

Electrical & Computer Engineering Seminar

“Managing the Copy-and-Paste Programming Practice in Modern IDEs with the CnP and CReN Software Tools”

Abstract

Programmers often copy and paste code during software development in order to reuse existing code to solve a similar task. When the newly pasted code is modified manually, undetected errors may result, such as failing to rename an identifier consistently with others. We propose to provide automated tool support (CnP) in the integrated development environment (IDE) to prevent and detect such errors, thus improving the quality of software as it is being developed. Features of the CnP tool include tracking and highlighting the statements involved in copying and pasting so that programmers can better visualize and manage their coding activity, and detecting inconsistencies in the code based on inferences of the programmer’s intention. The inferred rules are created from relationships inherent within and between involved code clones. As a proof of concept, we have created a part of the CnP tool, named CReN, which focuses on consistently renaming identifiers, such as variable names, within copy-and-paste clones. CReN prevents identifier renaming inconsistencies by automatically renaming all instances of an identifier in a group consistently when any one instance in the group is modified. The programmer can provide feedback to CReN to improve its inferences. We plan to add to the CnP tool the detection and prevention of two other types of copy-and-paste errors as well. These techniques are motivated by usage patterns in existing source code, which serves as an evaluation of the usefulness of CnP. We also plan to evaluate the effectiveness of these techniques using controlled experiments.

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4:00 P.M.