**Abstract**
Sparse Metrix-Vector product (SpMV) is a fundamental computational kernel utilized in multiple applications as scientific and engineering applications and solves the linear system and partial differential equations.Existing solutions often employ fixed thread assignments to rows based on empirical formulas, leading to sub-optimal configurations and significant performance losses. our proposed tool ZEKI a data driven Machine learning approach, leveraging machine learning for thread Configuration in SpMV on shared memory.The proposed strategy predicts near-optimal thread configurations for matrices by using Block CSR storage formats, enhancing overall performance of the SpMV kernel. To address irregularities in sparse matrices, the paper suggests partitioning them into multiple blocks on different number of threads on the distribution of non-zero elements. Our approach involves training and testing using various machine learning methods such as decision trees, random forests, gradient boosting, ridge regressors, and AdaBoost. We conducted evaluations on a dataset comprising nearly 1000+ real-world matrices from 37 application domains like robotics,Power network, and computational fluid dynamics. our proposed Zeki has reached 88.30\% of the highest achievable performance, showcasing a significant disparity from the traditional methods of manually or randomly selecting number of Threads in practice.