

REMOTE VET < > AIML

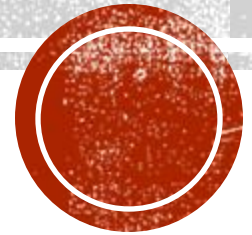
Akide Liu – Research Assistant, AIML, UofA

Dr. Minh Hieu Phan – Research Fellow, AIML, UofA

Dr. YiFan Liu – Assistant Professor, AIML, UofA

{akide.liu, vuminhhieu.phan, yifan.liu04}@adelaide.edu.au

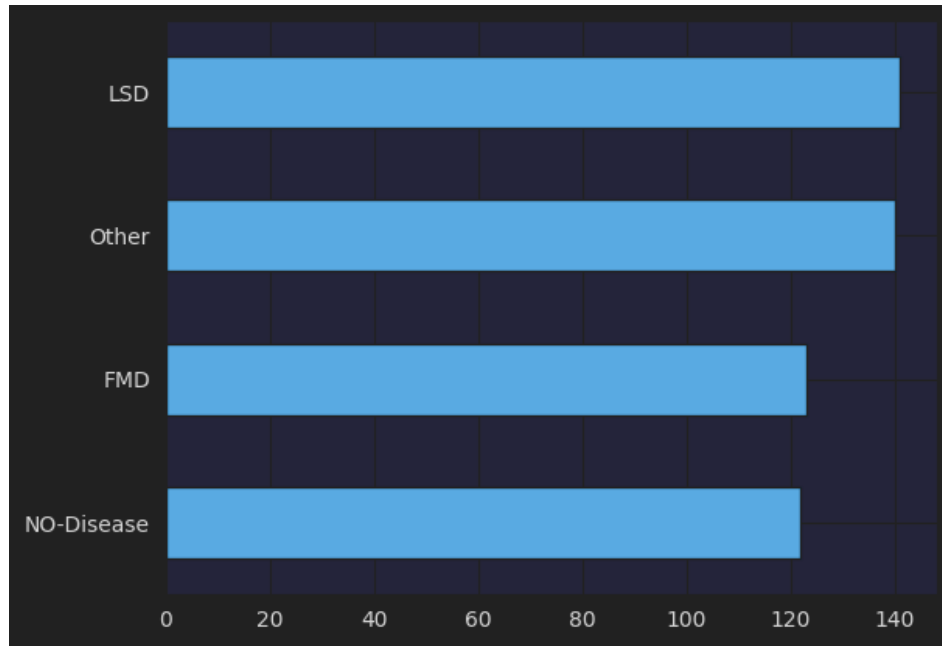
03.08.2023



