BIRDBASE: BIRD SPECIES DETECTION SYSTEM

SENG 461-Web Programming with Python and Git

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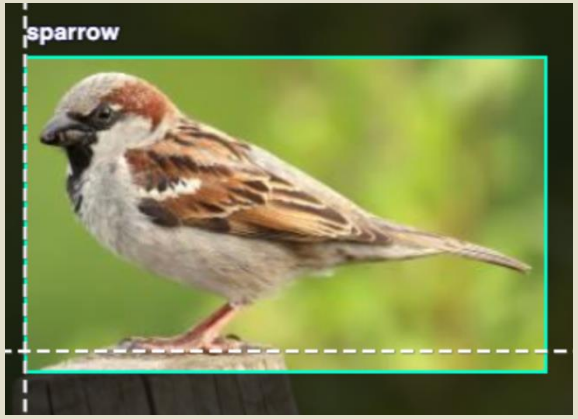
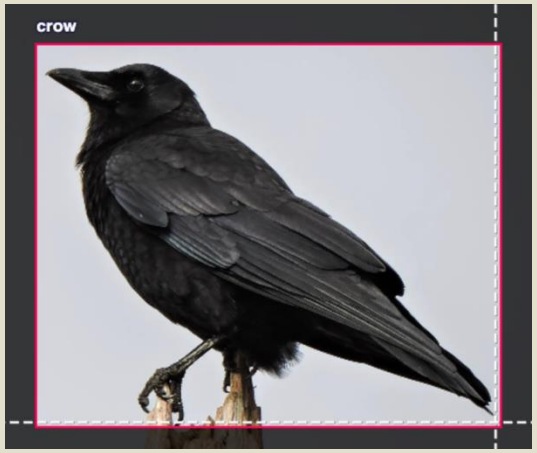
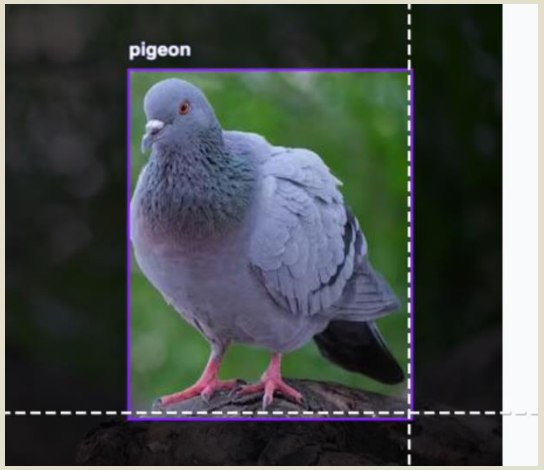
What is BirdBase?

- **Main Goal:** To help people identify bird species instantly using Artificial Intelligence.
- **Smart Identification:** Upload a photo and let the AI find the bird.
- **Detailed Information:** Learn about the bird's habitat, lifespan, and behavior.
- **Fast & Easy:** A simple web interface designed for everyone.

```JSON
"pigeon": {
    "name": "Pigeon",
    "habitat": "Cities and parks",
    "lifespan": "3-5 years",
    "description": "Social birds adapted to urban life."
}
```







How it Works?

