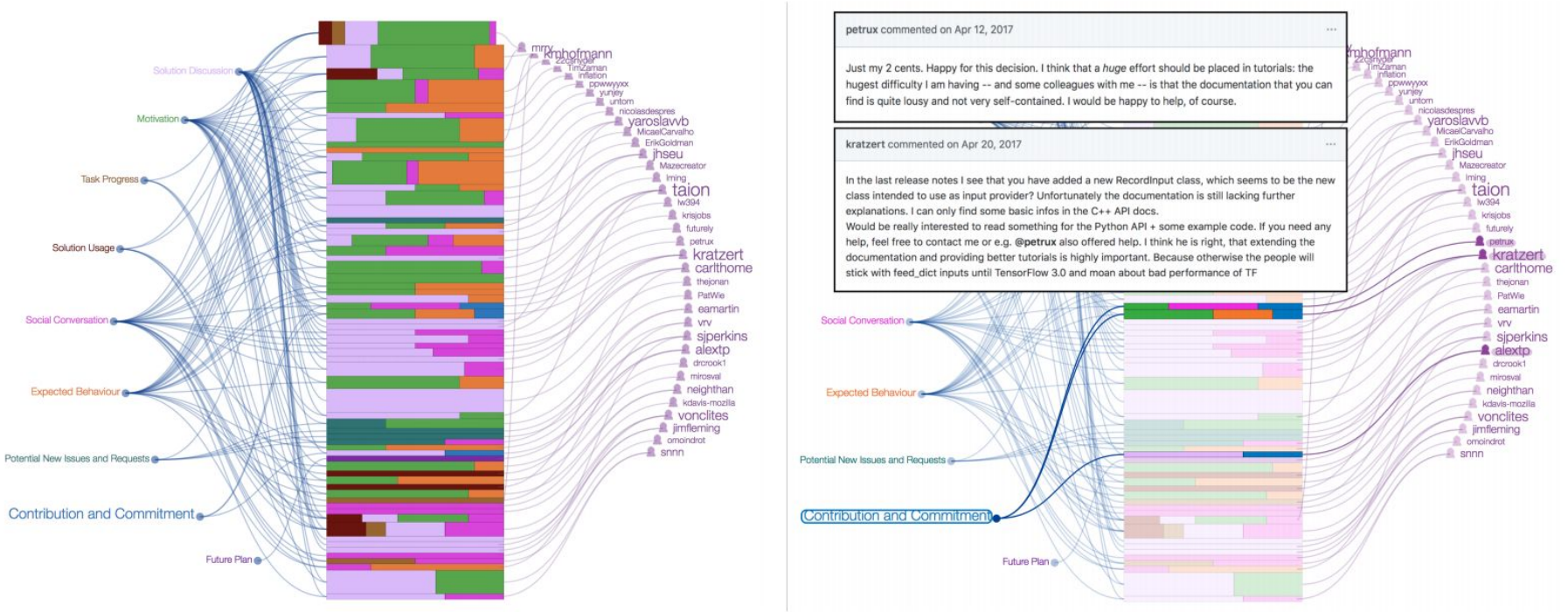
Analysis and Detection of Information Types of Open Source Software Issue Discussions

