Group 01

FeatherFind

Bird Exploration and Identification System

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GitHub - https://github.com/HarinduR/FeatherFind.git

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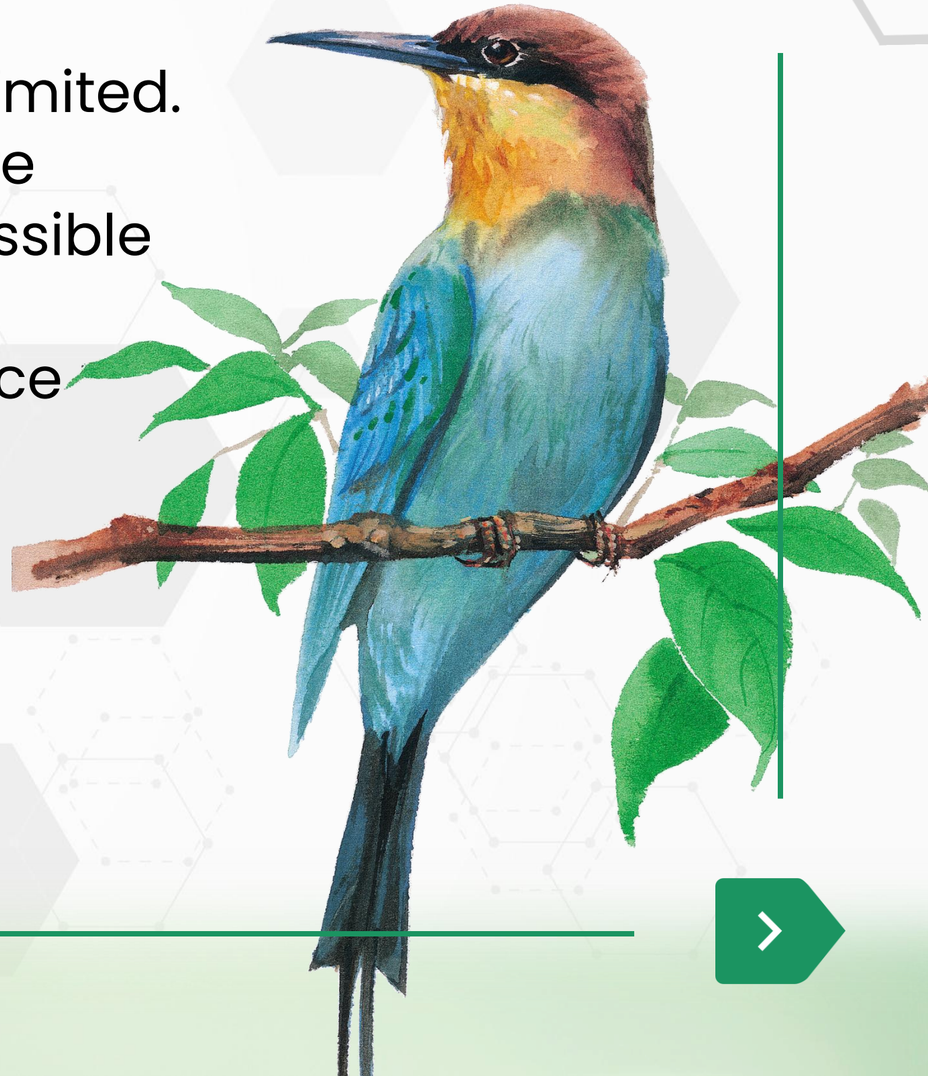
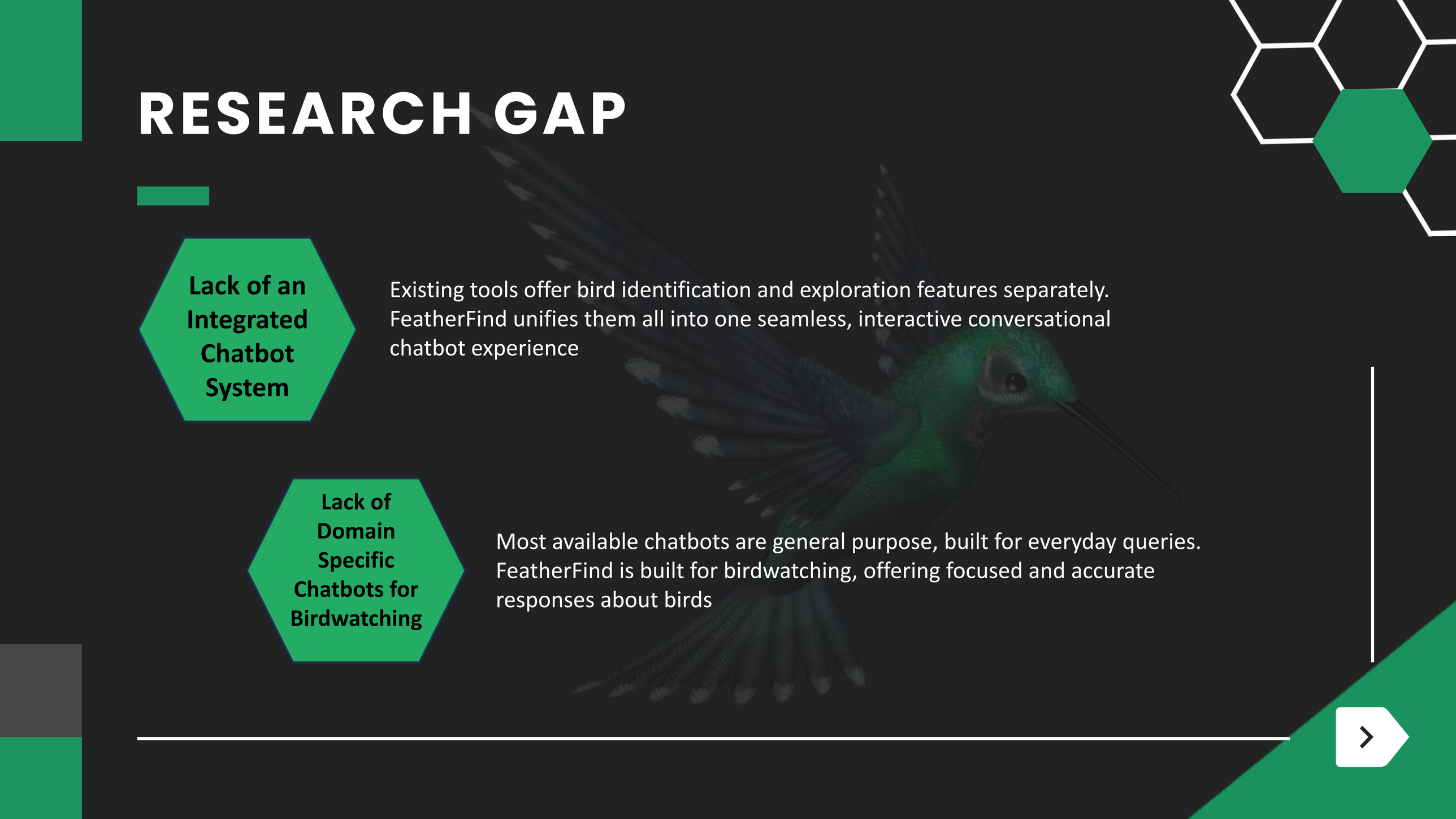
PROBLEM STATEMENT

