Dec 2 - Dec 9 Progress

Raise an issue.

Reproduction

- Can now reproduce Lin Tan's results on PROMISE data. We have his PROMISE and AST baselines, but not his semantic features (the code to generate those are protected by a patent).
- Difference was in how `bug > 1` samples were being treated; they are now set to 1 instead of being purged.

Experiments

- Running models with the new pre-processing on PROMISE data, they're doing better.

Results so far:

Dataset	Our method				MSR			Lin Tan		
	P	R	F	Runtime	P	R	F	P	R	F
ant 1.5 - 1.6	51.9 (3.7)	72.8 (10.9)	**59.9 (1.9)**	20.6 (0.4)	33	80	47	44.8	51.1	47.7
ant 1.6 - 1.7	45.6 (2.7)	67.5 (3.0)	**54.6 (0.7)**	37.7 (0.3)	21	98	35	41.8	77.1	54.2
camel 1.2 - 1.4	25.6 (1.3)	55.2 (4.8)	34.6 (1.4)	8.6 (0.8)	20	82	32	24.8	75.2	**37.3**
camel 1.4 - 1.6	28.6 (1.1)	48.9 (5.9)	35.9 (1.6)	31.5 (0.2)	28	68	**40**	28.3	63.7	39.1
ivy 1.4 - 2.0	20.4 (2.7)	67.5 (10.0)	32.3 (3.9)	43.6 (0.8)	11	70	18	22.6	60	**32.9**
jEdit 3.2 - 4.0	39.4 (1.3)	64.0 (4.0)	49.0 (1.6)	49.6 (0.3)	35	75	47	44.7	73.3	**55.6**
jEdit 4.0 - 4.1	47.8 (2.7)	64.6 (5.0)	**55.2 (1.4)**	14.8 (0.5)	33	93	49	46.1	67.1	54.6
xerces 1.2 - 1.3	16.1 (1.0)	75.4 (17.4)	**31.3 (3.0)**	43.9 (0.3)	23	28	26	16	46.4	23.8

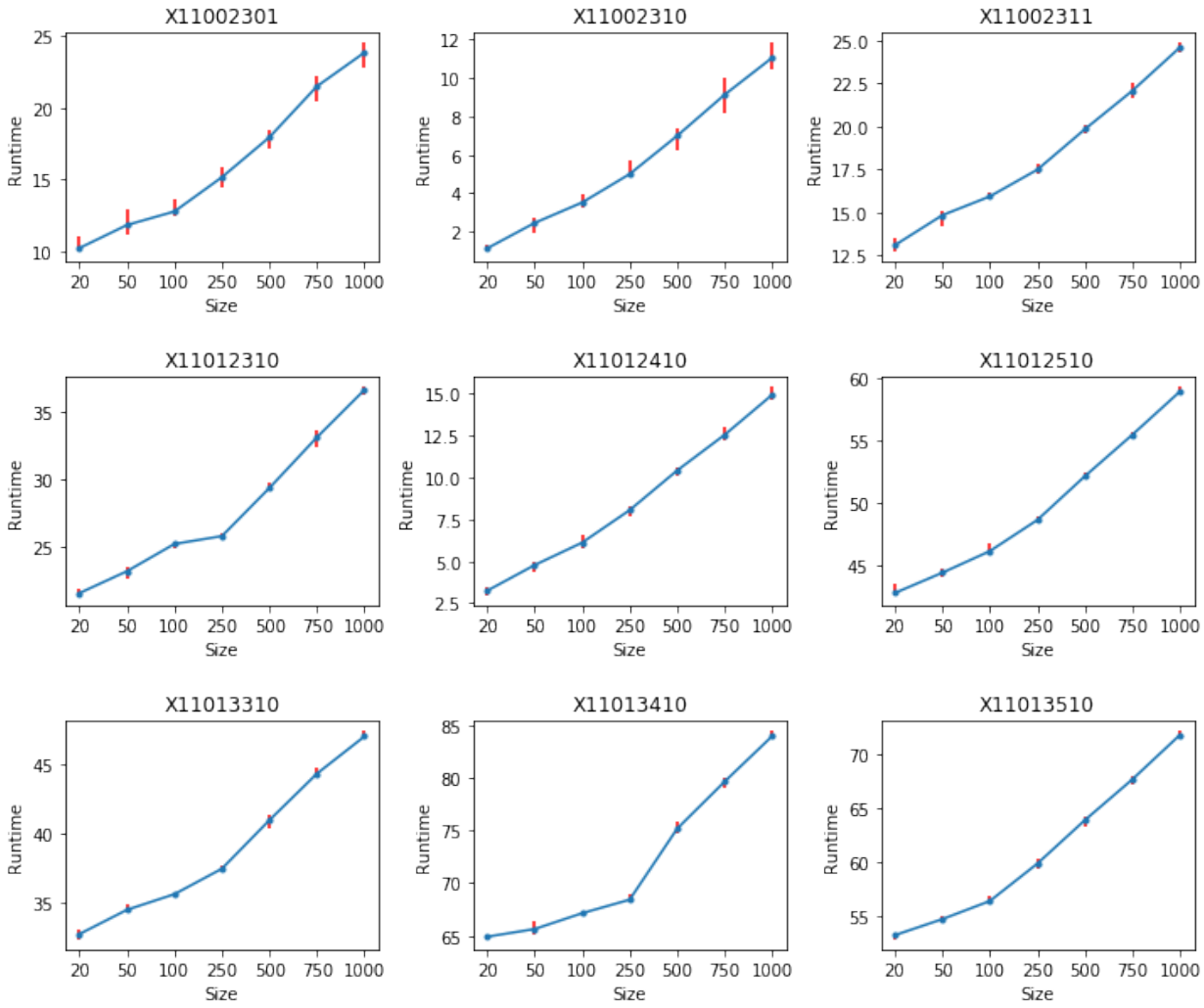
- Where we are not SOTA yet, I will run more hyper-parameter search. The above are done with only the top-10 models, rather than top-28.