Paper in a nutshell



Paper in a nutshell

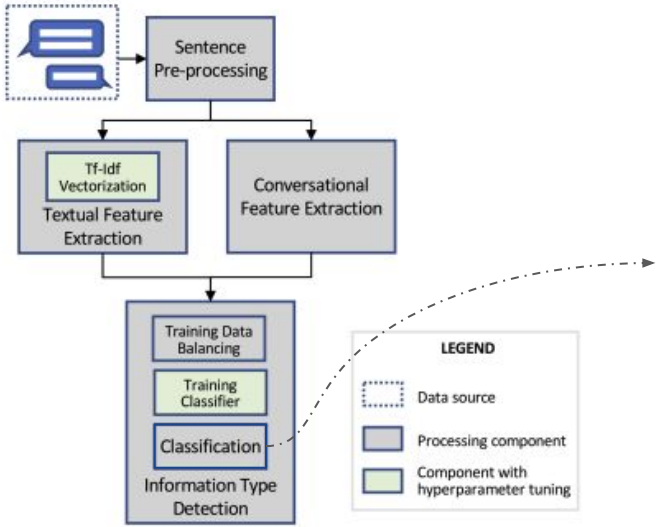
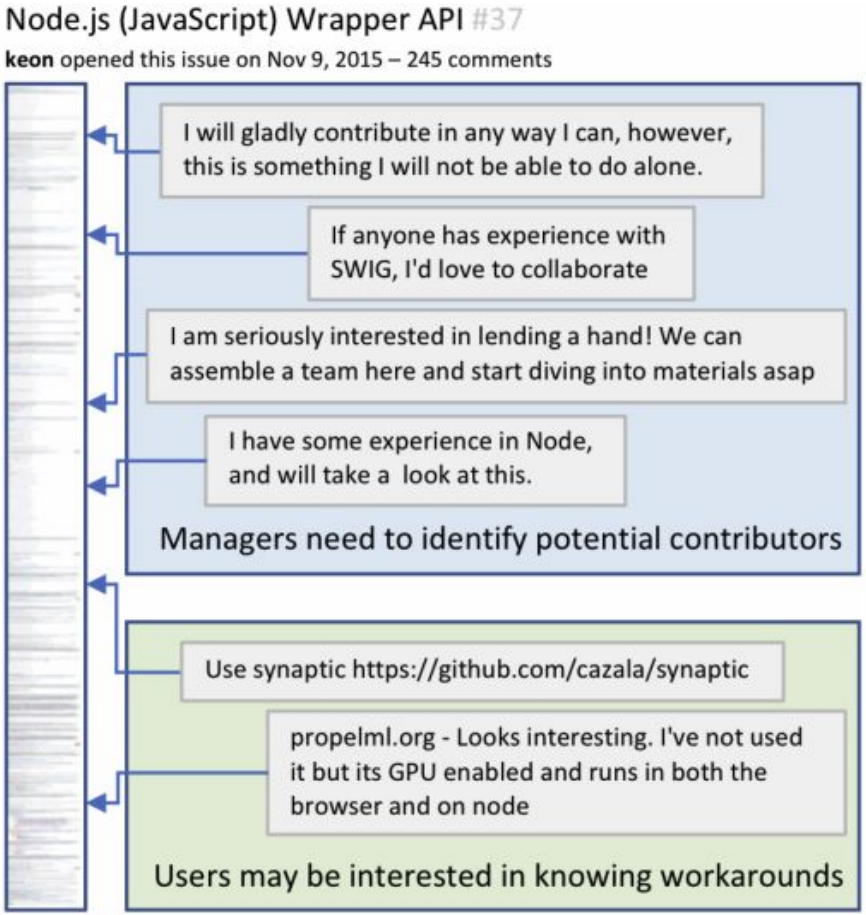


TABLE III: All configurations for detecting information types

ID	Model	Feature Set	Imbalance Handling
LTC	Logistic Regression	Textual	Class Weight
LTS	Logistic Regression	Textual	SMOTE
LCC	Logistic Regression	Conversational	Class Weight
LCS	Logistic Regression	Conversational	SMOTE
LBC	Logistic Regression	Both	Class Weight
LBS	Logistic Regression	Both	SMOTE
RTC	Random Forest	Textual	Class Weight
RTS	Random Forest	Textual	SMOTE
RCC	Random Forest	Conversational	Class Weight
RCS	Random Forest	Conversational	SMOTE
RBC	Random Forest	Both	Class Weight
RBS	Random Forest	Both	SMOTE

C = Adjusting class weight
S = Smote

Text


Node.js (JavaScript) Wrapper API #37
keon opened this issue on Nov 9, 2015 – 245 comments
I will gladly contribute in any way I can, however, this is something I will not be able to do alone.
If anyone has experience with SWIG, I'd love to collaborate
I am seriously interested in lending a hand! We can assemble a team here and start diving into materials asap
I have some experience in Node, and will take a look at this.
Managers need to identify potential contributors
Use synaptic https://github.com/cazala/synaptic
propelml.org - Looks interesting. I've not used it but its GPU enabled and runs in both the browser and on node
Users may be interested in knowing workarounds