Current birdwatching tools are fragmented and limited. Misidentification and difficulty in spotting birds are common challenges. There is a need for an accessible solution that offers accurate, versatile, and conversational support, enhancing user experience



RESEARCH GAP



Lack of an Integrated Chatbot System

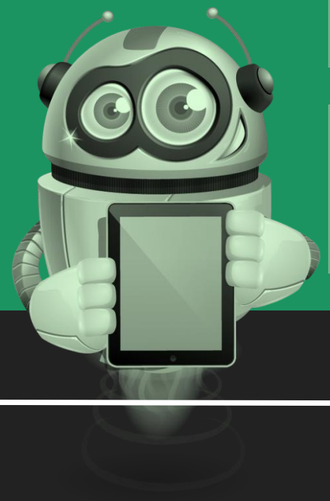
Existing tools offer bird identification and exploration features separately. FeatherFind unifies them all into one seamless, interactive conversational chatbot experience

Lack of Domain Specific Chatbots for Birdwatching

Most available chatbots are general purpose, built for everyday queries. FeatherFind is built for birdwatching, offering focused and accurate responses about birds

PROJECT AIM

The aim of this research is to design and develop an intelligent bird exploration and identification system that helps users identify bird species through textual descriptions or images and provides accurate predictions about bird presence, location, and time of observation in the Hambantota District.



Objective 01
Enable bird identification through keyword-based queries
Using Natural Language Processing and Ontology integration.

Objective 02
Develop an image recognition module to identify birds from user-submitted photographs.

Objective 03
Predict the likelihood of bird sightings using machine learning models, including presence, optimal location and best time.

Objective 04
Develop a Bird Info Generator to provide users with curated information about bird species

S.W.O.T

swot analysis

S

Strengths

Combines multiple AI components (image classification, keyword finder, Range prediction, chatbot, Information generating) to deliver an all-in-one intelligent bird identification experience.

W

Weaknesses

The system currently supports a limited number of bird species and features. Connecting each components with the chatbot process can be hard. The lack of chatbot memory reduces the user interaction.

T

Threats

Rapid technological changes and competition from global apps with larger datasets may challenge long-term sustainability without regular updates.

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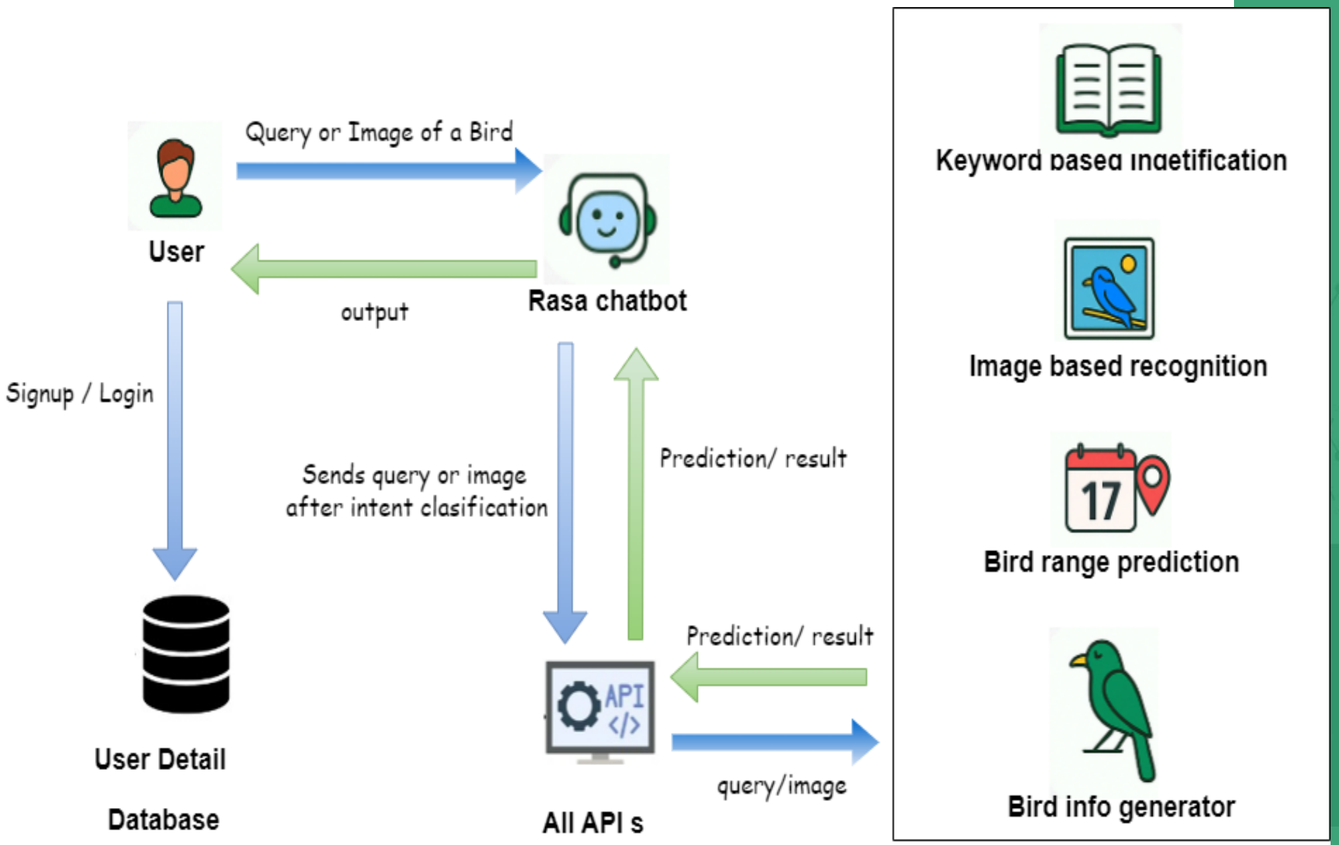
Opportunities

