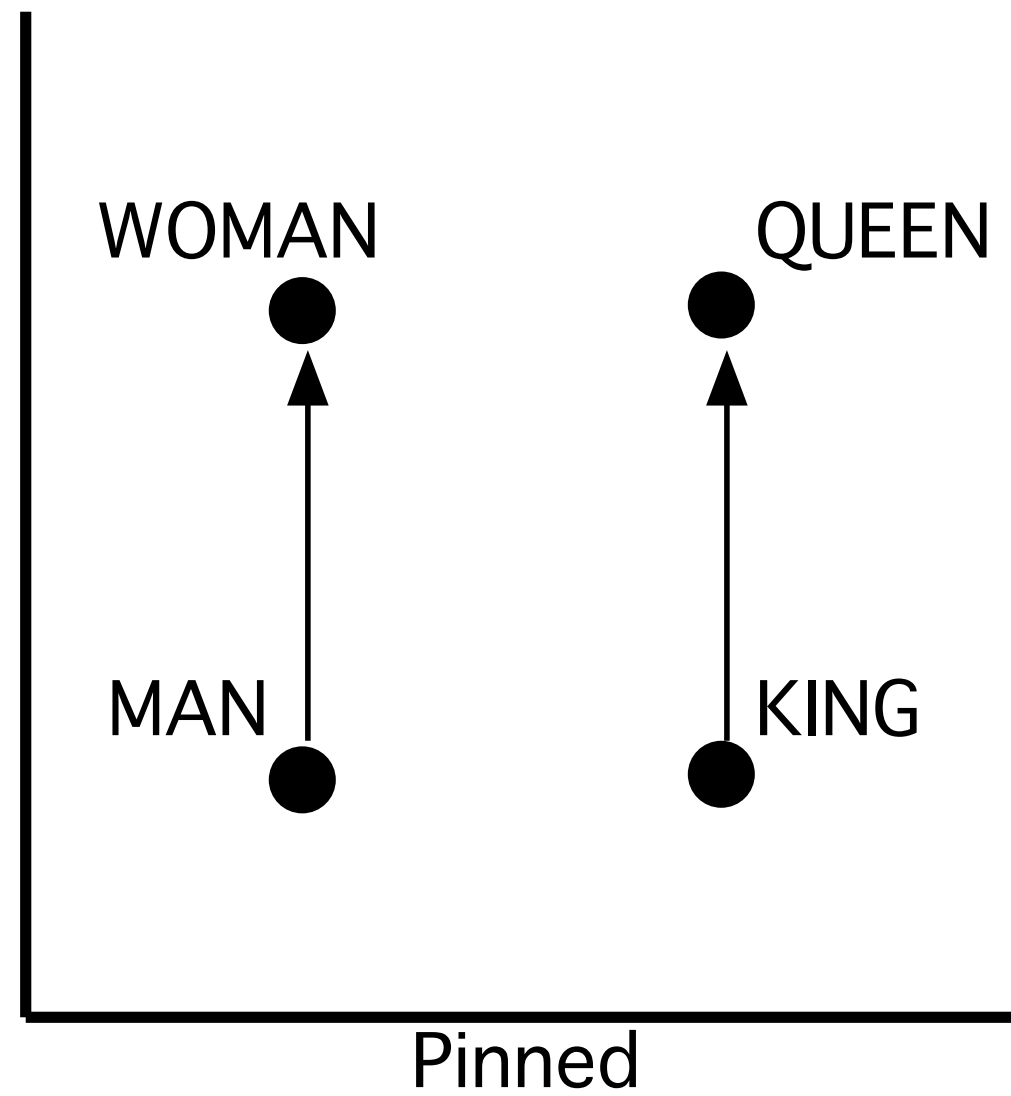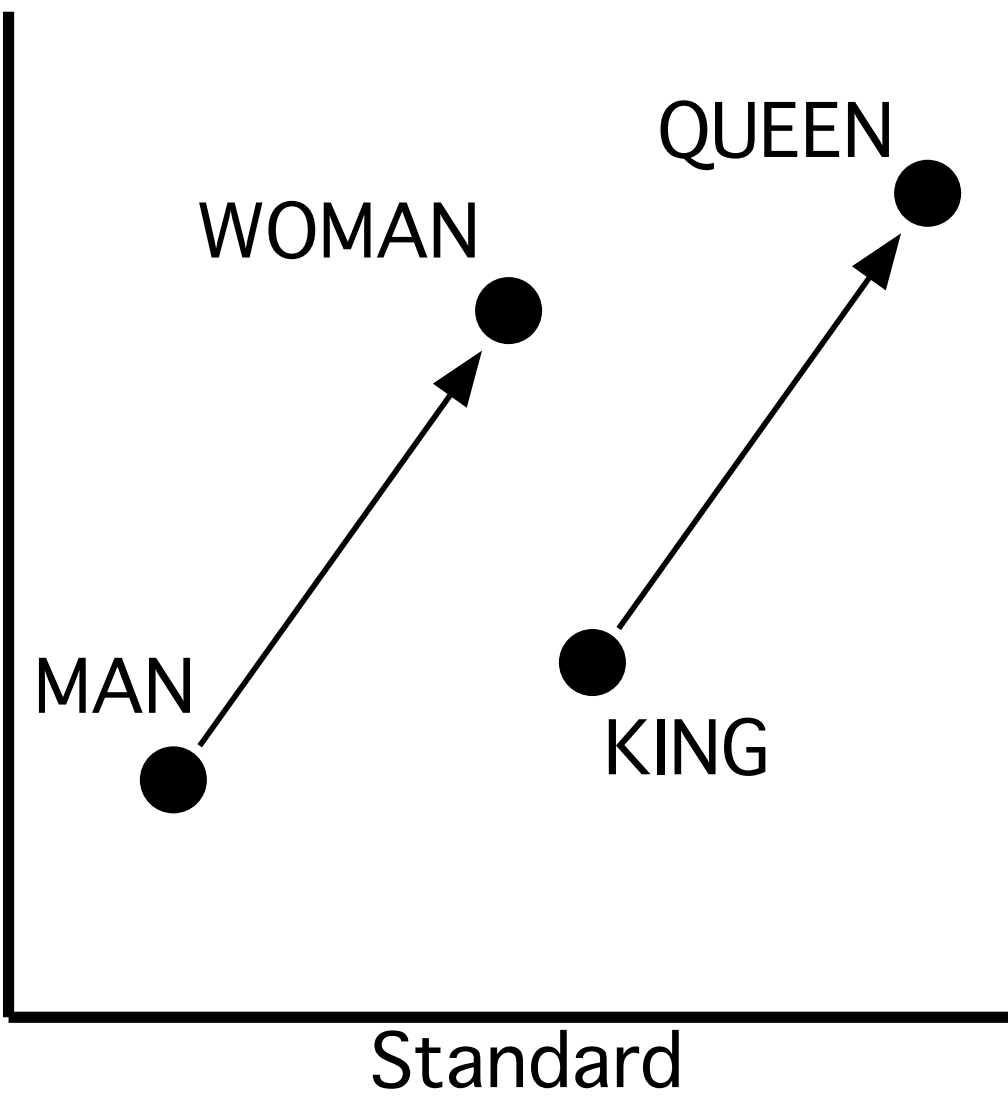