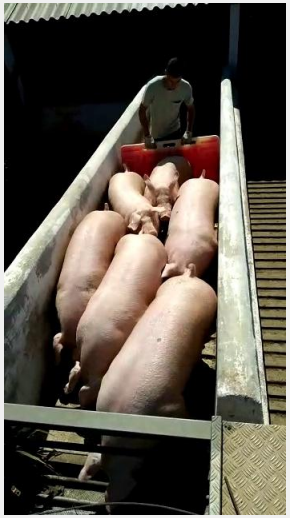
AUGMENTED STARTUPS
Computer Vision | AI | Robotics

Automated Livestock (Pig) Counting: With Object Detection and Streamlit



Introduction

- **Automated livestock counting has the ability to improve and modernize farming by providing a hassle-free solution for tracking animals.**
- **We can use computer vision for pig detection and counting in images, and NLP to create an interactive pig care advisor through a chatbot.**
- **Objective: To create a pig counting system using object detection and integrating it with a chatbot.**
  - **Utilize a pre-trained object detection model from Roboflow for accurate pig counting.**
  - **Implement a chatbot for providing pig care advice using Hugging Face Transformers.**
  - **Develop an intuitive user interface for the system using Streamlit.**

Setting Up the Environment

- pip install inference
- pip install streamlit
- pip install transformers
- pip torch

Object Detection Model - Implementation

AUGMENTED STARTUPS
Computer Vision | AI | Robotics

Using a custom-trained YOLOv5 object detection model from Roboflow Universe for pig detection and counting.

Pig_Counting_Object_Detection.py

```python
import numpy as np
import cv2
import base64
import io
from PIL import Image
from inference.models.utils import get_roboflow_model

model = get_roboflow_model(
    model_id="pig-count/1",
    #Replace ROBOFLOW_API_KEY with your Roboflow API Key
    #api_key="ROBOFLOW_API_KEY"
    api_key="LxUviUVXkfaYWYXkBYcE"
)

#read your input image from your local files
frame = cv2.imread("pig.jpg")

results = model.infer(image=frame,confidence=0.8,iou_threshold=0.85)

output=frame.copy()
count=0

# Plot image with face bounding box (using opencv)
for result in results[0]:
    bounding_box = results[0][count]
    print(bounding_box)

    x0, y0, x1, y1 = map(int, bounding_box[:4])

    cv2.rectangle(output, (x0, y0), (x1, y1), (255,255,0), 2)
    cv2.putText(output, "Pig", (x0, y0 - 10), cv2.FONT_HERSHEY_SIMPLEX, 0.5, (255, 255, 255), 2)
    count=count+1

print("Number of pigs in image:",count)
cv2.imwrite('Pig_output.jpg',output)
```

Building the Chatbot

AUGMENTED STARTUPS
Computer Vision | AI | Robotics

Implement a chatbot using Hugging Face Transformers and Streamlit to answer questions about pig care.

Chatbot.py

```python
import streamlit as st
import cv2
import random
import time
import torch
from transformers import pipeline

text2text_generator = pipeline("text2text-generation")

st.write("### Welcome to the Question and Answer Chatbot. Let's talk about taking care of pigs.")
input = st.text_input("Ask me something about pigs?")

if 'count' not in st.session_state or st.session_state.count == 6:
  st.session_state.count = 0
  st.session_state.chat_history_ids = None
  st.session_state.old_response = ''
else:
  st.session_state.count += 1


if input:

    #read whole file to a string
    context_input= "Pigs need regular healthcare, including veterinary check-ups, vaccinations, and protection against diseases lik

    response = text2text_generator('question: '+ input + 'context: ' +context_input)

    answer = response[0]['generated_text']
    print(answer)

    if answer == "":
        answer = "Sorry, I can't answer that."

    st.write(f"Chatbot: {answer}")
    st.session_state.old_response = answer
```

Context

- **"Pigs need regular healthcare, including veterinary check-ups, vaccinations, and protection against diseases like swine flu and foot-and-mouth disease. They're social animals, so interaction with other pigs or humans is essential for their mental health. They also enjoy activities like playing with toys and listening to music, which enhance their well-being."**

Integration
-
Object Detection and Chatbot

Potential Enhancements and Future Work

- Improving pig counting accuracy
- Enhancing the chatbot's knowledge base
- Real-time video feed integration for continuous monitoring

Thank you & Welcome