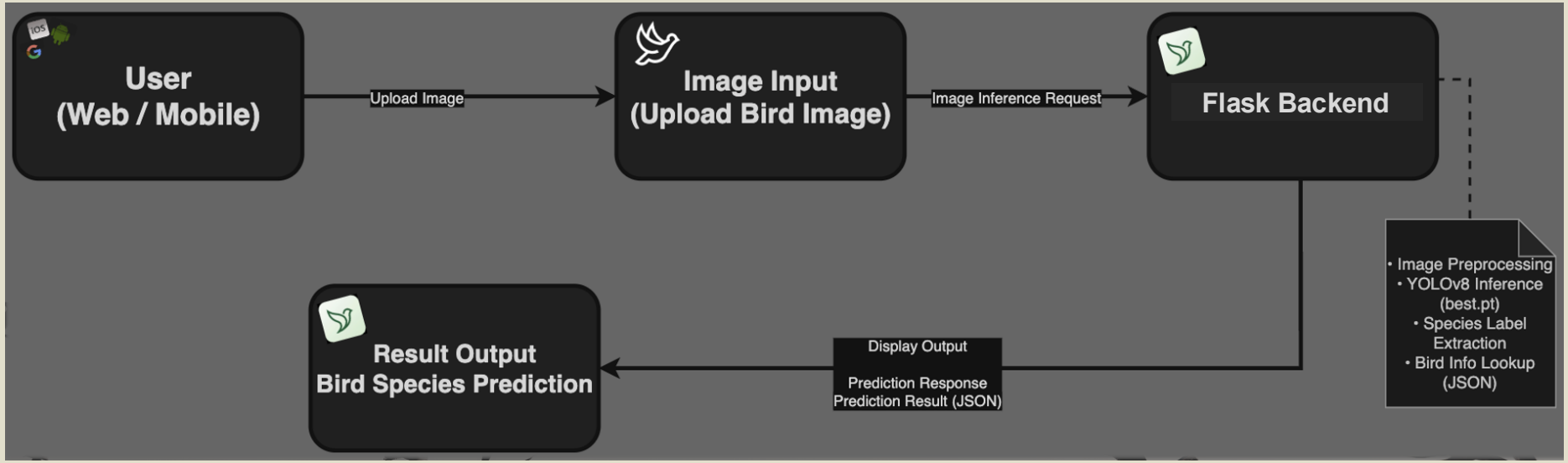
- **Project Workflow:**

1. **User Interface:** The user uploads a bird photo through the website.
2. **API Request:** JavaScript sends the photo to our Python server (Flask).
3. **AI Detection:** The YOLOv8 model analyzes the image to find the bird.
4. **Data Matching:** The system matches the bird species with information in our database.
5. **Final Result:** The website displays the detected bird and its facts.

```python
@app.route('/predict', methods=['POST'])
def predict():
    # 1. Get the image from user
    file = request.files['image']

    # 2. Let the AI predict
    results = model.predict(source=upload_path)

    # 3. Return the results
    return jsonify(results)
```



The Tools We Used

- We used modern technologies to build a fast and reliable system:
- **Frontend:** HTML5, CSS3, and JavaScript (ES6) for a responsive UI.
- **Backend:** Python with Flask Framework for API management.
- **AI Model:** YOLOv8 (Ultralytics) for high-speed object detection.
- **Database:** JSON format for storing bird species data.
- **Version Control:** Git and GitHub for team collaboration.

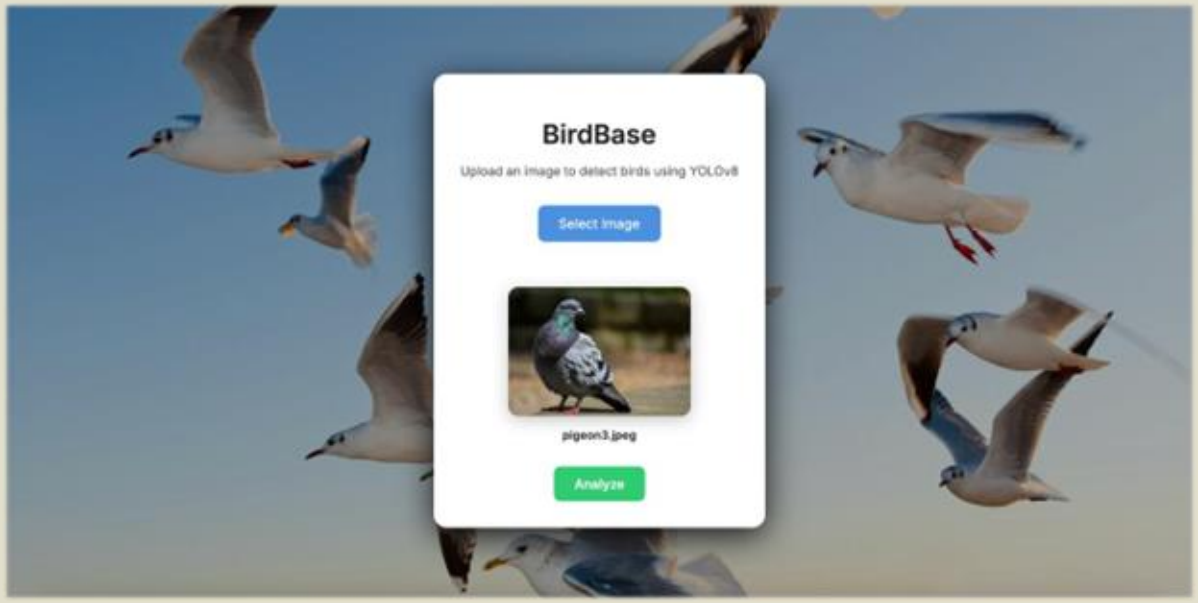

```
# Project Dependencies
Flask
flask-cors
ultralytics
Pillow
```

