**Project Initialization and Planning Phase**

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| Date | 20 September 2024 |
| Team ID | 739872 |
| Project Title | Bird Species Classification |
| Maximum Marks | 3 Marks |

**Project Proposal (Proposed Solution) template**

The proposed solution involves developing a deep learning-based bird species classification system using Convolutional Neural Networks (CNNs) integrated with IBM Watson The dataset will be divided into training, validation, and testing sets to ensure effective learning and evaluation. A CNN model will be designed and trained to extract features and classify bird species accurately. A Flask-based web interface will be developed to allow users to upload images for classification.

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| **Project Overview** | |
| Objective | Develop a deep learning-based system for automatic bird species classification using Convolutional Neural Networks (CNNs) and IBM Watson. |
| Scope | The project focuses on processing bird images from the **CUB\_200\_2011** dataset, training a CNN model for classification, and deploying the model using IBM Watson with a Flask-based web interface for real-time image classification. |
| **Problem Statement** | |
| Description | Traditional bird species identification is a complex task that requires expert knowledge and manual effort. With thousands of bird species worldwide, differentiating them based on physical characteristics can be time-consuming and prone to human error. |
| Impact | Automating bird species classification can significantly benefit biodiversity research, conservation efforts, and ecological studies. A reliable AI-based system can help scientists track bird populations, detect endangered species, and monitor habitat changes more effectively. |
| **Proposed Solution** | |
| Approach | The project employs a Convolutional Neural Network (CNN) trained on the CUB\_200\_2011 dataset for bird species classification. Image preprocessing techniques such as resizing, normalization, and data augmentation will be applied to improve model performance |
| Key Features | Deep learning-based bird classification using CNNs.  - Integration with IBM Watson for scalable and efficient deployment.  - Flask-based web interface for user-friendly interaction.  - Real-time image classification with accurate species prediction.  - Transfer learning for improved model accuracy and faster training. |

**Resource Requirements**

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| **Resource Type** | **Description** | **Specification/Allocation** |
| **Hardware** | | |
| Computing Resources | CPU/GPU specifications, number of cores | e.g., Google Colab with Tesla T4 GPU or 2 x NVIDIA V100 GPUs |
| Memory | RAM specifications | e.g., 16 GB RAM |
| Storage | Disk space for data, models, and logs | e.g., 1 TB SSD or Google Drive storage |
| **Software** | | |
| Frameworks | |  | | --- | |  |  |  | | --- | | Python frameworks | | e.g., Flask, IBM Watson Machine Learning |
| Libraries | Additional libraries | e.g., TensorFlow, Keras, OpenCV, NumPy, Matplotlib |
| Development Environment | IDE, version control | e.g., Google Colab, Jupyter Notebook, GitHub |
| **Data** | | |
| Data | Source, size, format | |  | | --- | |  |  |  | | --- | | e.g., CUB\_200\_2011dataset from  Kaggle, 11,788 images in JPG  format | |