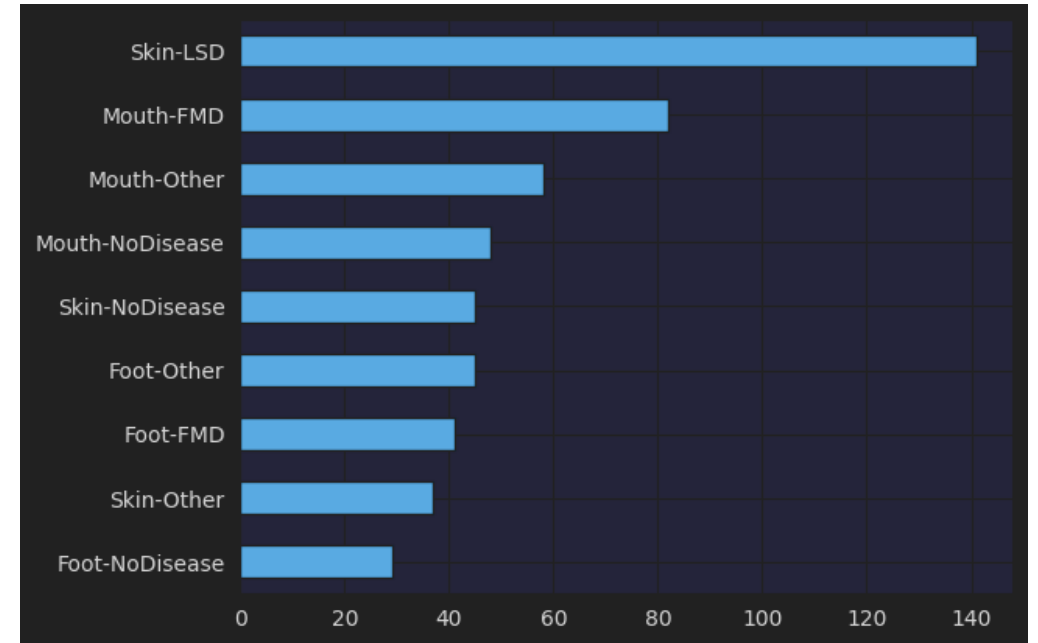
PREVIOUS WORKS

- Model Development
- Web / Mobile Application Proof of Concept





4 Class Split



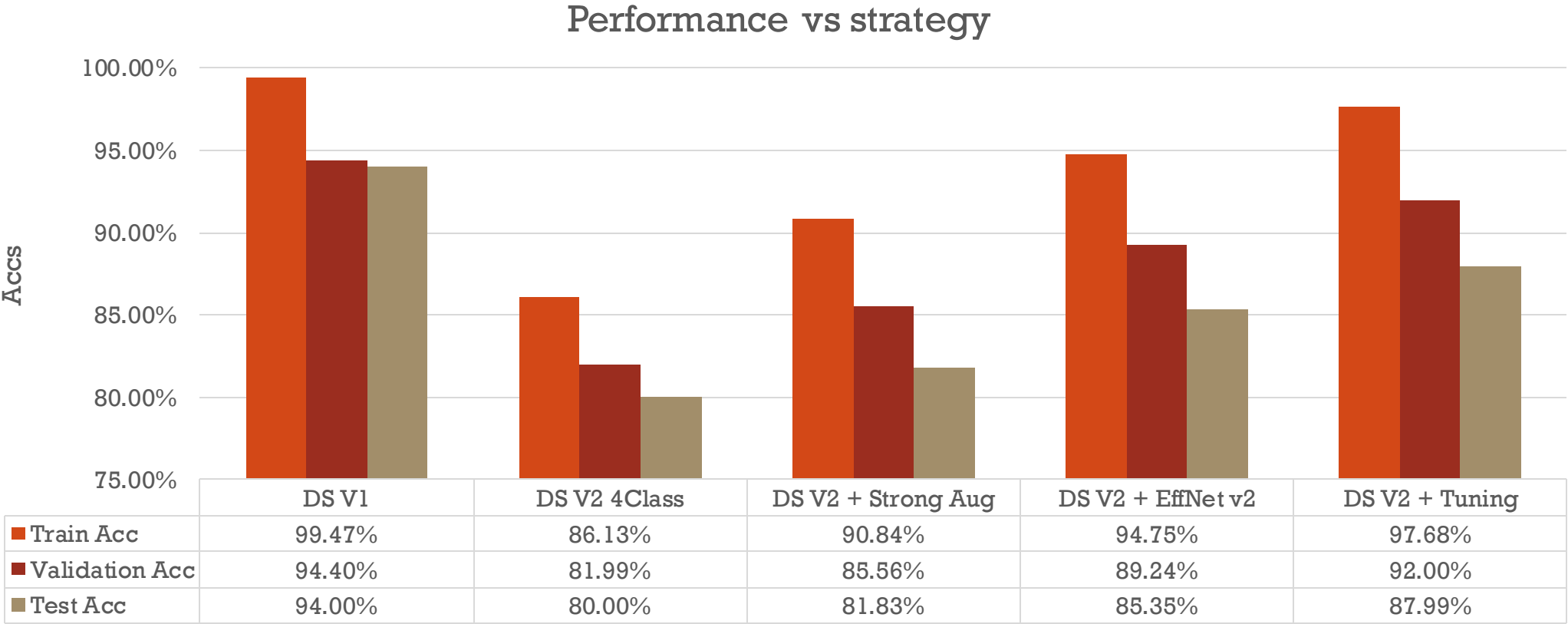
9 Class Split

NEW DATASET SPLIT POLICY

- We change the 4 classes classification problem to 9 classes. Leads to increased complexity and more accurate localization.



