

Table 7 shows the detailed names and classifications of the 65 metrics we use, including code metrics, process metrics, and ownership metrics.

Table 7. A summary of the studied metrics.

	metrics	count
code metrics	CountDeclMethodPrivate, AvgLineCode, CountLine, MaxCyclomatic, CountDeclMethodDefault, AvgEssential, CountDeclClassVariable, SumCyclomaticStrict, AvgCyclomatic, AvgLine, CountDeclClassMethod, AvgLineComment, AvgCyclomaticModified, CountDeclFunction, CountLineComment, CountDeclClass, CountDeclMethod, SumCyclomaticModified, CountLineCodeDecl, CountDeclMethodProtected, CountDeclInstanceVariable, MaxCyclomaticStrict, CountDeclMethodPublic, CountLineCodeExe, SumCyclomatic, SumEssential, CountStmtDecl, CountLineCode, CountStmtExe, RatioCommentToCode, CountLineBlank, CountStmt, MaxCyclomaticModified, CountSemicolon, AvgLineBlank, CountDeclInstanceMethod, AvgCyclomaticStrict, PercentLackOfCohesion, MaxInheritanceTree, CountClassDerived, CountClassCoupled, CountClassBase, CountInput_Max, CountInput_Mean, CountInput_Min, CountOutput_Max, CountOutput_Mean, CountOutput_Min, CountPath_Max, CountPath_Mean, CountPath_Min, MaxNesting_Max, MaxNesting_Mean, MaxNesting_Min	54
process metrics	COMM, ADEV, DDEV, Added_lines, Del_lines	5
ownership metrics	OWN_LINE, OWN_COMMIT, MINOR_COMMIT, MINOR_LINE, MAJOR_COMMIT, MAJOR_LINE	6

Table 8 shows the specific introduction of process metrics and ownership metrics.

Table 8. A summary of the studied process and ownership metrics.

Metrics	Description
<i>Process Metrics</i>	
COMM	The number of Git commits
ADDED_LINES	The normalized number of lines added to the module
DEL_LINES	The normalized number of lines deleted from the module
ADEV	The number of active developers
DDEV	The number of distinct developers
<i>Ownership Metrics</i>	
MINOR_COMMIT	The number of unique developers who have contributed less than 5% of the total code changes (i.e., Git commits) on the module
MINOR_LINE	The number of unique developers who have contributed less than 5% of the total lines of code on the module
MAJOR_COMMIT	The number of unique developers who have contributed more than 5% of the total code changes (i.e., Git commits) on the module
MAJOR_LINE	The number of unique developers who have contributed more than 5% of the total lines of code on the module
OWN_COMMIT	The proportion of code changes (i.e., Git commits) made by the developer who has the highest contribution of code changes on the module
OWN_LINE	The proportion of lines of code written by the developer who has the highest contribution of lines of code on the module