Conversational Features

Feature Type	Feature Name	Description	Value Range
Participant	AA	Author's association with repository.	{OWNER, CL, MBR, OTHER}
	BEGAUTH	Flag of whether the comment author also posted the original issue.	{True, False}
Length	LEN	Length of the sentence in terms of character count.	{Positive Numbers}
	TLEN	Count of words in sentence divided by that of the longest sentence in thread	(0, 1]
	CLEN	Count of words in sentence divided by that of the longest sentence in comment.	(0, 1]
Structural	TLOC	Position of sentence in comment divided by the number of sentences in comment.	(0, 1]
	CLOC	Position of sentence in conversation divided by the number of sentences in thread	(0, 1]
	FIRST_TURN	Flag of whether if this is in the first comment.	{True, False}
	LAST_TURN	Flag of whether this is the last comment or not	{True, False}
Temporal	TPOS1	Time from beginning of conversation to comment divided by the total time of thread.	[0, 1]
	TPOS2	Time from comment to end of conversation divided by the total time of thread.	[0, 1]
	PPAU	Time from previous comment to current comment (normalized).	[0, 1]
	NPAU	Time from current comment to next comment (normalized).	[0, 1]
Code	HAS_CODE	Flag to indicate whether the comment contains a code snippet.	{True, False}

Note: CL - Collaborator, MBR - Member

Scenario 1: Stratified 5-fold cross validation

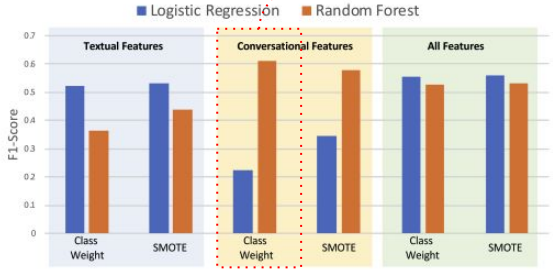


Fig. 5: Comparison of F1-scores in Scenario 1 (Stratified 5-fold cross validation)

TABLE V: Detailed results for each information type in Scenario 1 with configuration RCC (Random Forest using Conversational features with class weight adjustment)

Label	Precision	Recall	F1-Score	Support
Expected Behaviour	0.42	0.28	0.33	124
Motivation	0.56	0.53	0.54	288
Observed Bug Behaviour	0.56	0.70	0.62	131
Bug Reproduction	0.53	0.47	0.50	245
Investigation and Exploration	0.60	0.65	0.62	377
Solution Discussion	0.68	0.71	0.69	1411
Contribution and Commitment	0.25	0.19	0.21	83
Task Progress	0.27	0.14	0.18	125
Potential New Issues and Requests	0.67	0.66	0.66	230
Solution Usage	0.65	0.82	0.73	368
Workarounds	0.58	0.45	0.49	89
Action on Issue	0.45	0.39	0.42	61
Social Conversation	0.63	0.62	0.63	798
Weighted average/Total	0.61	0.62	0.61	4330

Scenario 2: Leave-one-out

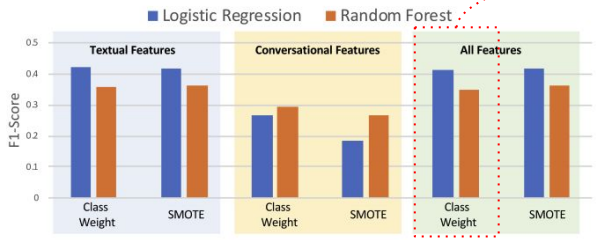


Fig. 6: Comparison of F1-scores in Scenario 2 (Leave-One-Issue-Out cross validation)

TABLE VI: Detailed results for Scenario 2 with configuration LTC (Logistic Regression using textual features with class weight adjustment)