# Pinned Features in Embedded Word Representations
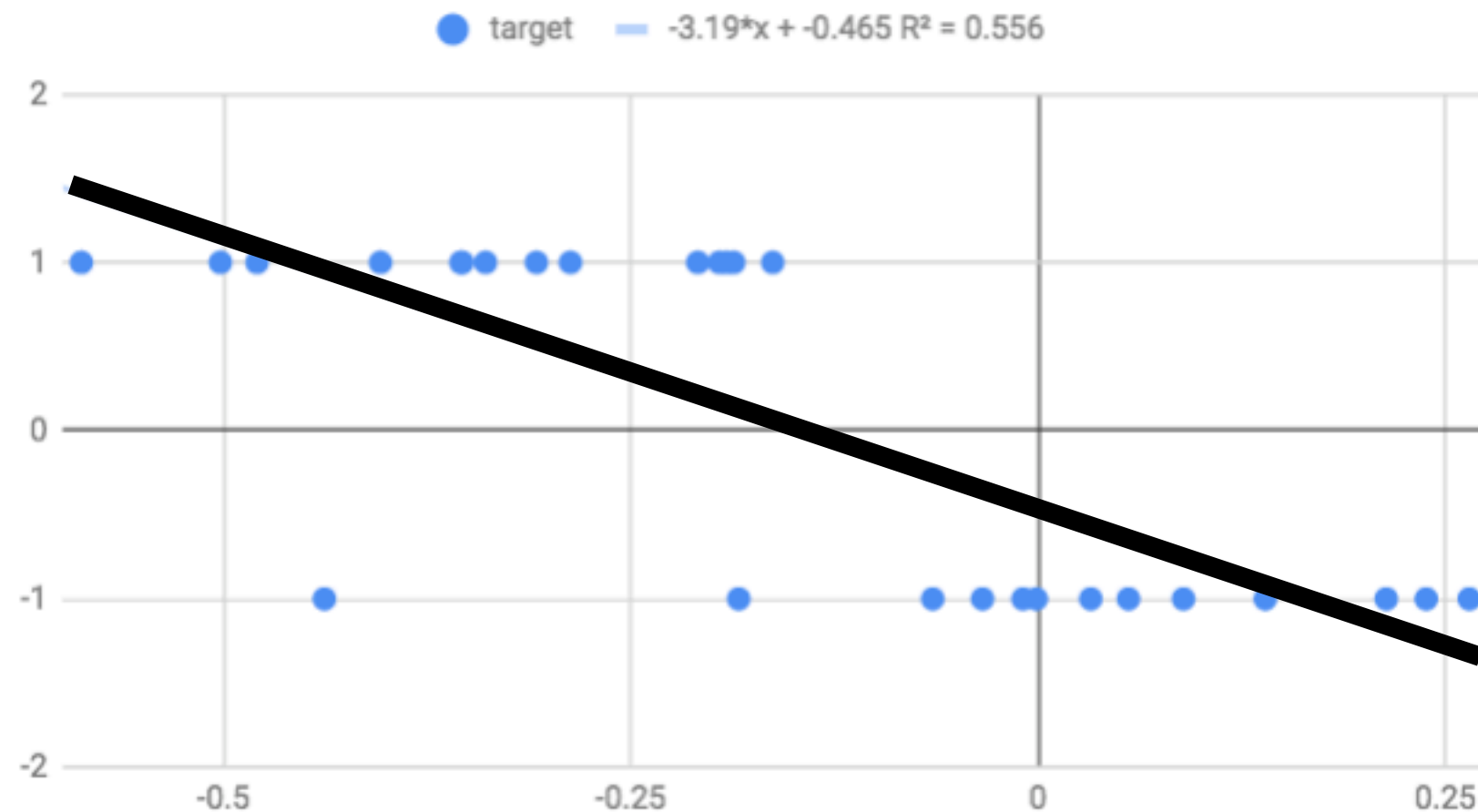
Joe Strout

