

Making Changes

YEGOR BUGAYENKO

Lecture #3 out of 8
80 minutes

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BRAM ADAMS

“We found that 33% of the patches makes it into a Linux release, and that most of them need 3 to 6 months for this.”

— Yujuan Jiang, Bram Adams, and Daniel M. German. Will My Patch Make It? And How Fast? Case Study on the Linux Kernel. In *Proceedings of the 10th Working Conference on Mining Software Repositories (MSR)*, pages 101–110. IEEE, 2013. doi:[10.1109/MSR.2013.6624016](https://doi.org/10.1109/MSR.2013.6624016)

Table 7. Probable Reasons why Contributors Abandon their PRs

Category	Reason	Frequency (%)
Contributor-related	Difficulty addressing the maintainers' comments	45.8
	Difficulty resolving the CI failures	20.9
	Difficulty resolving the merge issues	14.1
	Difficulty complying with the project requirements	1.4
Maintainer-related	Lack of review from the maintainers	22.6
	Lack of answer from the maintainers	9.3
	Lack of integration by the maintainers	6.5
	Lack of consensus among the maintainers	4.5
PR-related	Existence of duplicated work	3.1
	Dependency on upcoming changes	1.4

Source: SayedHassan Khatoonabadi, Diego Elias Costa, Rabe Abdalkareem, and Emad Shihab. On Wasted Contributions: Understanding the Dynamics of Contributor-Abandoned Pull Requests — A Mixed-Methods Study of 10 Large Open-Source Projects. *ACM Transactions on Software Engineering and Methodology*, 32(1):1–39, 2023. doi:[10.1145/3530785](https://doi.org/10.1145/3530785)



1. Make small pull requests [Bugayenko, 2020].



DABBISH LAURA

“Pull requests with many comments were much less likely to be accepted, moderated by the submitter’s prior interaction in the project.”

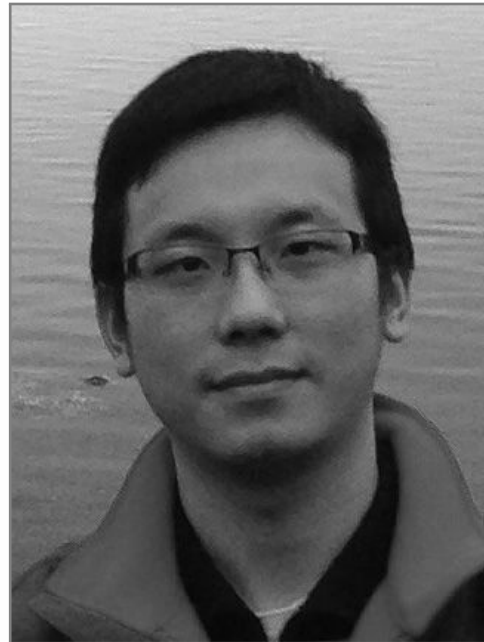
— Jason Tsay, Laura Dabbish, and James Herbsleb. Influence of Social and Technical Factors for Evaluating Contribution in GitHub. In *Proceedings of the 36th International Conference on Software Engineering*, pages 356–366, 2014a. doi:[10.1145/2568225.2568315](https://doi.org/10.1145/2568225.2568315)



GEORGIOS GOUSIOS

“We examined 291 carefully selected Ruby, Python, Java and Scala projects (in total, 166,884 pull requests)... The number of total lines changed by pull requests is on average less than 500 (95% percentile: **1227**, 90% percentile: 497, 80% percentile: 168) with a median number of 20.”

— Georgios Gousios, Martin Pinzger, and Arie van Deursen. An Exploratory Study of the Pull-Based Software Development Model. In *Proceedings of the 36th International Conference on Software Engineering*, pages 345–355, 2014. doi:[10.1145/2568225.2568260](https://doi.org/10.1145/2568225.2568260)



YUE YU

“Our preliminary models show that pull request review latency is complex, and depends on many predictors. Naturally, the size of the pull request matters: the shorter it is the faster it will be reviewed.”

