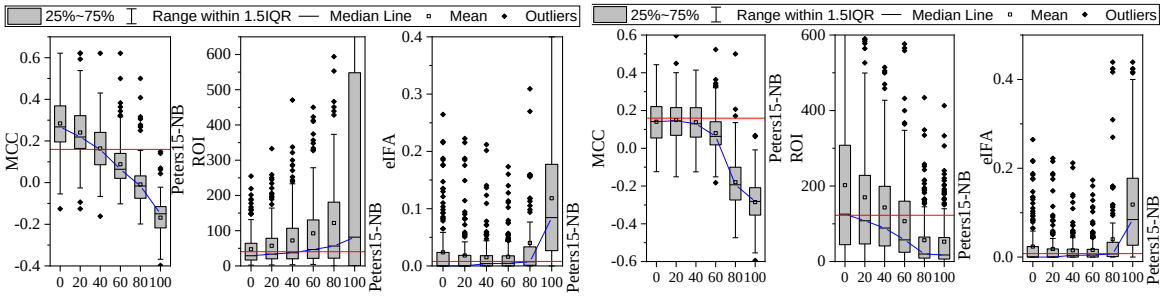
The influence of the excluded-code-size-percentage in ONE

In MATTER, the parameter, excluded-code-size-percentage, in ONE in our experiments is set to 20% in default. In the following, we analyze how the excluded-code-size-percentage affects the performance of ONE and finally the evaluation results of MATTER. Fig. 1 reports how the performance of ONE varies with the excluded-code-size-percentage under SNM (PII = 20%) and under SSC (PCI = 20%). The median performances are connected by lines. For ease of observation, we mark the median performance value of Peters15-NB, by the red line. The performance of CamargoCruz09-NB, Amasaki15-NB, and Peters15-NB are very close and statistically negligible in our experiment. Therefore we only represent Peters15-NB in Fig. 1 due to the limitation of space.

As mentioned before, with the excluded-code-size-percentage getting larger, the size of top modules in N-E is getting smaller. As a result, the total size of the top modules accounting for PII = 20% will become smaller (i.e., PCI will become smaller). Therefore, the recall under SNM tends to decrease with the increase of excluded-code-size-percentage. As shown in Fig. 1(a), the decrease in PCI makes ROI increase with the excluded-code-size-percentage. When the excluded-code-size-percentage grows up and does not exceed 80%, the ROI of ONE first is comparable and then gets better than those three representative models. When the excluded-code-size-percentage does not exceed 20%, ONE performs better than those three models in terms of MCC. In total, under SNM with PII = 20%, for the excluded-code-size-percentage, the default value of 20% leads to a reasonably strong MCC, ROI, and eIFA.

As shown in Fig. 1(b), in terms of MCC, ONE performs best under excluded-code-size-percentage = 20%. After 20%, MCC decreases with the increase of excluded-code-size-percentage. It is clear that the top modules in N-E will become smaller in size when the excluded-code-size-percentage increases. As a result, the top modules accounting for PCI = 20% will contain more modules to be labeled as defective (i.e., PII will become larger). We can see that ROI keeps decreasing due to the increase in PII. Besides, when the excluded-code-size-percentage exceeds 80%, we observe a sharp deterioration of eIFA, indicating that it is hard to find a defective module fast. In total, under SSC with PCI = 20%, for the excluded-code-size-percentage, the default value of 20% leads to a reasonably strong MCC, ROI, and eIFA.

Overall, under both SNM and SSC, for the excluded-code-size-percentage, the default value of 20% SLOC leads to a reasonable performance in terms of effort-aware indicators ROI and eIFA, and the traditional classification indicator MCC when compared with the representative defect prediction models. In other words, our results indicate that 20% SLOC is a appropriate default value to put the top largest modules at the bottom of the module rank in ONE.



(a) SNM (b) SSC

Figure 1: The performance trend of ONE with the excluded-code-size-percentage:
(a) under SNM with PII = 20% and (b) under SSC with PCI = 20%