Standard

Pinned

Method: Baseline

- train Word2Vec skip-gram on Wikipedia subset

- find dimension with highest correlation with target values

- fit a line mapping that dimension to target values

- use to predict values in test set

Method: Baseline

target and d[180]

● target — -3.19*x + -0.465 R² = 0.556

Method: Pinned

- add "gate" vector parallel to word vectors:

  1 for unpinned, 0 for pinned

- elementwise-multiply all changes by this gate vector

- initialize embedding values and gates for training words

"street"

0.249	-0.021	-0.145	0.168	0.085	0.481	← **word**
1	1	1	1	1	1	← **gate**

"aunt"

1.000	0.069	0.213	0.320	-0.414	-0.239	← **word**
0	1	1	1	1	1	← **gate**

Data

Attribute	Pinned Dimension	Training Set	Test Set	Examples
Gender	0	28	6	mother: 1 father: -1
Latitude	1	45	6	vancouver: 0.54 mumbai: 0.20
Mass	2	25	6	elephant: 0.37 hamster: -0.08
has_wheels	3	297	33	cabbage: 0 truck: 1
is_dangerous	4	123	14	soup: 0 sword: 1

Corpus size: 100 MB, 1.7 million words

Results
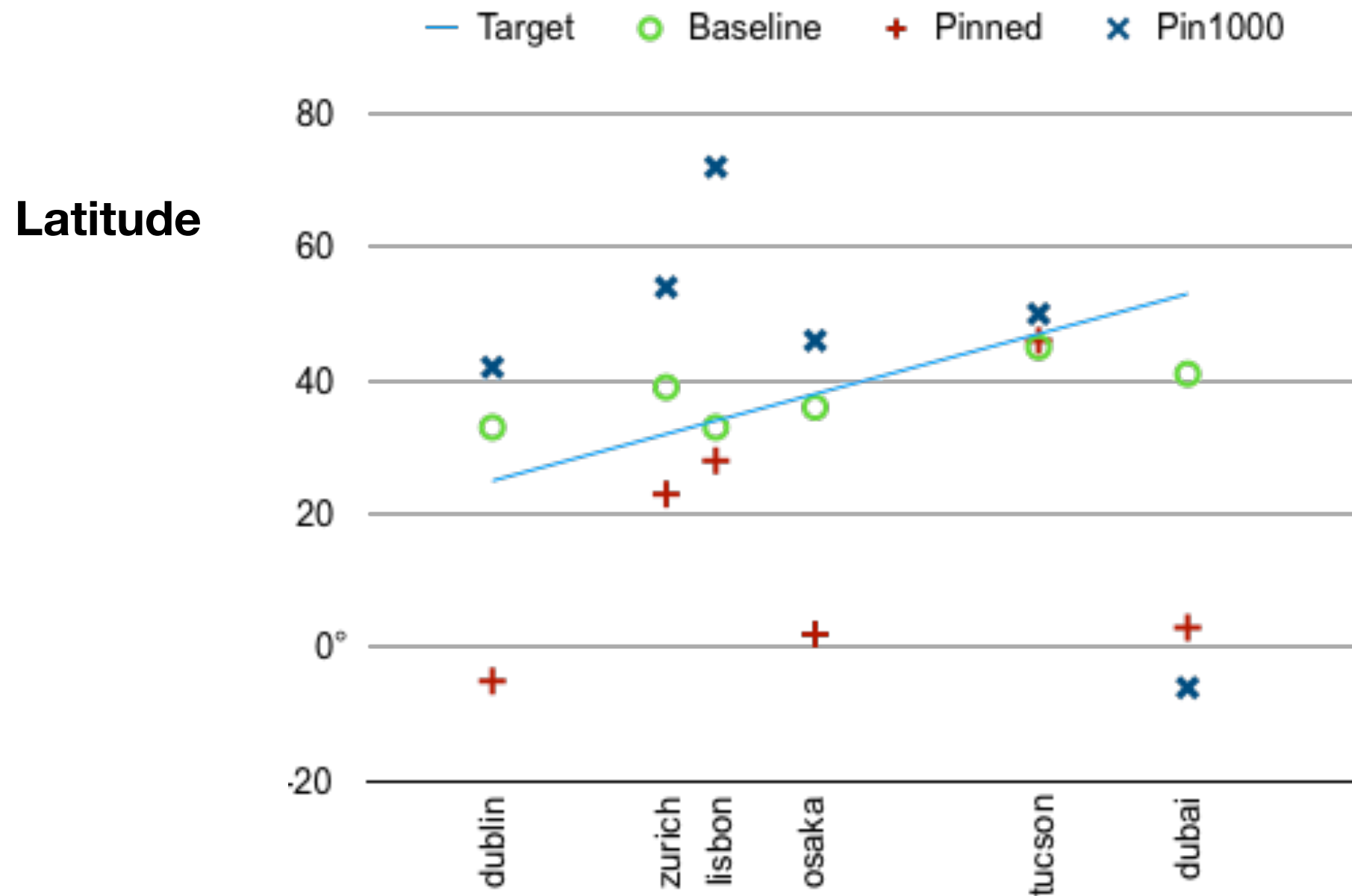
(Pinned) Mean Error: 60%
p = 0.46

Results

	Predicted	
is_dangerous	1	0

Actual	1	7	2
	0	3	2

Accuracy: 64%   Precision: 0.19;   Recall: 0.75;   F1: 0.30
p = 0.80

Future Directions

- More labeled data

- Larger corpus

- Different objective function

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Questions?