— Yue Yu, Huaimin Wang, Vladimir Filkov, Premkumar Devanbu, and Bogdan Vasilescu. Wait for It: Determinants of Pull Request Evaluation Latency on GitHub. In *Proceedings of the 12th Working Conference on Mining Software Repositories*, pages 367–371. IEEE, 2015. doi:[10.1109/MSR.2015.42](https://doi.org/10.1109/MSR.2015.42)



AMIANGSHU BOSU

“We found that the more files that are in a change, the lower the proportion of comments in the code review that will be of value to the author of the change.”

— Amiangshu Bosu, Michaela Greiler, and Christian Bird. Characteristics of Useful Code Reviews: An Empirical Study at Microsoft. In *Proceedings of the 12th Working Conference on Mining Software Repositories*, pages 146–156. IEEE, 2015. doi:[10.1109/MSR.2015.21](https://doi.org/10.1109/MSR.2015.21)



CAITLIN SADOWSKI

“A correlation between change size and review quality is acknowledged by Google and developers are strongly encouraged to make small, incremental changes (with the exception of large deletions and automated refactoring).”

— Caitlin Sadowski, Emma Söderberg, Luke Church, Michal Sipko, and Alberto Bacchelli. Modern Code Review: A Case Study at Google. In *Proceedings of the 40th International Conference on Software Engineering: Software Engineering in Practice*, pages 181–190, 2018. doi:[10.1145/3183519.3183525](https://doi.org/10.1145/3183519.3183525)



2. Don't group your changes [Bugayenko, 2020].



CAROLYN D. EGELMAN

“Google categorizes CRs into specific sizes, these sizes are indicated as part of the code review tool and in the notification to the reviewer of the code change... The general advice is to split change requests for easier and quicker reviews when possible.”

— Carolyn D. Egelman, Emerson Murphy-Hill, Elizabeth Kammer, Margaret Morrow Hodges, Collin Green, Ciera Jaspan, and James Lin. Predicting Developers’ Negative Feelings About Code Review. In *Proceedings of the 42nd International Conference on Software Engineering*, pages 174–185, 2020. doi:[10.1145/3377811.3380414](https://doi.org/10.1145/3377811.3380414)



3. Insist on code reviews and merges...
politely.



MARCO ORTU

“Our results show that valence (expressed in comments received and posted by a reporter) and joy expressed in the comments written by a reporter are linked to a higher likelihood of issues to be merged. On the contrary, sadness, anger, and arousal expressed in the comments written by a reporter, and anger, arousal, and dominance expressed in the comments received by a reporter, are linked to a lower likelihood of a pull request to be merged.”

— Marco Ortu, Giuseppe Destefanis, Daniel Graziotin, Michele Marchesi, and Roberto Tonelli. How Do You Propose Your Code Changes? Empirical Analysis of Affect Metrics of Pull Requests on GitHub. *IEEE Access*, 8(1):110897–110907, 2020. doi:[10.1109/ACCESS.2020.3002663](https://doi.org/10.1109/ACCESS.2020.3002663)

What is “valence”?

Valence, also known as hedonic tone, is a characteristic of emotions that determines their emotional affect (intrinsic appeal or repulsion). Positive valence corresponds to the "goodness" or attractiveness of an object, event, or situation, making it appealing or desirable. Conversely, negative valence relates to “badness” or averseness, rendering something unappealing or undesirable. — [Wikipedia](#)



RAHUL IYER

“The larger the difference in personality traits between the requester and the closer, the more positive effect it has on pull request acceptance.”

— Rahul N. Iyer, S. Alex Yun, Meiyappan Nagappan, and Jesse Hoey. Effects of Personality Traits on Pull Request Acceptance. *IEEE Transactions on Software Engineering*, 47(11):2632–2643, 2019. doi:[10.1109/TSE.2019.2960357](https://doi.org/10.1109/TSE.2019.2960357)



DENAЕ FORD


“We observe that both social and technical aspects are being taken into consideration when deciding upon pull request acceptance. Moreover, we observe that many more social aspects are being considered during the experiment than reported during the post-experiment survey.”

