

## ABSTRACT

In recent years, Python-based Object-Relational Mapping (ORM) frameworks have gained popularity due to their ability to simplify database interactions by abstracting SQL queries and managing schemas. However, these frameworks often face performance limitations, particularly in large-scale applications with complex data relationships. This research investigates the integration of Just-In-Time (JIT) compilation to enhance the performance of Python ORM frameworks. A custom ORM, named **JITORM**, was developed and compared with existing frameworks such as SQLAlchemy, Pony ORM, and Tortoise ORM. The evaluation focuses on key metrics including execution time, memory usage, and CPU utilization across varying dataset sizes (50,000 to 200,000 records). The results indicate that JITORM consistently achieves lower response times and improved memory efficiency in data-intensive scenarios. These findings suggest that incorporating JIT compilation into ORM design offers practical performance benefits, particularly for applications with high data workloads and limited system resources. Further research is recommended to explore additional features and real-world deployment of JITORM.

**Keywords:** Python, Object-Relational Mapping (ORM), Just-In-Time (JIT) Compilation, Performance Optimization, Execution Time