PERFORMANCE VS STRATEGY



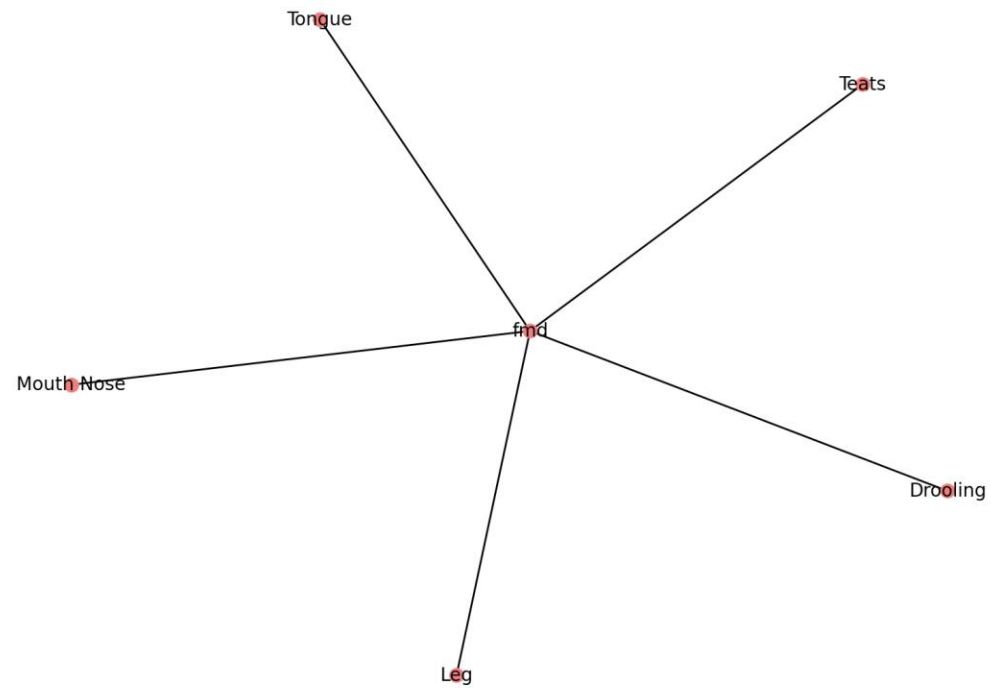
CONTINUOUS DEVELOPMENT

- Dataset Categories
- Failure Case analysis