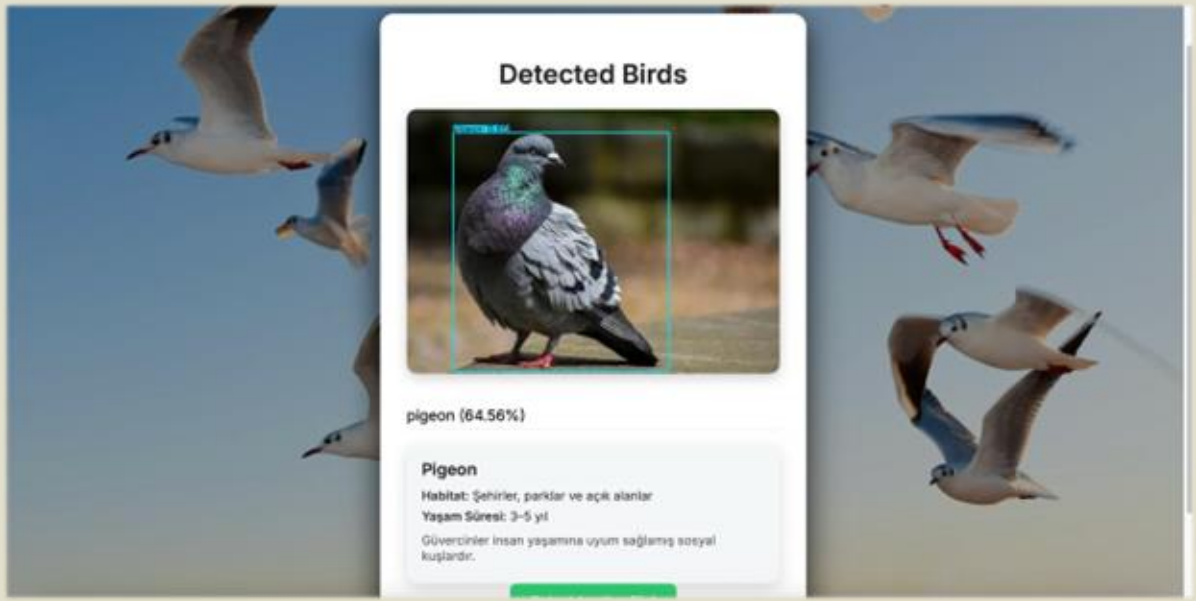
AI Integration

- **Real-Time Detection:** YOLO is one of the fastest and most accurate AI models for finding objects in images.
- **The Brain (best.pt):** We used a pre-trained model file called best.pt to recognize specific bird species.
- **Confidence Score:** The AI doesn't just guess; it gives a percentage (e.g., 95%) of how sure it is about the bird.
- **Bounding Boxes:** The system automatically draws a box around the bird to show exactly what it detected.

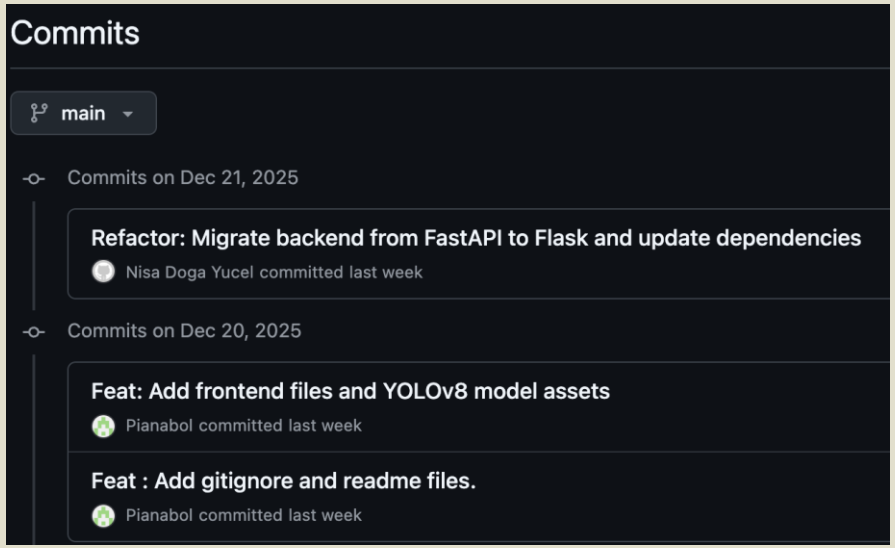
Web Development & User Experience

- **1. Upload Screen:** A clean interface where the user selects a bird image.
- **2. Processing:** The system handles the file and runs the AI model in the background.
- **3. Result Screen:** Displays the image with detection boxes and bird information.
- **4. Reset:** Users can click "Detect Another Bird" to start over easily.





Git Version Control & Collaboration



images	Feat: Add frontend files and YOLOv8 model assets	last week
outputs/result	Refactor: Migrate backend from FastAPI to Flask and upd...	last week
uploads	Refactor: Migrate backend from FastAPI to Flask and upd...	last week
.gitignore	Feat : Add gitignore and readme files.	last week
BirdInfo.json	Feat: Add frontend files and YOLOv8 model assets	last week
README.md	Feat : Add gitignore and readme files.	last week
app.py	Refactor: Migrate backend from FastAPI to Flask and upd...	last week
best.pt	Feat: Add frontend files and YOLOv8 model assets	last week
index.html	Refactor: Migrate backend from FastAPI to Flask and upd...	last week
requirements.txt	Refactor: Migrate backend from FastAPI to Flask and upd...	last week
style.css	Feat: Add frontend files and YOLOv8 model assets	last week

- We used GitHub to store our code and collaborate as a team.
- Every step of the project was tracked with meaningful commit messages (e.g., "Add YOLOv8 assets", "Migrate to Flask").

BirdBase successfully combines Web Programming and AI. We built a working system that is fast, user-friendly, and technically solid.

Thank you for listening!