— Denae Ford, Mahnaz Behroozi, Alexander Serebrenik, and Chris Parnin. Beyond the Code Itself: How Programmers *Really* Look at Pull Requests. In *Proceedings of the 41st International Conference on Software Engineering: Software Engineering in Society*, pages 51–60. IEEE, 2019. doi:[10.1109/ICSE-SEIS.2019.00014](https://doi.org/10.1109/ICSE-SEIS.2019.00014)



Source: Denae Ford, Mahnaz Behroozi, Alexander Serebrenik, and Chris Parnin. Beyond the Code Itself: How Programmers *Really* Look at Pull Requests. In *Proceedings of the 41st International Conference on Software Engineering: Software Engineering in Society*, pages 51–60. IEEE, 2019.
[doi:10.1109/ICSE-SEIS.2019.00014](https://doi.org/10.1109/ICSE-SEIS.2019.00014)

GitHub is increasing size of the avatar images and emphasizing a developer’s “personal brand” by spotlighting features such as the contribution heat map. In the future, platform designers must be more mindful in balancing the power of signals that can amplify bias or harm against users, while still providing the mechanisms for users to freely evaluate the merits of potential code contributions.




4. Be a leader and a boss of a pull request — be the one who cares.



JASON TSAY

“We found that the level of a submitter’s prior interaction on a project changed how politely developers discussed the contribution and the nature of proposed alternative solutions.”

— Jason Tsay, Laura Dabbish, and James Herbsleb. Let’s Talk About It: Evaluating Contributions Through Discussion in GitHub. In *Proceedings of the 22nd International Symposium on Foundations of Software Engineering*, pages 144–154, 2014b. doi:[10.1145/2635868.2635882](https://doi.org/10.1145/2635868.2635882)



5. Mostly explain “why” you make changes, not “what” you change

TABLE II
STATISTICS OF OUR COLLECTED PULL REQUESTS

Type	Empty-desc PR	Trivial-desc PR	Long-desc PR	PR with only 1 valid commit	PR with >20 valid commits	Long-source PR	Adequate PR	Total
Number	114,466	61,547	20,516	83,803	2,438	8,399	41,832	333,001

*Long-desc PR and Long-source PR refer to the PRs for which the target sequence and the source sequence do not meet the length constraints, respectively.

Source: Zhongxin Liu, Xin Xia, Christoph Treude, David Lo, and Shanping Li. Automatic Generation of Pull Request Descriptions. In *Proceedings of the 34th International Conference on Automated Software Engineering*, pages 176–188. IEEE, 2019. doi:[10.1109/ase.2019.00026](https://doi.org/10.1109/ase.2019.00026)

disable comments for anonymous abstract objects at XMIR-to-EO generation #2877

Merged

yegor256 merged 3 commits into master from 2873 last week

Conversation 0

Commits 3

Checks 15

Files changed 26

yegor256 commented last week · edited by pr-codex bot

Member

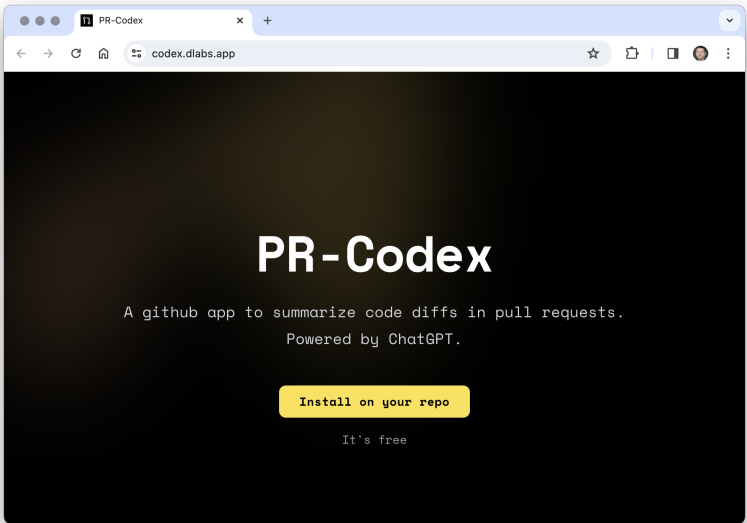
PR-Codex overview

The focus of this PR is to make changes to the code diff in order to correct spelling errors and improve code readability.