Label	Precision	Recall	F1-Score	Support
Expected Behaviour	0.71	0.1	0.15	124
Motivation	0.44	0.1	0.13	288
Observed Bug Behaviour	0.23	0.03	0.04	131
Bug Reproduction	0.53	0.36	0.42	245
Investigation and Exploration	0.47	0.24	0.31	377
Solution Discussion	0.59	0.65	0.58	1411
Contribution and Commitment	0.51	0.31	0.37	83
Task Progress	0.35	0.26	0.29	125
Potential New Issues and Requests	0.1	0.03	0.03	230
Solution Usage	0.57	0.08	0.12	368
Work-Arounds	0.51	0.06	0.09	89
Action on Issue	0.78	0.49	0.58	61
Social Conversation	0.74	0.69	0.70	798
Weighted average/Total	0.55	0.42	0.42	4330

Paper in a nutshell

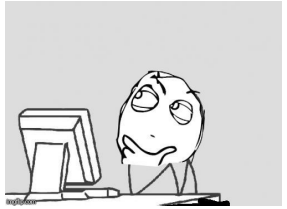
Our findings indicated that supervised classifiers such as Random Forest can effectively detect most sentence types using only conversational features when prior knowledge about the issue discussion is available. Logistic Regression methods can yield satisfactory performance using textual features when classifying sentences from new issues, particularly for certain information types such as *Solution Discussion*, *Action on Issue*, and *Social Conversation* while falling short on others.

Paper in a nutshell

TABLE VI: Detailed results for Scenario 2 with configuration LTC (Logistic Regression using textual features with class weight adjustment)

Label	Precision	Recall	F1-Score	Support
Expected Behaviour	0.71	0.1	0.15	124
Motivation	0.44	0.1	0.13	288
Observed Bug Behaviour	0.23	0.03	0.04	131
Bug Reproduction	0.53	0.36	0.42	245
Investigation and Exploration	0.47	0.24	0.31	377
Solution Discussion	0.59	0.65	0.58	1411
Contribution and Commitment	0.51	0.31	0.37	83
Task Progress	0.35	0.26	0.29	125
Potential New Issues and Requests	0.1	0.03	0.03	230
Solution Usage	0.57	0.08	0.12	368
Work-Arounds	0.51	0.06	0.09	89
Action on Issue	0.78	0.49	0.58	61
Social Conversation	0.74	0.69	0.70	798
Weighted average/Total	0.55	0.42	0.42	4330

	A	B	C	D
	Label	**Precision**	**F1**	**Support**
	Social Conversation	0.74	0.7	798
	Action on Issue	0.78	0.58	61
	Solution Discussion	0.59	0.58	1411
	Bug Reproduction	0.53	0.42	245
	Contribution and Commitment	0.51	0.37	83
	Investigation and Exploration	0.47	0.31	377
	Task Progress	0.35	0.29	125
	Expected Behaviour	0.71	0.15	124
	Motivation	0.44	0.13	288
	Solution Usage	0.57	0.12	368
	Workarounds	0.51	0.09	89
	Observed Bug Behaviour	0.23	0.04	131
	Potential New Issues and Requests	0.1	0.03	230



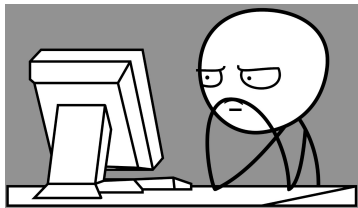
Paper in a nutshell

Label	Precision	F1	Support
Social Conversation	0.74	0.7	798
Solution Discussion	0.59	0.58	1411
Action on Issue	0.78	0.58	61
Bug Reproduction	0.53	0.42	245
Contribution and Commitment	0.51	0.37	83
Investigation and Exploration	0.47	0.31	377
Task Progress	0.35	0.29	125
Expected Behaviour	0.71	0.15	124
Motivation	0.44	0.13	288
Solution Usage	0.57	0.12	368
Workarounds	0.51	0.09	89
Observed Bug Behaviour	0.23	0.04	131
Potential New Issues and Requests	0.1	0.03	230

