Investigation of the relationship between software metrics measurements and its maintainability degree

By Oleksandr Shapoval

Goal

Practically learn methods of empirical engineering software, algorithms for data collection and data analysis.

Results include software measurement, analysis and selection of direct and indirect metrics for research and identification of dependencies between direct and indirect metrics.

Empirical Software Engineering

- Focuses on gathering evidence, through measurements and experiments involving software systems (software products, processes, and resources)
- This data is intended to be used as the basis of theories about the processes involved in software engineering (theory backed by data is a fundamental tenet of the scientific method)

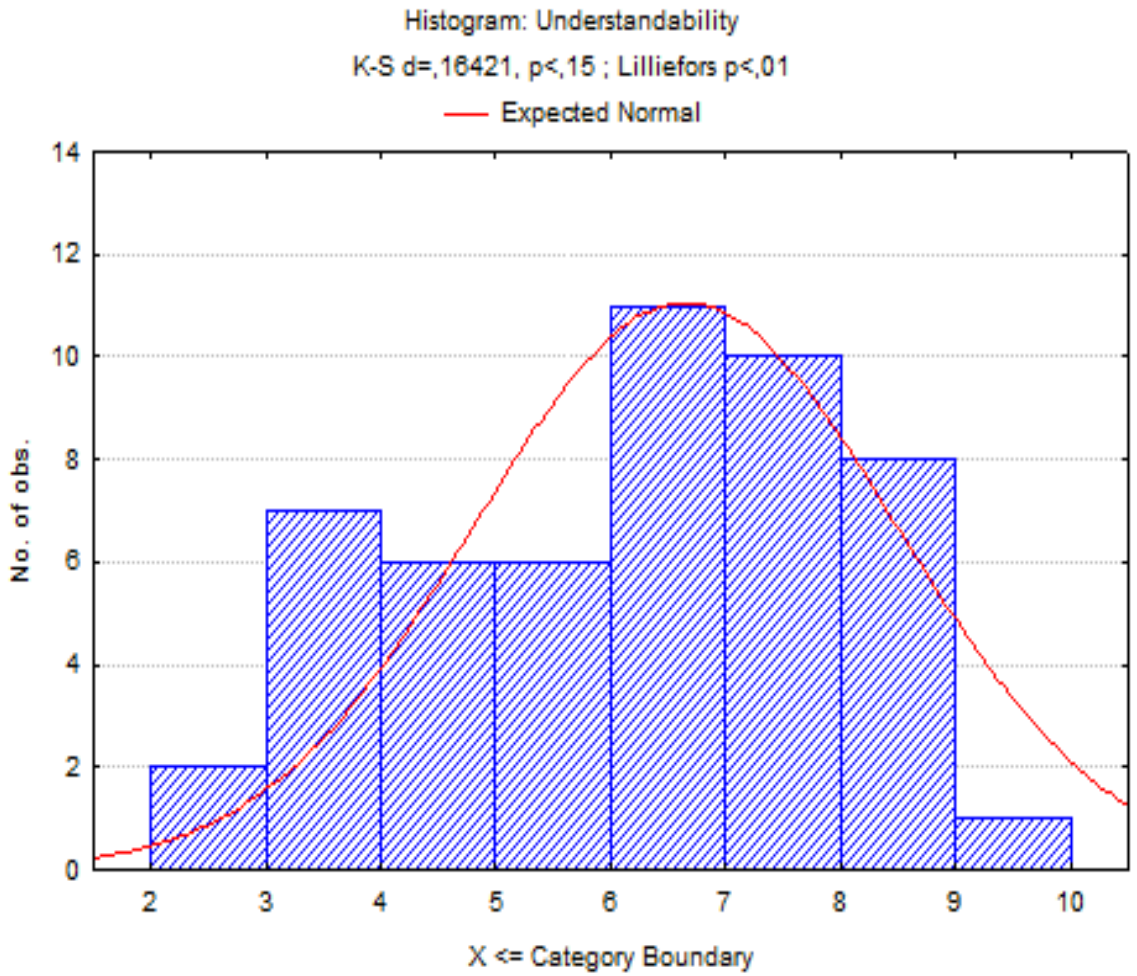
Direct metrics

- Lines of Code (SLOC)
- Number of Methods (NOM)
- Number of Direct Descendants (NDD)
- Height of Inheritance Tree (HIT)
- The number of classes to call (Fan-out)

