

# Genetic Algorithms for Test Case Optimization

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**Abstract:** *This research presents the design and development of a Genetic Algorithm-based system for software test case optimization. The system is developed to improve the efficiency, accuracy, and coverage of software testing by automatically selecting and prioritizing the most effective test cases. The paper explains each stage of development, including requirement analysis, algorithm design, module creation, and final implementation. The proposed model uses the principles of natural selection and evolution to find the best combination of test cases, reducing testing time and cost while maintaining high fault detection capability. This approach ensures better resource utilization and improved software quality through optimized testing.*

**Keywords:** Genetic Algorithm, Software Testing, Test Case Optimization, Automation, Quality Assurance

