Blekinge Institute of Technology
Department of Computer Science

Task 2: Research Proposal
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Submitted for Ph.D. Position on Software Architectures and Technical Debt at BTH

TITLE: Misalignment between ownership and contribution affects system reliability

PROBLEM STATEMENT

"OCAM (Ownership and Contribution Alignment Model) is a tool for detecting the misalignment between ownership and contribution. It is the first step towards investigating the impact it might have on the faster accumulation of Technical Debt [Zabardast and Gonzalez-Huerta, 1, 2022]". Besides studying the TD, the OCAM didn't show any factors impacted by the misalignment between ownership and contribution, such as non-behavioral requirements and the system's reliability. The misalignment strike system reliability is a problem, not a feature, that needs to be addressed and answered.

RESEARCH OBJECTIVES

The future research question addressed in this proposal is RQ: How does misalignment of ownership and contribution affect reliability.

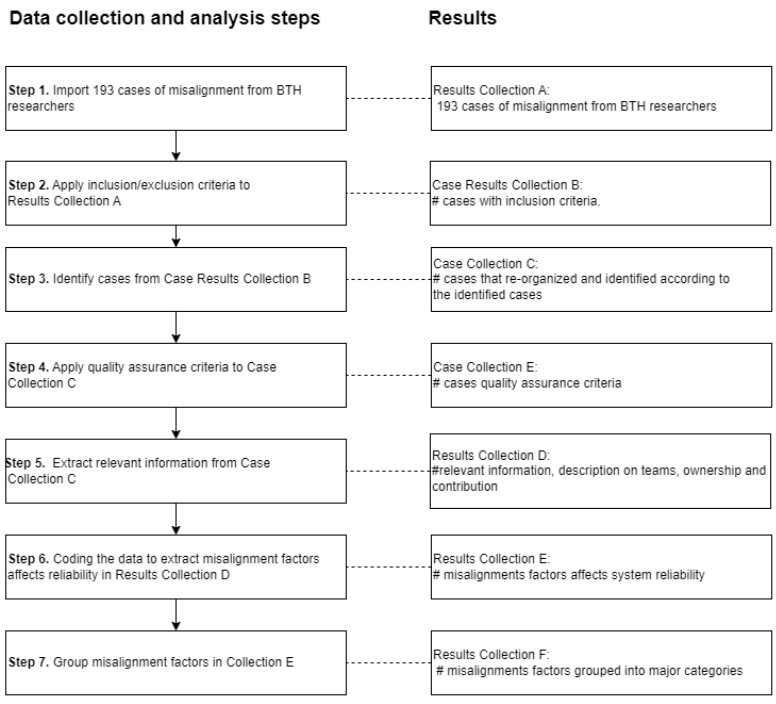
RESEARCH APPROACH

We have a system with a misalignment problem between ownership and contribution. The misalignment problem strikes the system's reliability. A misalignment that affects system reliability is a misalignment between ownership and contribution that affects the quality of a system from performing consistently well.

- Data Collection Steps (Wang Xiaofeng, 2379, 2016):
- Import 193 cases of misalignment from BTH researchers [OCAM model has identified 193 cases of misalignment (Zabardast and Gonzalez-Huerta, 3, 2022)].
    - Apply inclusion/exclusion criteria.
    - Identify cases from inclusion.
    - Apply quality assurance criteria.
- Data Analysis steps (Wang Xiaofeng, 2382, 2016):
    - Extract relevant data from cases.
    - Coding the data to identify types of misalignment factors affects system reliability.
    - Grouping misalignment factors into identical categories based on (How they affected the system's reliability).

The overall data collection and analysis process employed in the study showing in Fig.1 UML diagram and explained in detail in the following text.

Fig.1 UML diagram - Data collection and analysis steps and results



DATA COLLECTION STEPS

Step 1. Import 193 cases of misalignment from BTH researchers

From [Zabardast and Gonzalez-Huerta, 3, 2022], we will collect 193 cases of misalignment identified and processed by researchers at BTH. Results Collection A: 193 cases of misalignment.

Step 2. Apply inclusion/exclusion criteria to Results Collection A

We want to select the cases that contain relevant and reliable content to this project; we will apply a set of inclusion/exclusion criteria to Results Collection A

The inclusion criteria are:

- The cases must be freely accessible and available at any time.
- The cases are being processed by the OCAM model.
- The topic of the cases must be about misalignment between ownership and contribution.
- The cases contain examples of misalignment affecting system reliability.
- The example of misalignment affecting system reliability must be clear in cases
- The cases must be in English.
- The cases must be in a text-based format (e.g., DOC, TXT).

The exclusion criteria are:

- The case contains a duplicated content of the previously examined case.
- The case is non-text based (e.g., Video, Audio, Image).
- Unauthentic cases, e.g., cases collected/imported from Gray Literature

Case Results Collection B: # cases with inclusion criteria.

Step 3. Identify cases from Case Results Collection B

We read through Case Results Collection B and looked for information about misalignment between ownership and contribution that affect system reliability. We consider each mention of misalignment between ownership and contribution as a potential case study. This step resulted in Case Collection C: # cases that were reorganized and identified according to the identified cases.

Step 4. Apply quality assurance criteria to Case Collection C

To ensure the quality assurance criteria on the cases for further analysis, we will evaluate the data we have in Case Collection D based on the following quality assurance criteria.

- Does the data about a case allow the researchers to re-construct the misalignment that affects system reliability in terms of how the misalignment between ownership and contribution affects system's reliability?

- Do the researchers have to make excessive guessing to understand the misalignment types and the factors that affect system reliability?

A case is included if the answer to the first criterion is positive and the answer to the second one is negative. This step resulted in Case Collection E: # cases quality assurance criteria.

DATA ANALYSIS STEPS

Step 5. Extract relevant information from Case Collection C

For each case in Case Collection E, we will look for the following information of the case:

- Name of ownership and contribution, with their responsibility and roles on the project.
- Member of the team with their responsibility and roles on the project.
- Description and explanation of how or why misalignment occurs, and description of how or why misalignment affects system reliability.

Results Collection D: # cases with relevant information, description of teams, ownership and contribution. We will use QDA software, e.g., NVivo or Atlas ti, to code all that information for further data analysis steps. This step will give us, as researchers, a background on the misalignment and expand the researchers' ability to (knowing-how\why) this misalignment affects the system's reliability.

Step 6. Coding the data to extract misalignment factors affects reliability in Results Collection D

We will use qualitative data analysis (QDA) software, e.g., NVivo or Atlas ti, to code the selected cases to extract misalignment factors that affect the reliability. Results Collection E: # misalignments factors affect system reliability.

Step 7. Group misalignment factors in Collection E

Results Collection F: # misalignments factors grouped into major categories. In this step, we will classify those factors into identical categories. The categorization process is based on how the misalignment factor affects system reliability.