ISCAS 中国科学院软件研究所学术年会'2022
暨计算机科学国家重点实验室开放周
学术论文

BugListener: Identifying and Synthesizing Bug Reports from Collaborative Live Chats

面向开发者沟通记录的缺陷报告自动合成

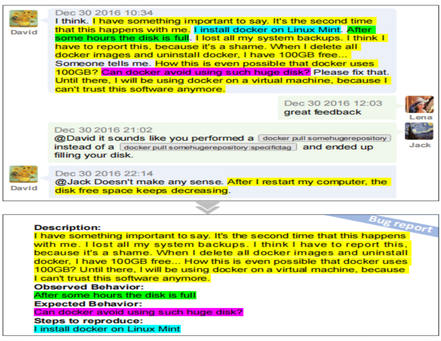
石琳 沐方文 张昱旻 杨叶 陈俊杰 陈啸 蒋涵芝 江子攸 王青

the 44th International Conference on Software Engineering (ICSE 2022)

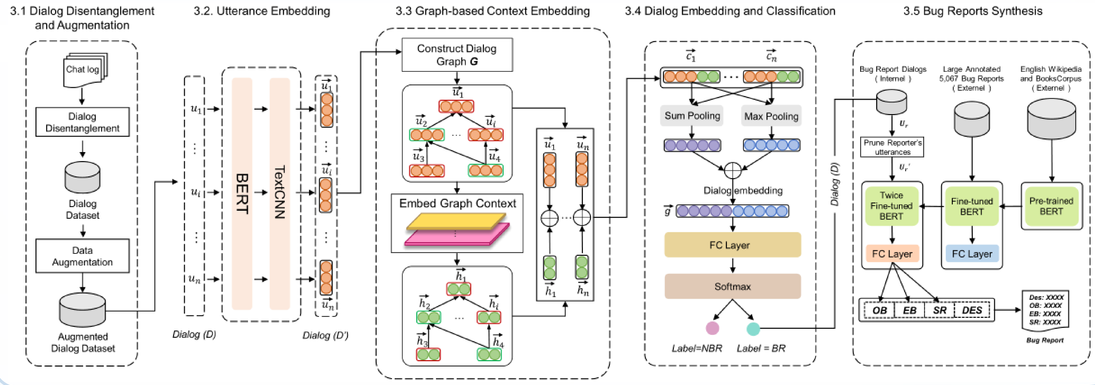
主要联系人：石琳（15001193593，shilin@iscas.ac.cn）

Introduction

- Developers frequently rely on live-chatting to discuss emergent bugs/errors they encounter in daily development tasks. However, it remains a challenging task to accurately record such knowledge.
- In this paper, we first formulate the task of identifying and synthesizing bug reports from community live chats, and propose a novel approach, named BugListener, to address the challenges.



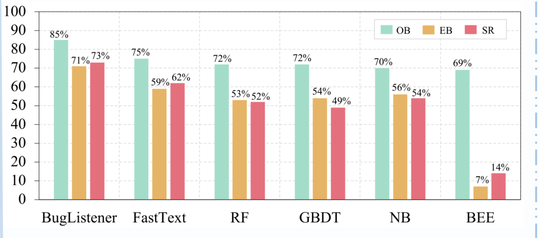
Approach



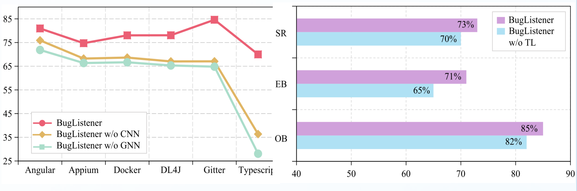
Experiments

Methods	Angular			Appium			Docker			DL4J			Gitter			Typescript			Average		
	P	R	F1	P	R	F1	P	R	F1	P	R	F1	P	R	F1	P	R	F1	P	R	F1
BugListener	82.93	79.07	80.95	69.39	80.95	74.73	77.42	78.69	78.05	85.07	72.15	78.08	82.09	87.30	84.62	70.00	70.00	70.00	77.82	78.03	77.74
NB	58.88	73.26	65.28	62.22	66.67	64.37	65.52	31.15	42.22	62.79	34.18	44.26	72.92	55.56	63.06	35.29	30.00	32.43	59.60	48.47	51.94
GBDT	72.22	60.47	65.82	65.17	69.05	67.05	66.00	54.10	59.46	85.00	64.56	73.38	59.77	82.54	69.33	35.14	65.00	45.61	63.88	65.95	63.44
RF	75.00	59.30	66.23	72.15	67.86	69.94	68.75	36.07	47.31	72.73	20.25	31.68	62.34	76.19	68.57	60.00	30.00	40.00	68.50	48.28	53.96
FastText	77.59	52.33	62.50	68.54	72.62	70.52	56.60	49.18	52.63	74.51	48.10	58.46	67.24	61.90	64.46	40.91	45.00	42.86	64.23	54.86	58.57
CNC	80.36	52.33	63.38	67.05	70.24	68.60	74.51	62.29	67.86	84.44	48.10	61.29	68.18	71.43	69.77	52.00	65.00	57.78	71.09	61.57	64.78
DECA	51.32	45.35	48.15	51.16	52.38	51.76	45.57	59.02	51.43	42.22	48.10	44.97	55.36	49.20	52.10	21.57	55.00	30.99	44.53	51.51	46.57
Casper	67.65	53.49	59.74	66.06	85.71	74.61	60.56	70.49	65.15	82.14	58.23	68.15	73.33	69.84	71.54	32.50	65.00	43.33	63.71	67.13	63.75

- On average, BugListener achieves the best precision, recall, and F1, i.e., 77.82%, 78.03%, and 77.74%.



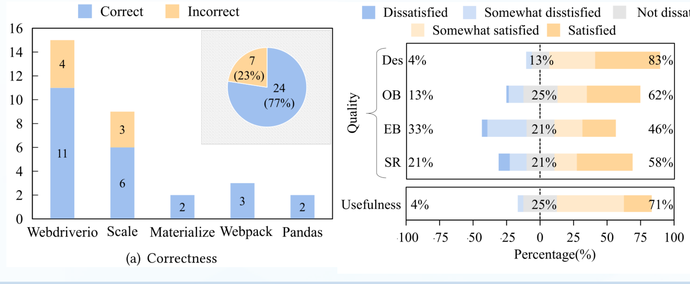
- BugListener outperforms the five baselines in predicting OB, EB, and SR sentences in terms of F1.



- The GNN, TextCNN, and Transfer Learning technique adopted by BugListener are helpful for bug report identification and synthesis.

Human Evaluation

- Among the 31 bug reports identified by BugListener, 24 (77%) of them are correct.
- The high quality of DES, OB, EB, and S2R are highly admitted. In addition, 71% of participants agree that BugListener is useful.



Conclusion

We proposed a novel approach, named BugListener, which can automatically identify and synthesize bug reports from live chat messages. The evaluation results show that our approach significantly outperforms all other baselines in both BRI and BRS tasks. A human evaluation study also confirms the effectiveness of BugListener in generating relevant and accurate bug reports.