Logistic Regression

Label	Precision	F1	Support
Solution Usage	0.65	0.73	368
Solution Discussion	0.68	0.69	1411
Potential New Issues and Requests	0.67	0.66	230
Social Conversation	0.63	0.63	798
Investigation and Exploration	0.6	0.62	377
Observed Bug Behaviour	0.56	0.62	131
Motivation	0.56	0.54	288
Bug Reproduction	0.53	0.5	245
Workarounds	0.58	0.49	89
Action on Issue	0.45	0.42	61
Expected Behaviour	0.42	0.33	124
Contribution and Commitment	0.25	0.21	83
Task Progress	0.27	0.18	125

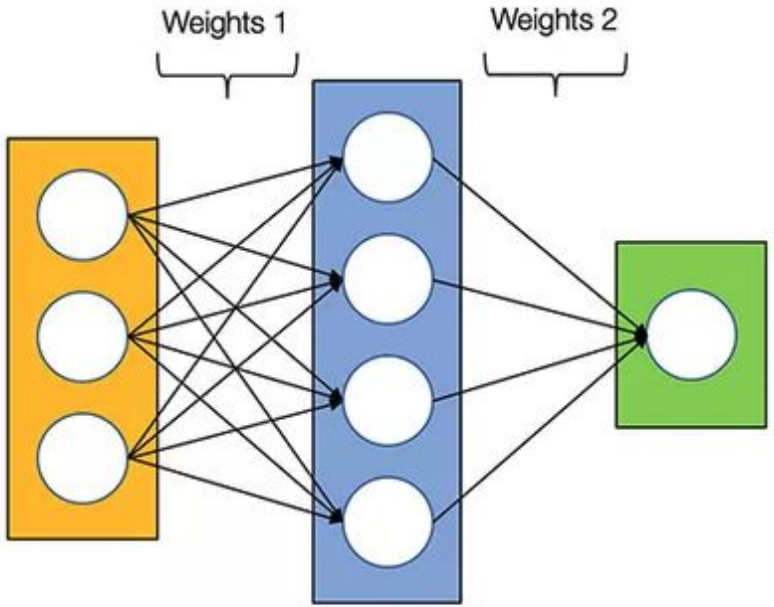
Random Forest



Can we beat them?

Neural Nets 101

Output



Contribution

Workarounds

Expected Behaviour

If anyone has experience with SWIG, I'd love to collaborate

propelml.org - Looks interesting. I've not used it but its GPU enabled and runs in both the browser and on node

Input

https://www.youtube.com/watch?v=UNmqTiOnRfg

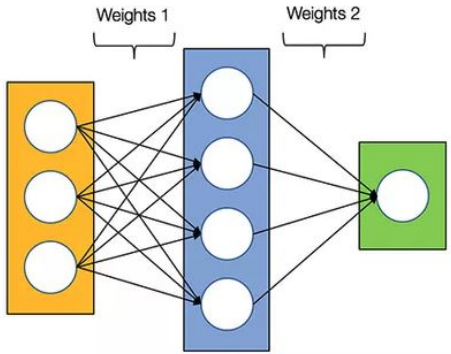
Neural Nets 101

If anyone has experience with SWIG, I'd love to collaborate

$\begin{bmatrix}1\\0\end{bmatrix}$

propelml.org - Looks interesting. I've not used it but its GPU enabled and runs in both the browser and on node

$\begin{bmatrix}0\\1\end{bmatrix}$



$\begin{bmatrix}1\\0\\0\end{bmatrix}$ Contribution

Workarounds $\begin{bmatrix}0\\1\\0\end{bmatrix}$

$\begin{bmatrix}0\\0\\1\end{bmatrix}$ Expected Behaviour

https://www.youtube.com/watch?v=UNmqTiOnRfg

If anyone has experience with SWIG, I'd love to collaborate

$$\begin{bmatrix} ? \end{bmatrix} \begin{bmatrix} 1 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$