Detailed summary

- Corrected spelling error in file names and function names.
- Updated comments for better code understanding.
- Added aliases and package declaration for clarity.
- Updated test method names to reflect the correct notation.
- Improved logging statements for debugging purposes.

Ask PR-Codex anything about this PR by commenting with /codex {your question}





6. Be prepared for criticism about your style, not functionality.



JACEK CZERWONKA

“Only about 15% of comments provided by reviewers indicate a possible defect, much less a blocking defect. Rather, it is feedback related to the long-term code maintainability that comprises a much larger portion of comments provided by reviewers; at least 50% of all.”


— Jacek Czerwotka, Michaela Greiler, and Jack Tilford. Code Reviews Do Not Find Bugs: How the Current Code Review Best Practice Slows Us Down. In *Proceedings of the 37th International Conference on Software Engineering*, volume 2, pages 27–28. IEEE, 2015. doi:[10.1109/ICSE.2015.131](https://doi.org/10.1109/ICSE.2015.131)



VALENTINA LENARDUZZI

“Unexpectedly, quality flaws measured by PMD turned out not to affect the acceptance of a pull request at all. As suggested by other works, other factors such as the reputation of the maintainer and the importance of the delivered feature might be more important than other qualities in terms of pull request acceptance.”

— Valentina Lenarduzzi, Vili Nikkola, Nyyti Saarimäki, and Davide Taibi. Does Code Quality Affect Pull Request Acceptance? An Empirical Study. *Journal of Systems and Software*, 171(1), 2021. doi:[10.1016/j.jss.2020.110806](https://doi.org/10.1016/j.jss.2020.110806)



7. Commit the code and its tests in different pull requests [Bugayenko, 2022].

Test first, fix next

```
1 // @todo #42 This test is disabled
2 // because the fibo() doesn't work
3 // correctly with this input, returning
4 // 17711 instead of 28657. Fix it.
5 #[test]
6 #[ignore]
7 fn calculates_23rd_fibonacci_number() {
8     let x = fibo(23);
9     assert_eq!(28657, x);
10 }
11 fn fibo(x: i32) {
12     0
13 }
```

```
1 // @todo #42 This test is disabled
2 // because the fibo() doesn't work
3 // correctly with this input, returning
4 // 17711 instead of 28657. Fix it.
5 #[test]
6 #[ignore]
7 fn calculates_23rd_fibonacci_number() {
8     let x = fibo(23);
9     assert_eq!(28657, x);
10 }
11 fn fibo(x: i32) {
12     if (x == 23) {
13         return 28657;
14     }
15     0
16 }
```

