Survey on Code Smells

Authors – Questionnaire

Part 1 - Cover & Consent Information Letter

Q1.1 **Cover Letter**

Dear code smells researcher:

As a code smells researcher, we believe the following initiative will be of your interest. In the scope of PhD research, we performed a Systematic Literature Review (SLR) on code smells detection and visualization. As a noticeable researcher in the area of Code Smells Detection, as recognized in our SLR, we would like you to express your objective assessment in its findings before publication, which we plan to happen soon.

We will sincerely appreciate if you accept participating in this online survey, since your opinion is of utmost importance to validate our conclusions and fine-tune our research strategy accordingly. In recognition for your effort in fully completing this survey (it will take around 15m), we will provide you free first-hand access to our SLR.

There are no wrong or right answers. We are just looking for honest answers that match your perception of reality, as close and fairly as possible. For anonymity sake, no names or identification of respondents will appear in the PhD dissertation or anywhere else.

We truly appreciate your cooperation and personally thank you for your time and assistance in this matter. If you have any questions, please feel free to contact us.

Yours sincerely,

Q1.2 **Consent Information Letter**

Purpose
This study attempts to collect information to assess the conclusions of a Systematic Literature Review on the detection and visualization of code smells.

Participation Requirements
The questionnaire consists of 12 main questions and is expected not to take more than 15 minutes to complete.

Potential Risk/Discomfort This survey has no risks associated with it. Moreover, you may withdraw at any time. You may also choose not to answer any question that you do not feel comfortable to answer or for which you are not sure of the answer.

Benefits
If you answer this survey until its completion, you will have first-hand access to the Systematic Literature Review that we have produced.

Anonymity/Confidentiality
Individual answers collected in this survey will be kept confidential. Only aggregated values will be reported.

Questions or Complaints
Should you have any questions or complaints about this study, you may contact the researchers whose name and contact information are provided above.

Thank you for participating in this study.

Yours sincerely,

Part 3 - Code smells detection techniques

Q3.2
SLR FINDING: The most frequently used code smells detection techniques are based on rule-based approaches.

- ○ Strong agreement (1)
- ○ Agreement (2)
- ○ Weak agreement (3)
- ○ Weak disagreement (4)
- ○ Disagreement (5)
- ○ Strong disagreement (6)

Q3.3 How do you rate your confidence degree while assessing the previous finding?

	Unsure | Sure |
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Q3.4 Optional justification or comments

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Q3.5
SLR FINDING: Very few code smells detection studies provide their oracles (a tagged dataset for training detection algorithms).

- ○ Strong agreement (1)
- ○ Agreement (2)
- ○ Weak agreement (3)
- ○ Weak disagreement (4)
- ○ Disagreement (5)
- ○ Strong disagreement (6)

Q3.6 How do you rate your confidence degree while assessing the previous finding?

	Unsure | Sure |
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Q3.7 Optional justification or comments

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Q3.8
OPINION: Please select the 3 most often detected code smells.

- [ ] God Class (1)
- [ ] Data class (2)
- [ ] Feature Envy (3)
- [ ] Long Method (4)
- [ ] Shotgun Surgery (5)
- [ ] Spaghetti Code (6)

Q3.9 How do you rate your confidence degree while expressing the previous opinion?

	Unsure | Sure |
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Q3.10 Optional justification or comments

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Part 4 - Code smells detection effectiveness

Q4.1
SLR FINDING: In the detection of simpler code smells (e.g. Long Method or God Class), the achieved precision and recall of detection techniques can be very high (up to 100%).

- ○ Strong agreement (1)
- ○ Agreement (2)
- ○ Weak agreement (3)
- ○ Weak disagreement (4)
- ○ Disagreement (5)
- ○ Strong disagreement (6)

Q4.2 How do you rate your confidence degree while assessing the previous finding?

	Unsure | Sure |
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Q4.3 Optional justification or comments

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Q4.4
SLR FINDING: When the complexity of code smells is greater (e.g. Divergent Change or Shotgun Surgery), the precision and recall in detection are much lower than in simpler code smells.

- ○ Strong agreement (1)
- ○ Agreement (2)
- ○ Weak agreement (3)
- ○ Weak disagreement (4)
- ○ Disagreement (5)
- ○ Strong disagreement (6)

Q4.5 How do you rate your confidence degree while assessing the previous finding?

	Unsure | Sure |
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Q4.6 Optional justification or comments

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Q4.7
SLR FINDING: There are few oracles (a tagged dataset for training detection algorithms) shared and publicly available. The existence of shared and collaborative oracles could improve the state of the art in code smells detection research.

- ○ Strong agreement (1)
- ○ Agreement (2)
- ○ Weak agreement (3)
- ○ Weak disagreement (4)
- ○ Disagreement (5)
- ○ Strong disagreement (6)

Q4.8 How do you rate your confidence degree while assessing the previous finding?