Contribution

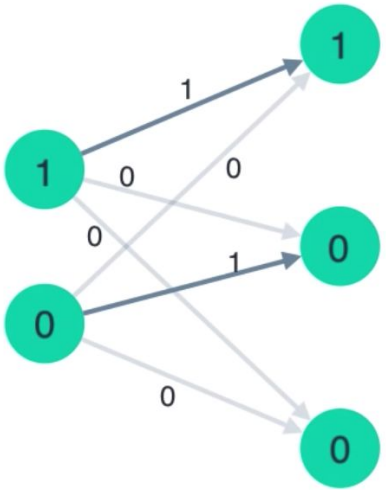
propelml.org - Looks interesting. I've not used it but its GPU enabled and runs in both the browser and on node

$$\begin{bmatrix} ? \end{bmatrix} \begin{bmatrix} 0 \\ 1 \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$

Workarounds

If anyone has experience with SWIG, I'd love to collaborate

$$\begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

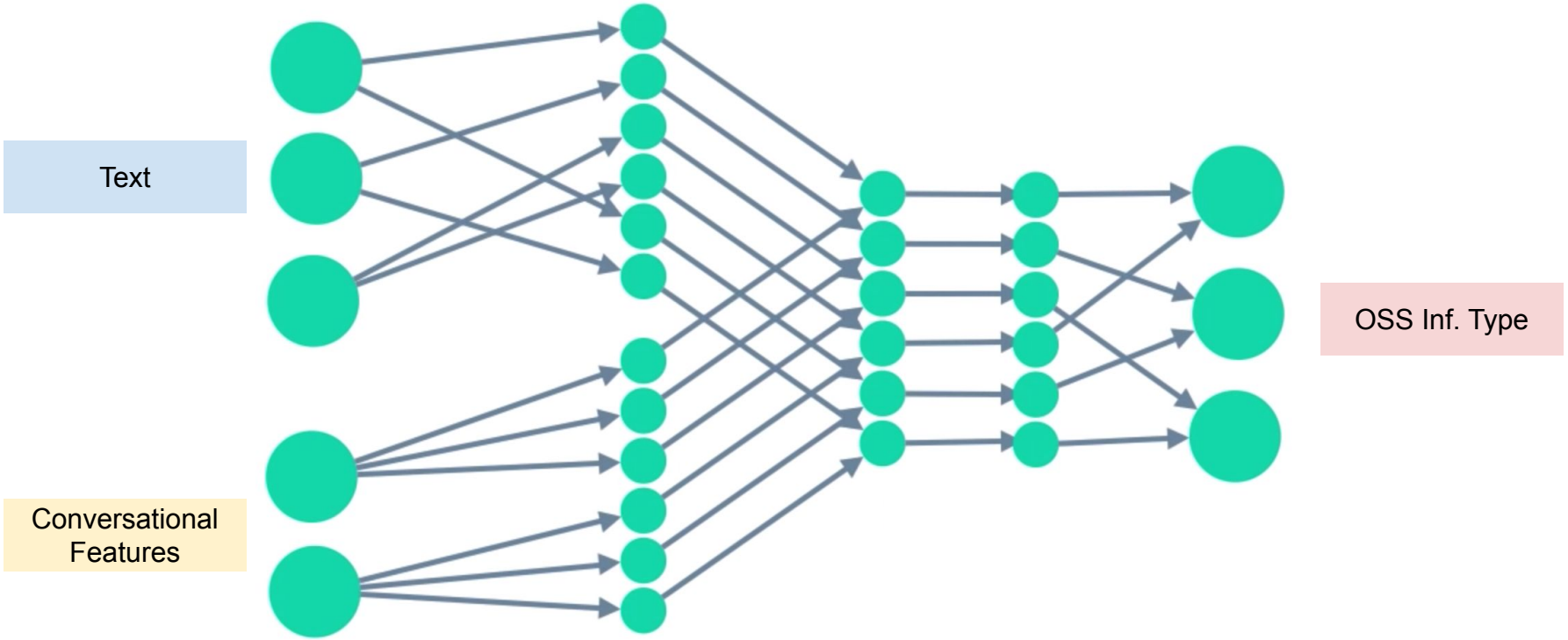


$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$

Contribution

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \end{bmatrix}$$

What am I trying to build?



Source code available at:

https://github.com/marquesarthur/nier-se-neural-nets

*private repo, I will add contributors upon request