

Project Initialization and Planning Phase

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| Date | 14 June 2025 |
| Team ID | SWTID1749820017 |
| Project Title | Dog Breed Identification using Transfer Learning |
| Maximum Marks | 3 Marks |

Project Proposal

This project proposal outlines a solution to address a specific problem. With a clear objective, defined scope, and a concise problem statement, the proposed solution details the approach, key features, and resource requirements, including hardware, software, and personnel.

| Project Overview | |
|-------------------|---|
| Objective | To develop an AI-based Dog Breed Classifier that accurately identifies the breed of a dog from an image using deep learning techniques, enhancing accessibility for pet owners, veterinarians, and shelters. |
| Scope | The project covers the collection and preprocessing of a dog image dataset, development and training of a convolutional neural network (CNN) model, and deployment of a web-based application where users can upload images and receive breed predictions. It will support multiple popular dog breeds and aim for real-time inference. |
| Problem Statement | |
| Description | Many individuals, especially new dog owners and animal shelter workers, struggle to identify a dog's breed accurately based on appearance. This affects decisions related to care, training, nutrition, and medical treatment. |

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|--------------------------|---|
| Impact | By solving this problem, users will gain quick and accurate breed identification, leading to better care and improved health outcomes for dogs. It will also streamline breed verification processes in shelters and vet clinics. |
| Proposed Solution | |
| Approach | The system will use a Convolutional Neural Network (CNN) trained on a labeled dataset of dog images covering multiple breeds. Transfer learning with pre-trained models (e.g., ResNet, MobileNet) will be employed to enhance accuracy and reduce training time. The model will be integrated into a Flask web app for user interaction. |
| Key Features | <input type="checkbox"/> Real-time breed prediction from uploaded images <input type="checkbox"/> User-friendly web interface built with HTML/CSS and Flask <input type="checkbox"/> Support for multiple common dog breeds <input type="checkbox"/> Scalable model architecture for future breed additions <input type="checkbox"/> Lightweight deployment suitable for local or cloud hosting |

Resource Requirements

| Resource Type | Description | Specification/Allocation |
|---------------------|---|-----------------------------------|
| Hardware | | |
| Computing Resources | CPU/GPU specifications, number of cores | A100 GPU |
| Memory | RAM specifications | 83.5GB System RAM, 40.0GB GPU RAM |
| Storage | Disk space for data, models, and logs | 112GB |
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| Software | | |
|-------------------------|----------------------|---|
| Frameworks | Python frameworks | TensorFlow, Keras |
| Libraries | Additional libraries | Numpy, Matplotlib, OpenCV, Scikit-learn, os, pathlib, tqdm, Flask |
| Development Environment | IDE, version control | Google Colab, GitHub, Flask Localhost |
| Data | | |
| Data | Source, size, format | Stanford dog dataset (20,580 images with 120 dog breeds) |