Supplementary Material for "Identifying Inaccurate Descriptions in LLM-generated Code Comments via Test Execution"

June 21, 2024

Abstract

This document provides additional details for the paper "Identifying Inaccurate Descriptions in LLM-generated Code Comments via Test Execution".

1 Prompt Used for Comment Generation

The following prompt was used for comment generation (and also explains the etc. category in Figure 2 of the main paper):

> You write comments that describe in detail what a bit of code does. For example, for the following code:
>
> ```java
> ⟨EXAMPLE CODE ⟩
> ```
>
> you could generate a detailed JavaDoc comment like:
>
> ```
> ⟨EXAMPLE COMMENT ⟩
> ```
>
> Maximize "coverage" over the code, so that each functionality of the code is explained.
> We have the following code:
> ```java
> ⟨TARGET CODE ⟩
> ```
>
> Generate a detailed JavaDoc comment for this code; make sure to start your response with the following lines:
> ```java
> /**

In Figure 2 of the paper, there is an etc. category with two documents in it. This type of error was related to the document generation prompt in Section - while we omitted the example code provided in that prompt due to formatting difficulties, it relates to a method in a hypothetical 'Fraction' object. In two cases, instead of generating a comment related to the ⟨CODE ⟩part of the prompt, the LLM generated a comment that described ⟨EXAMPLE CODE ⟩instead. These errors were substantially qualitatively different from the other comments where the LLM seemed to make mistakes during a best-effort attempt to generate a comment, so we separated these two cases out.

2 Prompt Used for Extracting Properties

The following prompt was used to extract a list of properties from a target document:

The following is the document I am interested in:

```java
⟨DOCUMENT AND SIGNATURE ⟩
```

Prior to generating tests, first identify as many properties WITHIN THE DOCUMENT as possible, that can be verified through a test. Return a numbered list with one property on one line, with the specific excerpt supporting the property VERBATIM in parentheses. Each property states an execution condition, and the corresponding expected behavior from the method. Thus, use the syntax "WHEN [condition], THEN the method does [behavior] (supporting excerpt in full)". Start your response with 1. WHEN [

3 Prompt Used for Test Generation

The following prompt was used to generate tests from each individual property:

For the property
"""
⟨PROPERTY ⟩
"""

generate three test methods that specifically verify this property. Vary the object construction if necessary; do not test ANYTHING outside of this property.
The method is from the `⟨CLASSNAME ⟩` class, which has the following constructors:
```java
⟨CONSTRUCTORS ⟩
```

An example test that uses the method looks like this (note: this test may or may not test the property itself)
```
⟨EXAMPLE TESTS ⟩
```

Within EACH generated test, start with a comment stating property above, as in
```
public void test1() {
// property
(test code)
}
public void test2() {
// property
(test code)
}
public void test3() {
// property
(test code)
}
```

Start your response with
```java
public void testName() throws Throwable {
// WHEN
```