

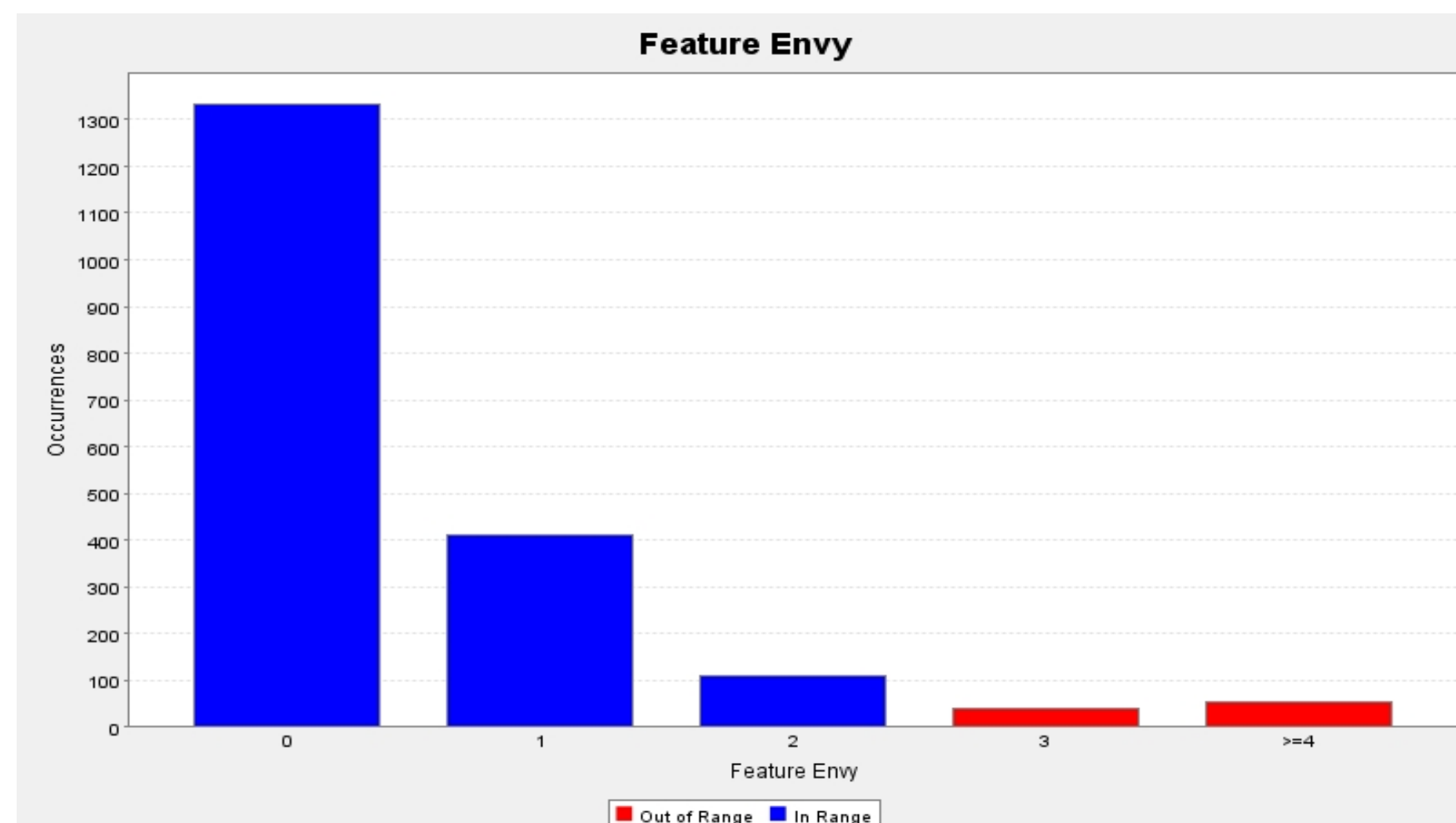
Retrospective Case Study and Potential Solutions in Regard to the Object Oriented Design of CharGer through Various Modeling and Analyses

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Overview:

This work is the product of the author's attempt to analyze the conceptual graph editor CharGer developed by Dr. Delugach to propose possible refactorings to improve upon its design. CharGer is undoubtedly a large program, with an estimated 56,000 lines of code. This is an excessively difficult and time consuming task for any software analyst to dissect and organize the intricacies of this work... or at least it used to be!