Growing global interest in birdwatching, conservation, and eco-tourism creates strong potential for scaling with multilingual. Rising popularity of chatbots create a unique opportunity for this system

SYSTEM DESIGN



Method Justification

We selected **OOAD** for its modularity and suitability for breaking down complex systems into independently manageable components.

Architecture Creation

The system is built to allow seamless communication and response generation from multiple components.

Component Definition

Identifies key components Keyword-Based Identification, Image-Based Recognition, Range Prediction and Bird Info Generator

Paradigm Choice

OOAD allowed us to independently develop and refine each model.

Implementation

Software Demonstration

BUSINESS MODEL CANVAS

Key Partners

- Birdwatching communities & forums
- Wildlife and conservation organizations

Key Activities

- Model development
- Chatbot development

Key Resources

- Data Scientist
- ML Engineer
- Models & Software

Value Propositions

- User-friendly & interactive chatbot
- Supports both image & text inputs

Customer Relationship

- Personalized interaction through chatbot

Channels

- Chatbot based web application

Customer Segment

- Amateur and professional birdwatcher
- Students and researchers

Revenue Streams

- Development and maintenance of the platform
- Marketing and outreach
- Cloud infrastructure and API usage

Cost Structure

- Subscription fees
- Potential partnerships and sponsorships

TESTING AND EVALUATION

Image Classification
Model: MobileNetV2

Bird classification
Training Accuracy – 94.14 %
Testing Accuracy – 95.25%

Chatbot
Model: BERT
Accuracy – 89%
Precision – 89%
Recall – 89%
F1-Score – 89 %

Time Prediction

