

Evaluating LLMs-Driven Java Code Refactoring from a Developer's Perspective (Post-Questionnaire)

* Indica uma pergunta obrigatória

1. E-mail *

Informed Consent Form
Dear Participant,

You are invited to take part in a research study entitled "Evaluating LLMs-Driven Java Code Refactoring from a Developer's Perspective" whose main objective is to empirically analyze the quality of refactored code generated by LLMs and developers' perceptions of using LLMs to refactor code smells.

1. Procedures

You will be asked to complete a questionnaire containing questions related to your experience and perception regarding software development and the use of LLMs. When the data are transcribed, your name will be removed and will not be used at any point during the analysis or presentation of results. No audio or video recordings will be requested during the study; we will only collect screenshots of the refactoring interactions with the LLMs, which will be discarded after analysis. Your image will not be used or disclosed, thus ensuring your confidentiality.

2. Handling of Possible Risks and Discomforts

Your participation involves answering the questionnaire, using LLMs to refactor code smells from a repository, and then completing another questionnaire about your experience. All necessary precautions will be taken during data collection to ensure your privacy and anonymity. The data collected will be used strictly for research purposes.

3. Research Confidentiality

All information collected during this study will remain confidential. Your name and the name of any organization you are affiliated with will not be identified under any circumstances, unless explicit authorization is provided.

4. Participation

Your participation in this study is very important and completely voluntary. You have the right to decline participation or withdraw from the study at any time. You also have the right to refuse to answer any question in the questionnaire. To participate in this study, you must be at least 18 years old.

Any questions regarding this research can be directed to NAME via email at: EMAIL.

2. Consent Statement *

Marcar apenas uma oval.

☐ I have read, or had read to me, the information contained in this document before signing this consent form. I declare that all technical language used in the description of this research study was satisfactorily explained to me and that I received answers to all my questions. I also confirm that I received a copy of this Informed Consent Form. I understand that I am free to withdraw from the study at any time without any penalty. I declare that I am over 18 years old and freely and voluntarily give my consent to participate in this study.

About you

3. What is your name? *

4. What is your registration number *

5. What is your teammate's name? *

6. What is the link to your activity repository? *

About the activity

7. Which LLM did you use? *

Marcar apenas uma oval.

- ☐ Gemini
- ☐ ChatGPT
- ☐ Github Copilot

8. What refactoring order did your team follow? *

Marcar apenas uma oval por linha.

	First	Second	Third	Fourth	Not refactored
Long Method	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Data Class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feature Envy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Long Parameter List	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Why did you follow the previous order? *

10. What did you think of the difficulty of refactoring the code smells by the LLM? *

Marcar apenas uma oval por linha.

	Very easy	Easy	Intermediate	Hard	Very hard
Long Method	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Long Parameter List	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feature Envy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Data Class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. In your perception, what is the impact of removing the code smell on the code quality? Why? *

About the techniques used

12. For Long Method, what refactoring techniques did you use? (If you used others, add them under 'Others') *

Marque todas que se aplicam.

☐ Extract Method

☐ Move Field

☐ Move Method

☐ Extract Class

☐ Extract Subclass

☐ Decompose Conditional

☐ Extract Superclass

☐ Replace Inheritance with Delegation

☐ Introduce Parameter Object

☐ Replace Temp with Query

☐ Encapsulate Field

☐ Outro:

13. For the previous code smell (Long Method), did the LLM add any new smell or remove more than one instance of the smell?

Marque todas que se aplicam.

	Refactored another instance of this smell	Inserted another instance of this smell
Long Method	<input type="checkbox"/>	<input type="checkbox"/>
Feature Envy	<input type="checkbox"/>	<input type="checkbox"/>
Data Class	<input type="checkbox"/>	<input type="checkbox"/>
Long Parameter List	<input type="checkbox"/>	<input type="checkbox"/>

14. For Long Parameter List, what refactoring techniques did you use? (If you used others, add them under 'Others') *

Marque todas que se aplicam.

☐ Extract Method

☐ Move Field

☐ Move Method

☐ Extract Class

☐ Extract Subclass

☐ Decompose Conditional

☐ Extract Superclass

☐ Replace Inheritance with Delegation

☐ Introduce Parameter Object

☐ Replace Temp with Query

☐ Encapsulate Field

☐ Outro: _____

15. For the previous code smell (Long Parameter List), did the LLM add any new smell or remove more than one instance of the smell?