Research Questions

Old

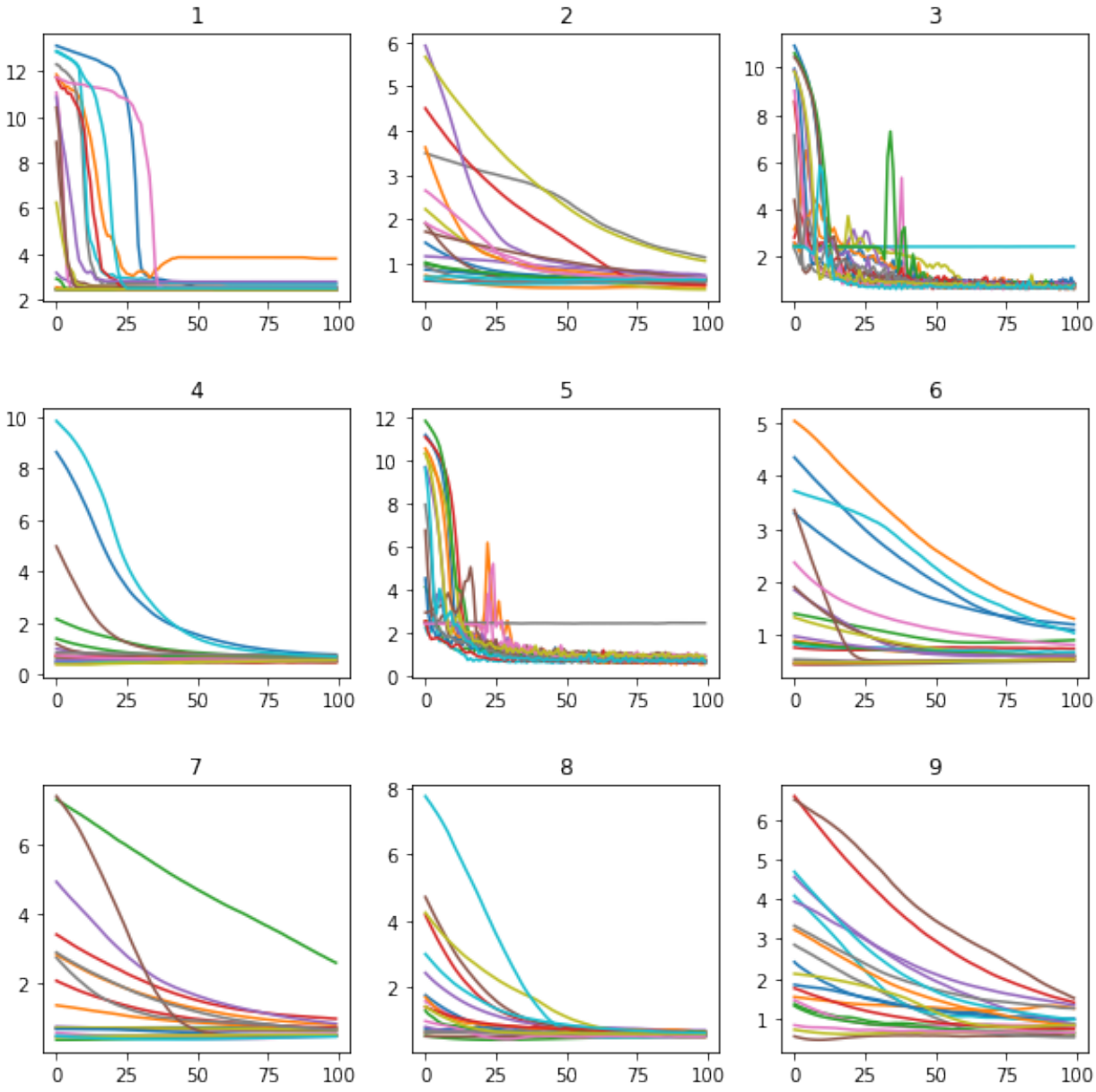
- ***How far can we stray from DL literature and still do well?***
  - Hamming distance 3
- ***Can these models outperform standard DL models?***
  - Yes.
- ***Can these models outperform SOTA SE methods?***
  - In general, yes
- ***Are these models transferable to other datasets?***
  - Where transfer does NOT mean cross-project defect prediction (CPDP), generally, yes.
  - For CPDP, experiments are required

- ***Are these models scalable?***
    - Yes.



New

- ***Why does oversampling help so much, such that the majority of models choose it?***
    - Because oversampling causes the minority class samples to contribute more to the loss, and therefore, the model cannot ignore them.
    - The performance boost from using these data points (< 5%) comes from oversampling rather than simply using them.
- ***How many epochs are really needed to train these models?***
    - About 65-75 seems to work for most models.



Work for next week

- Finish experiments
- Deep learners on AST features

Work for later

- Run cross-project defect prediction experiments
- Start writing paper (?)

Other Discussion

- RA Paperwork?
- Journal to aim for?