Model: XGBoost
MAE: 1.5776
(RMSE): 2.5664
R^2 Score: 0.6577

Bird Detection

Training Accuracy – 97.45 %
Testing Accuracy – 95.75%

Presence Prediction

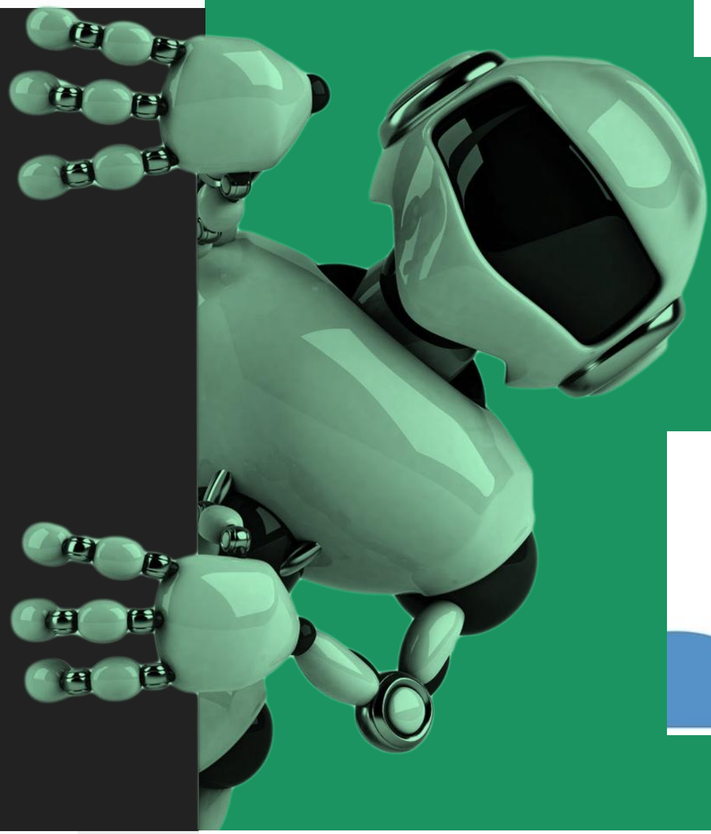
Model: Random Forest
Training Accuracy – 92.10 %
Testing Accuracy – 88.14%

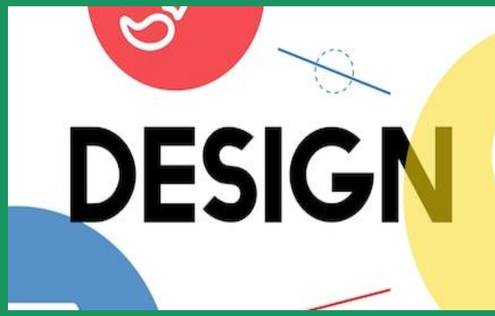
Bird Info Generator GPT2 finetune

perplexity - **1.61**

Location Prediction
Model: Random Forest

Training Accuracy – 90.36 %
Testing Accuracy – 89.09%





PROTOTYPE

LIMITATIONS AND FUTURE ENHANCEMENTS

Limitations

- Only 3 bird species and Hambantota district covered
- Models rely on traditional ML (Random Forest)
- Chatbot’s keyword approach lacks deep natural language understanding
- Not mobile-friendly yet (laptop-based)

Future Enhancements

- Expand species and region coverage
- Add LLM or improved NLU for smarter chatbot queries
- Build a mobile app for real-time field use
- Store user feedback for better retraining
- Enable bird sighting history tracking

conclusion

Literature Review Data Collection Dataset Creation YOLOv8 Model Training Mobile App Development AI models integration to the mobile app using Flask Documentation

INDIVIDUAL CONTRIBUTION

Harindu Raveen

Team Leader

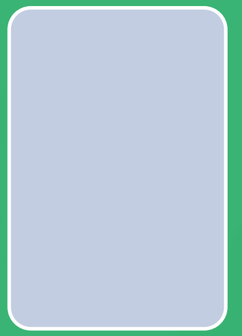
Bird Info Model Training
Chatbot Development
Flask API Integration
Data Collection
Documentation

Thehara Habarangamuwa

Image Classification Model Training
Validation Handling
Flask API Integration
Data Collection
Documentation

Daham Bandara

Keyword Extraction
Model Integration
UI Design
Flask API Integration
Documentation



Deshan Senanayake

Range Prediction Models Training
Validation Handling
Flask API Integration
Data Collection
Documentation

Q & A

Thank You