Marque todas que se aplicam.

	Refactored another instance of this smell	Inserted another instance of this smell
Long Method	<input type="checkbox"/>	<input type="checkbox"/>
Feature Envy	<input type="checkbox"/>	<input type="checkbox"/>
Data Class	<input type="checkbox"/>	<input type="checkbox"/>
Long Parameter List	<input type="checkbox"/>	<input type="checkbox"/>

16. For Feature Envy, what refactoring techniques did you use? (If you used others, add them under 'Others') *

Marque todas que se aplicam.

- ☐ Extract Method
- ☐ Move Field
- ☐ Move Method
- ☐ Extract Class
- ☐ Extract Subclass
- ☐ Decompose Conditional
- ☐ Extract Superclass
- ☐ Replace Inheritance with Delegation
- ☐ Introduce Parameter Object
- ☐ Replace Temp with Query
- ☐ Encapsulate Field
- ☐ Outro: _____

17. Para o code smell anterior (Feature Envy), a LLM adicionou algum smell ou removeu mais de uma instância de smell?

Marque todas que se aplicam.

	Refactored another instance of this smell	Inserted another instance of this smell
Long Method	<input type="checkbox"/>	<input type="checkbox"/>
Feature Envy	<input type="checkbox"/>	<input type="checkbox"/>
Data Class	<input type="checkbox"/>	<input type="checkbox"/>
Long Parameter List	<input type="checkbox"/>	<input type="checkbox"/>

18. For Data Class, what refactoring techniques did you use? (If you used others, add them under 'Others') *

Marque todas que se aplicam.

- ☐ Extract Method
- ☐ Move Field
- ☐ Move Method
- ☐ Extract Class
- ☐ Extract Subclass
- ☐ Decompose Conditional
- ☐ Extract Superclass
- ☐ Replace Inheritance with Delegation
- ☐ Introduce Parameter Object
- ☐ Replace Temp with Query
- ☐ Encapsulate Field
- ☐ Outro: _____

19. Para o code smell anterior (Data Class), a LLM adicionou algum smell ou removeu mais de uma instância de smell?

Marque todas que se aplicam.

	Refactored another instance of this smell	Inserted another instance of this smell
Long Method	<input type="checkbox"/>	<input type="checkbox"/>
Feature Envy	<input type="checkbox"/>	<input type="checkbox"/>
Data Class	<input type="checkbox"/>	<input type="checkbox"/>
Long Parameter List	<input type="checkbox"/>	<input type="checkbox"/>

About the LLM and refactoring

20. What level of difficulty did you experience when refactoring using the LLM? *

Marcar apenas uma oval.

12345

LittleA lot of difficulty

21. What difficulties did you encounter during the refactoring? *

22. Regarding development, in your perception, how have the LLMs been beneficial or harmful to you? *

23. About interaction with the LLM, it: *

Marque todas que se aplicam.

☐ Returned responses that made sense to the provided prompts

☐ Responded with text without spelling errors

☐ Responded with text that was easy to understand

☐ Did not stray from the context of the question

☐ Explained the content of the provided response

☐ Outro:

24. About the LLM's code generation, it: *

Marque todas que se aplicam.

- ☐ Used the refactoring techniques correctly
- ☐ Removed the code smells correctly
- ☐ Did not add extra logic
- ☐ Did not alter the functionality of the refactored parts
- ☐ Generated code that passed the tests (after providing the test)
- ☐ While refactoring one smell, added another instance of a smell
- ☐ Outro: _____

25. At any point, did the LLM exhibit any unusual or undesirable behavior? *

Marque todas que se aplicam.

- ☐ Generated code that did not run in the IDE
- ☐ Generated code that did not meet the requirements
- ☐ Generated code with poor formatting
- ☐ Generated code with bad practices
- ☐ Generated a new code smell in the refactoring response
- ☐ Generated code that did not pass the tests (after providing the test)
- ☐ Outro: _____

26. In comparison to day-to-day development, what is your perception of using LLMs for refactoring? *

About your experience

27. What difficulties did you encounter regarding the activity? *

28. Do you have any suggestions for improvement?

