 16:28:00	369.52	206.27
...	Cash	1	2018-03-03 13:39:44	278.60	666.45
...	Credit Card	0	2018-03-22 15:00:23	840.06	135.70
...	Check	0	2018-03-22 02:28:11	678.29	668.40
...	...	...	...	...	...

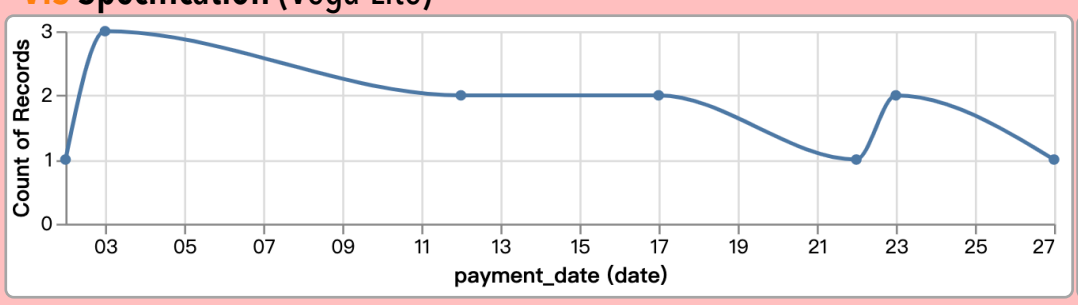
NL Query

What are the payment date of the payment with amount paid higher than 300 or with payment type is 'Check, and count them by a line chart

VIS Query (Vega-Zero, a variant of Vega-Lite)

```
mark       line
data       payments
encoding   x payment_date y aggregate count payment_date
transform  filter amount_paid > 300 or payment_type_code='check' group x
```

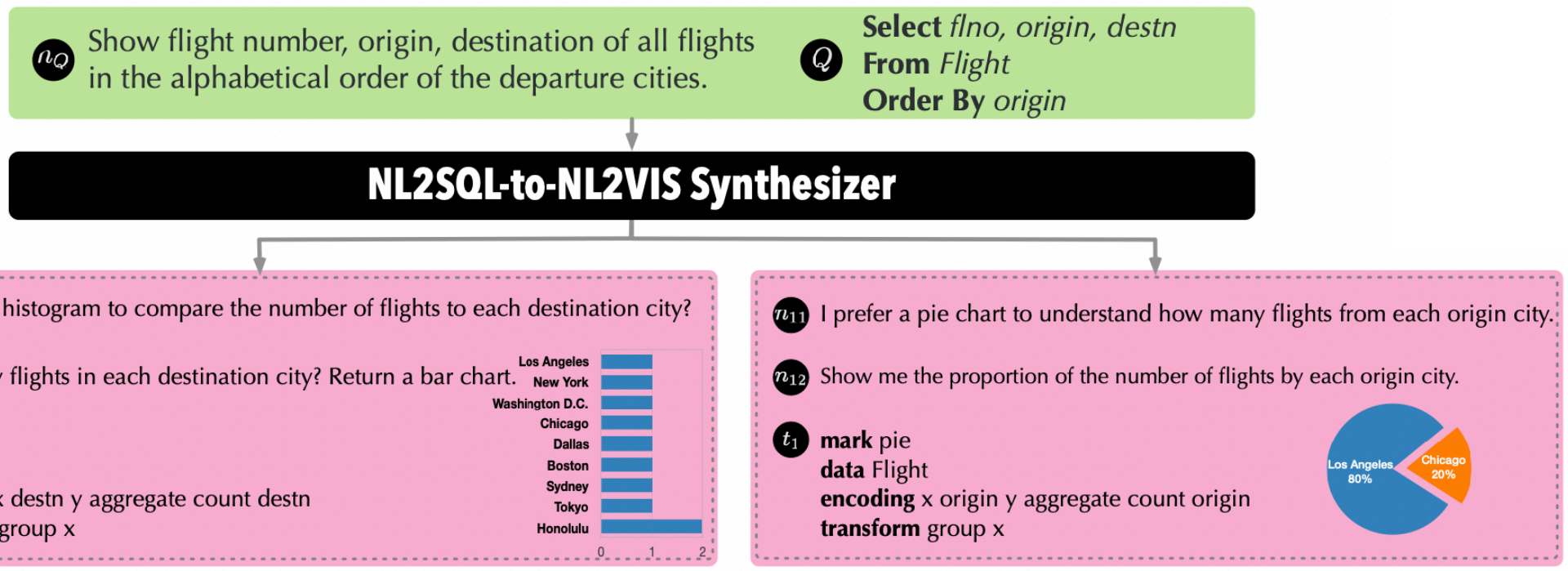
VIS Specification (Vega-Lite)



Properties

nvBench_id: *2617*
DB_id: *products_for_hire*
Chart: *Line*
Hardness: *Hard*

Synthesizing nvBench from NL-to-SQL Benchmarks



nvBench: `https://github.com/TsinghuaDatabaseGroup/nvBench`