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PREFACE

Writing this thesis has been both a meaningful challenge and a remarkable journey—shedding light on complex issues of software performance that many developers commonly face. The most significant challenge emerged during the initiation of Chapter 1, where I began exploring the intersection between Python-based Object-Relational Mapping (ORM) frameworks and Just-In-Time (JIT) compilation techniques. This chapter not only establishes the conceptual foundation but also outlines the experimental design that guides the entire research process.

The core of this thesis lies in the integration of JIT compilation to improve the performance of ORM frameworks—an essential endeavor for applications that demand efficient data processing. The goal is to achieve substantial improvements in execution speed, resource utilization, and scalability, thereby addressing the inherent limitations of traditional ORM systems. This work becomes increasingly relevant as applications continue to handle ever-growing volumes of data in the digital era.

Each chapter in this thesis builds logically upon the previous one, providing a cohesive and comprehensive exploration of JIT-enhanced ORM performance. From the research methodology and experimental setup to testing and analysis, the chapters collectively present how JIT can transform ORM operations, supported by empirical results and quantitative evaluation.

This research would not have been possible without the continuous support and guidance of my academic mentors, whose insights have been invaluable throughout this process. As this document is submitted in partial fulfillment of the requirements for my degree, it is my sincere hope that it contributes meaningfully to the broader discourse on software performance optimization and serves as a foundation for further research in this field.

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