Initial Feature Envy Scores



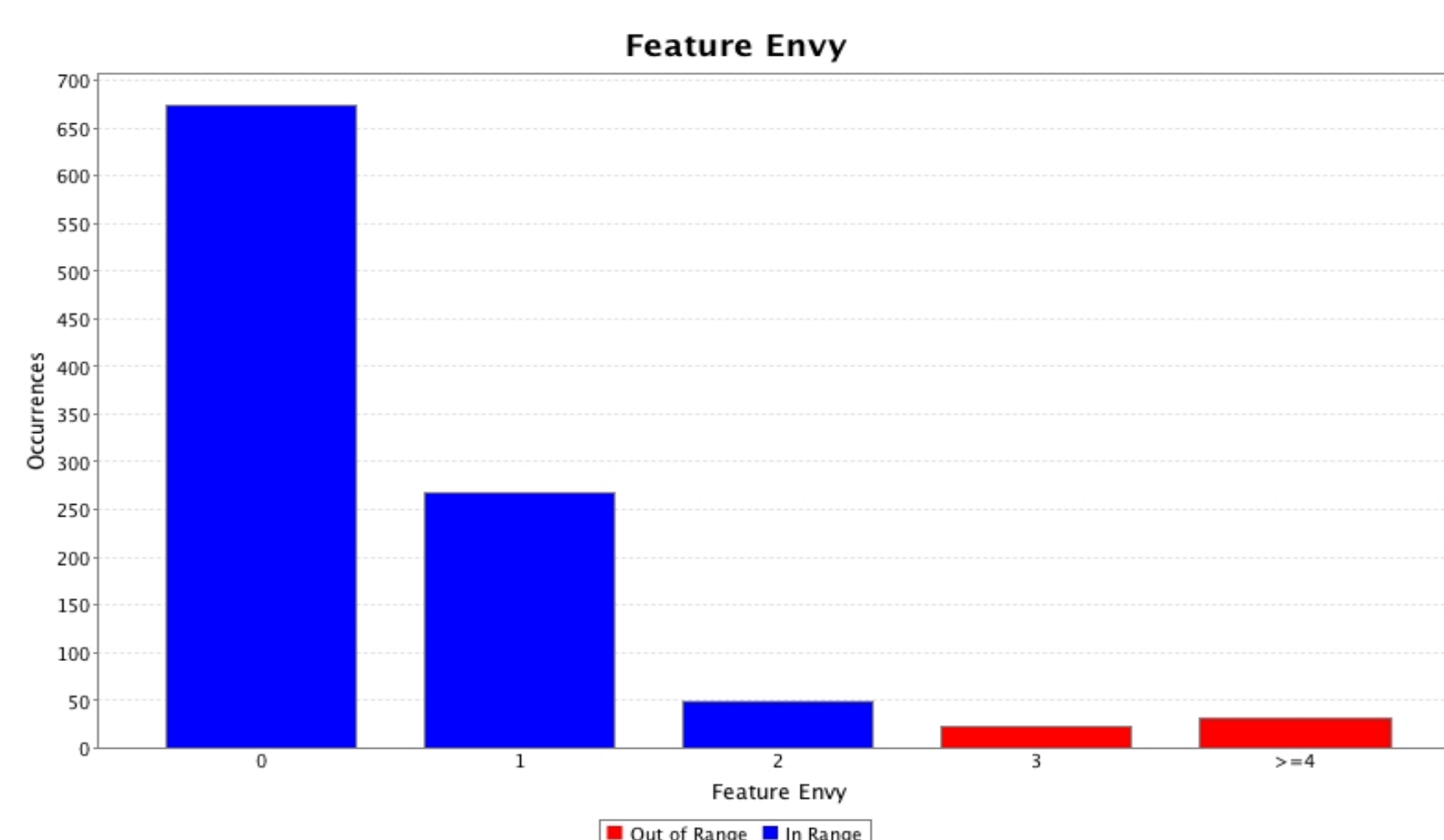
Explanation:

The ability to quickly and efficiently refactor code is essential to software maintenance. As more features are added to a software, it becomes increasingly complex. With software metrics like *feature envy* (shown on the left), analysts can gather information on the software's design, and use them as markers to closely analyze and propose better design solutions if necessary. For example, *feature envy* highlights the use of external method uses by program classes. This is generally bad practice in software design, so the identification of problem areas in code become much easier.

Impact:

This analysis can be used to show the effectiveness of metrics as they relate to the processes of software analysis. Improvements to software analysis techniques create many positives, but perhaps the most important factor is the amount of time saved during the code analysis, reducing the costs of effective code maintenance. Use of metrics during the software development phase will also help assure software engineers that their designs are maintainable.

Feature Envy Scores After Program Update



Key Findings:

Through the use of 26 unique software metrics, the author was able to provide a critical analysis of CharGer in the time span of one summer. The analysis of CharGer yielded constructive information to the developer of CharGer. The two graphs above show the use of metrics for analysis in action; the graph on the left is the measurement of *feature envy* during the author's analysis, while the graph on the right shows *feature envy* after CharGer received an update. Notice that for each *feature envy* rank on the X-axis, the total number of occurrences on the Y-axis have decreased. Overall, the author found CharGer to be a well designed program with very few flaws, even through the scope of metrics, considering its size and total development time.

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