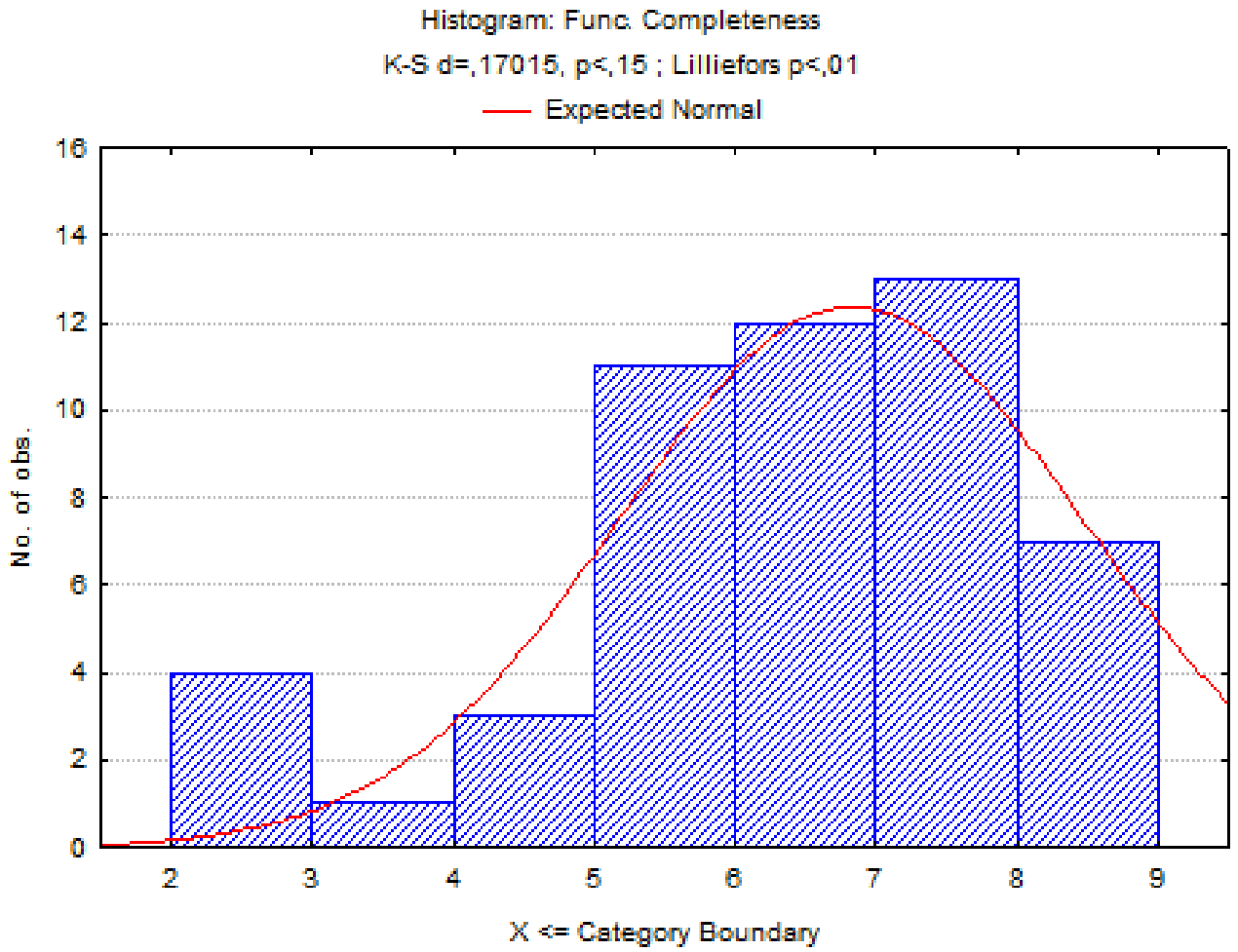
Indirect metrics

- Average Method Weight (AMW)
- Access to Foreign Data (ATFD)
- Base Class Overriding Ratio (BOvR)
- Tight Class Cohesion (TCC)
- Weight of Class (WOC)

Understandability



Functionality completeness



Analysis stabilization

Correlation analysis

Regression analysis

Results

As the results of the course work, there can be named tuples of ‘metric – expert estimation’ that are most coupled:

- HIT – Understandability (for normal distribution – linear dependence)
- LOC – Understandability,
- BOvR – Understandability (for unnormal distribution – nonlinear dependence).

Thank you!