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MAXIMUM MARKS	4 MARKS

Chapter 7

7. Functional and Performance Testing

7.1 - Functional and Performance Testing

Testing is a critical phase in the development of the Dog Breed Identification using Transfer Learning system. It ensures that the application performs according to the specified requirements and delivers accurate, reliable, and efficient results. Functional testing verifies whether each component of the system operates correctly, while performance testing evaluates the system's speed, stability, and scalability under different conditions.

Functional Testing

Functional testing focuses on validating the core functionalities of the system to ensure that it behaves as expected. In this project, functional testing begins with verifying the image upload feature. The system must accept valid image formats such as JPG or PNG and reject unsupported file types with appropriate error messages. This ensures secure and proper data handling.

The testing process also verifies edge cases, such as uploading extremely small images, large images, or images that do not contain a dog. These tests ensure that the system remains stable and provides meaningful feedback to users.

Performance Testing

Performance testing evaluates how efficiently the system operates under different workloads and conditions. One of the primary performance metrics in this project is model accuracy. The trained model is evaluated using validation and test datasets to measure classification accuracy. Metrics such as precision, recall, and F1-score may also be analyzed to assess model effectiveness.

Response time is another critical performance factor. The system must process uploaded images and return predictions within a few seconds to maintain a smooth user experience. Testing ensures that the prediction pipeline—including preprocessing and inference—operates efficiently without unnecessary delays.

Finally, stress testing ensures that the system does not crash under extreme conditions, such as repeated uploads or high server load. This confirms the robustness and reliability of the deployed web application.

Conclusion

Functional and performance testing together ensure that the Dog Breed Identification system is accurate, reliable, and user-friendly. Functional testing verifies correct operation of each module, while performance testing ensures speed, efficiency, and stability. By conducting thorough testing, the project guarantees that the implemented solution meets both technical requirements and user expectations.