**Title:**

Comparative Analysis of Code Smells in Multi-Language Software Projects: A Case Study on PHP, ASP.NET, and Java

**Abstract:**

Code smells are indicators of poor programming practices that reduce software maintainability and may lead to bugs and performance issues. While prior studies have focused on detecting code smells in individual languages, limited research exists comparing multiple languages under a unified framework. This thesis aims to analyze and compare code smells across PHP, ASP.NET, and Java projects using static analysis tools such as SonarQube. The study will classify the most frequent types of code smells, evaluate which languages tend to accumulate more smells, and explore their relation to software quality factors such as complexity and maintainability. The findings will provide insights for developers and organizations in selecting programming languages, improving code quality, and planning long-term software maintenance.

**Problem Statement:**

* Code smells negatively affect readability, maintainability, and overall software quality.
* Most existing research focuses on single-language projects.
* Lack of comparative multi-language studies makes it difficult to understand which languages tend to produce more smells and why.
* Without such insights, organizations cannot make informed choices regarding language adoption and maintenance costs.

**Objectives:**

1. Detect and classify code smells in projects written in PHP, ASP.NET, and Java.
2. Compare the frequency and types of smells across different languages.
3. Analyze whether certain smells are correlated with software complexity and bug-proneness.
4. Provide recommendations for developers and organizations to improve code quality and maintainability.

**Expected Contributions:**

* A multi-language comparison of code smells (PHP, ASP.NET, Java).
* Identification of the most frequent and critical code smells in different programming languages.
* Practical guidelines for improving software quality in industry and academia.