Bibliography

- Amiangshu Bosu, Michaela Greiler, and Christian Bird. Characteristics of Useful Code Reviews: An Empirical Study at Microsoft. In *Proceedings of the 12th Working Conference on Mining Software Repositories*, pages 146–156. IEEE, 2015. doi:[10.1109/MSR.2015.21](https://doi.org/10.1109/MSR.2015.21).
- Yegor Bugayenko. Open Source Etiquette. <https://www.yegor256.com/200729.html>, 7 2020. [Online; accessed 07-02-2024].
- Yegor Bugayenko. The Code and Its Tests in Different Pull Requests. <https://www.yegor256.com/220804.html>, 8 2022. [Online; accessed 08-02-2024].
- Jacek Czerwonka, Michaela Greiler, and Jack Tilford. Code Reviews Do Not Find Bugs: How the Current Code Review Best Practice Slows Us Down. In *Proceedings of the 37th International Conference on Software Engineering*, volume 2, pages 27–28. IEEE, 2015. doi:[10.1109/ICSE.2015.131](https://doi.org/10.1109/ICSE.2015.131).
- Carolyn D. Egelman, Emerson Murphy-Hill, Elizabeth Kammer, Margaret Morrow Hodges, Collin Green, Ciera Jaspan, and James Lin. Predicting Developers’ Negative Feelings About Code Review. In *Proceedings of the 42nd International Conference on Software Engineering*, pages 174–185, 2020. doi:[10.1145/3377811.3380414](https://doi.org/10.1145/3377811.3380414).
- Denae Ford, Mahnaz Behroozi, Alexander Serebrenik, and Chris Parnin. Beyond the Code Itself: How Programmers Really Look at Pull Requests. In *Proceedings of the 41st International Conference on Software Engineering: Software Engineering in Society*, pages 51–60. IEEE, 2019. doi:[10.1109/ICSE-SEIS.2019.00014](https://doi.org/10.1109/ICSE-SEIS.2019.00014).
- Georgios Gousios, Martin Pinzger, and Arie van Deursen. An Exploratory Study of the Pull-Based Software Development Model. In *Proceedings of the 36th International Conference on Software Engineering*, pages 345–355, 2014. doi:[10.1145/2568225.2568260](https://doi.org/10.1145/2568225.2568260).
- Rahul N. Iyer, S. Alex Yun, Meiyappan Nagappan, and Jesse Hoey. Effects of Personality Traits on Pull Request Acceptance. *IEEE Transactions on Software Engineering*, 47(11):2632–2643, 2019. doi:[10.1109/TSE.2019.2960357](https://doi.org/10.1109/TSE.2019.2960357).
- Yujuan Jiang, Bram Adams, and Daniel M. German. Will My Patch Make It? And How Fast? Case Study on the Linux Kernel. In *Proceedings of the 10th Working Conference on Mining Software Repositories (MSR)*, pages 101–110. IEEE, 2013. doi:[10.1109/MSR.2013.6624016](https://doi.org/10.1109/MSR.2013.6624016).
- SayedHassan Khatoonabadi, Diego Elias Costa, Rabe Abdalkareem, and Emad Shihab. On Wasted Contributions: Understanding the Dynamics of Contributor-Abandoned Pull Requests — A Mixed-Methods Study of 10 Large Open-Source Projects. *ACM Transactions on Software Engineering and Methodology*, 32(1):1–39, 2023. doi:[10.1145/3530785](https://doi.org/10.1145/3530785).
- Valentina Lenarduzzi, Vili Nikkola, Nyyti Saarimäki, and Davide Taibi. Does Code Quality Affect Pull Request Acceptance? An Empirical Study. *Journal of Systems and Software*, 171(1), 2021. doi:[10.1016/j.jss.2020.110806](https://doi.org/10.1016/j.jss.2020.110806).
- Zhongxin Liu, Xin Xia, Christoph Treude, David Lo, and Shanping Li. Automatic Generation of Pull Request Descriptions. In *Proceedings of the 34th International Conference on Automated Software Engineering*, pages 176–188. IEEE, 2019. doi:[10.1109/ase.2019.00026](https://doi.org/10.1109/ase.2019.00026).
- Marco Ortu, Giuseppe Destefanis, Daniel Graziotin, Michele Marchesi, and Roberto Tonelli. How Do You Propose Your Code Changes? Empirical Analysis of Affect Metrics of Pull Requests on GitHub. *IEEE Access*, 8(1): 110897–110907, 2020. doi:[10.1109/ACCESS.2020.3002663](https://doi.org/10.1109/ACCESS.2020.3002663).
- Caitlin Sadowski, Emma Söderberg, Luke Church, Michal Sipko, and Alberto Bacchelli. Modern Code Review: A Case Study at Google. In *Proceedings of the 40th International Conference on Software Engineering: Software Engineering in Practice*, pages 181–190, 2018. doi:[10.1145/3183519.3183525](https://doi.org/10.1145/3183519.3183525).
- Jason Tsay, Laura Dabbish, and James Herbsleb. Influence of Social and Technical Factors for Evaluating Contribution in GitHub. In *Proceedings of the 36th International Conference on Software Engineering*, pages 356–366, 2014a. doi:[10.1145/2568225.2568315](https://doi.org/10.1145/2568225.2568315).

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Determinants of Pull Request Evaluation Latency on GitHub. In *Proceedings of the 12th Working Conference on Mining Software Repositories*, pages 367–371. IEEE, 2015. doi:[10.1109/MSR.2015.42](https://doi.org/10.1109/MSR.2015.42).