	Unsure | Sure |
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Q4.9 Optional justification or comments

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Part 2 - Code smells visualization

Q2.2
SLR FINDING: The vast majority of code smells detection studies do not propose visualization features for their detection.

- Strong agreement (1)
- Agreement (2)
- Weak agreement (3)
- Weak disagreement (4)
- Disagreement (5)
- Strong disagreement (6)

Q2.3 How do you rate your confidence degree while assessing the previous finding?

	Unsure | Sure |
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Q2.4 Optional justification or comments

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Q2.5
SLR FINDING: The vast majority of existing code smells visualization studies did not present evidence of its usage upon large software systems.

- ○ Strong agreement (1)
- ○ Agreement (2)
- ○ Weak agreement (3)
- ○ Weak disagreement (4)
- ○ Disagreement (5)
- ○ Strong disagreement (6)

Q2.6 How do you rate your confidence degree while assessing the previous finding?

	Unsure | Sure |
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Q2.7 Optional justification or comments

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Q2.8

SLR FINDING: Software visualization researchers have not adopted specific visualization related taxonomies, such as the ones below, to support the identification of code smells:

B. Price, R. Baecker, I. Small, A principled taxonomy of software visualization, Journal of Visual Languages and Computing 4 (3) (1993) 211–266. Roman, G. C., & Cox, K. C. (1993).A taxonomy of program visualization systems. Computer, 26(12), 11-24. Maletic, J. I., Marcus, A., & Collard, M. L. (2002). A task oriented view of software visualization. In Proceedings First International Workshop on Visualizing Software for Understanding and Analysis (pp.32-40). IEEE. Gallagher, K., Hatch, A., & Munro, M. (2008). Software architecture visualization: An evaluation framework and its application. IEEE Transactions on Software Engineering, 34(2), 260-270. Myller, N., Bednarik, R., Sutinen, E., & Ben-Ari, M. (2009). Extending the engagement taxonomy: Software visualization and collaborative learning. ACM Transactions on Computing Education (TOCE), 9(1), 7.

- ○ Strong agreement (1)
- ○ Agreement (2)
- ○ Weak agreement (3)
- ○ Weak disagreement (4)
- ○ Disagreement (5)
- ○ Strong disagreement (6)

Q2.9 How do you rate your confidence degree while assessing the previous finding?

	Unsure | Sure |
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Q2.10 Optional justification or comments

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Q2.11
OPINION: If visualization related taxonomies were used in the implementation of code smells detection tools, that could enhance their effectiveness.

- ○ Strong agreement (1)
- ○ Agreement (2)
- ○ Weak agreement (3)
- ○ Weak disagreement (4)
- ○ Disagreement (5)
- ○ Strong disagreement (6)

Q2.12 How do you rate your confidence degree while expressing the previous opinion?

	Unsure | Sure |
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Q2.13 Optional justification or comments

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Q2.14
OPINION: Which of the following visual attributes have you implemented in tools targeting the support of code smells identification? Consider bellow resources discussed in the literature [Mazza, R. (2009). Introduction to information visualization. Springer Science & Business Media.]:

- [ ] Color: Hue (1)
- [ ] Color: Intensity (8)
- [ ] Form: Orientation (3)
- [ ] Form: Length (4)
- [ ] Form: Width (22)
- [ ] Form: Size (2)
- [ ] Form: Collinearity (9)
- [ ] Form: Curvature (23)
- [ ] Form: Spatial grouping (24)
- [ ] Form: Added marks (25)
- [ ] Form: Shape (26)
- [ ] Form: Numerosity (27)
- [ ] Spatial position: 2D position (28)
- [ ] Spatial position: Stereoscopic depth (29)
- [ ] Spatial position: Concavity/convexity (30)
- [ ] Movement: Flicker (31)

☐ Movement: Motion (32)

Q2.15 How do you rate your confidence degree while expressing the previous opinion?

	Unsure | Sure |
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Q2.16 Optional justification or comments

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Q2.17
OPINION: The combined use of collaboration (among software developers) and visual resources may increase the effectiveness of code smells detection.

- ○ Strong agreement (1)
- ○ Agreement (2)
- ○ Weak agreement (3)
- ○ Weak disagreement (4)
- ○ Disagreement (5)
- ○ Strong disagreement (6)

Q2.18 How do you rate your confidence degree while expressing the previous opinion?

	Unsure | Sure |
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Q2.19 Optional justification or comments

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Part 5 - Respondents' info

Q5.1 **OPTIONAL**

Do you want to have first-hand access to the Systematic Literature Review?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If OPTIONAL Do you want to have first-hand access to the Systematic Literature Review? = Yes

Q5.2
Please provide your **Email address** below.

NOTE: You will not be identified in any report that is produced using the information you have provided in this questionnaire and your email will not be used for any other purpose, except for sending you the SLR.

- ○ Email address (3) _____