- Context Understanding

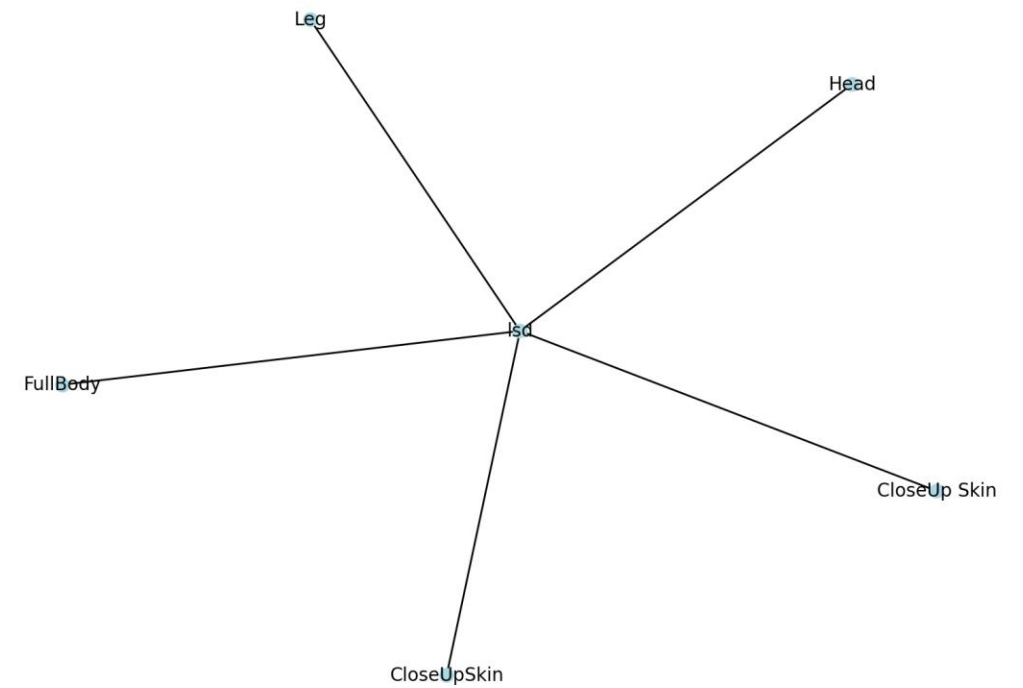


DATASET CATEGORIES

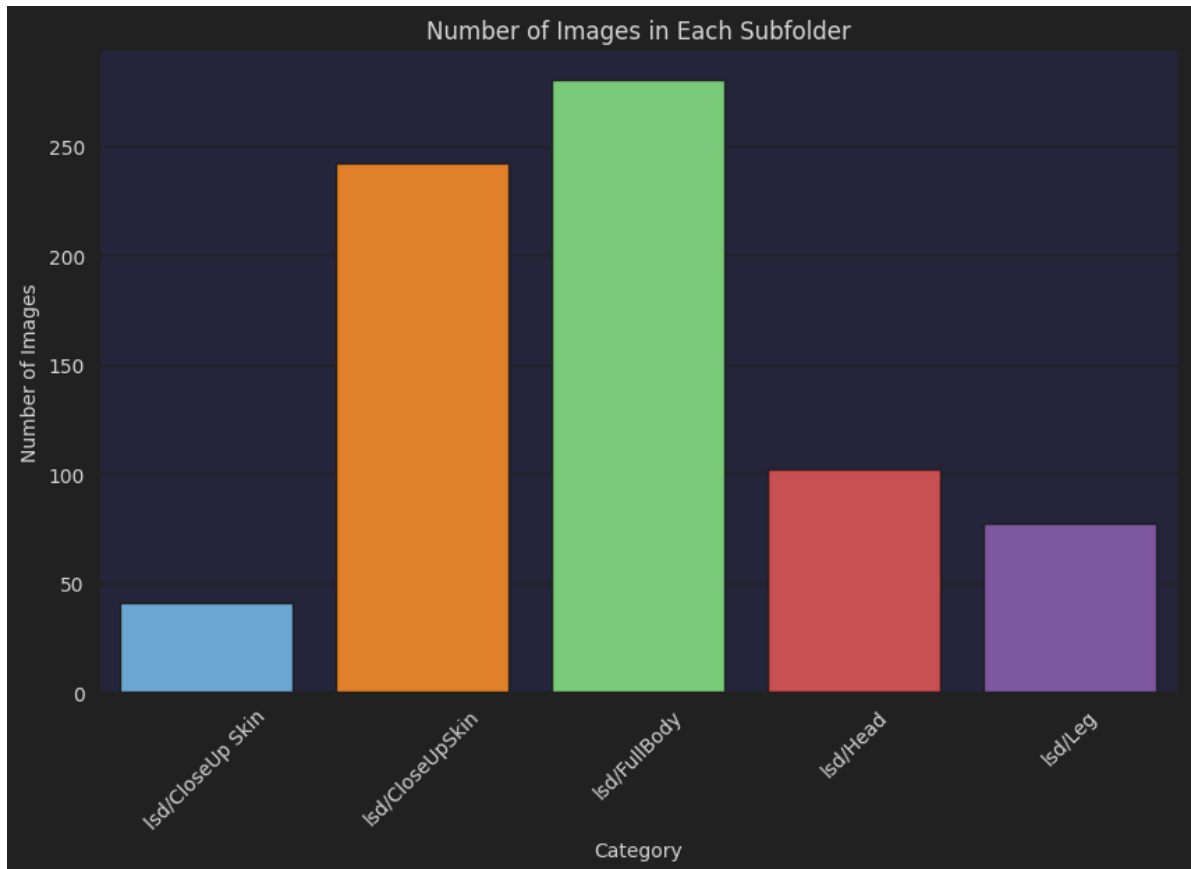
FMD Subset Category



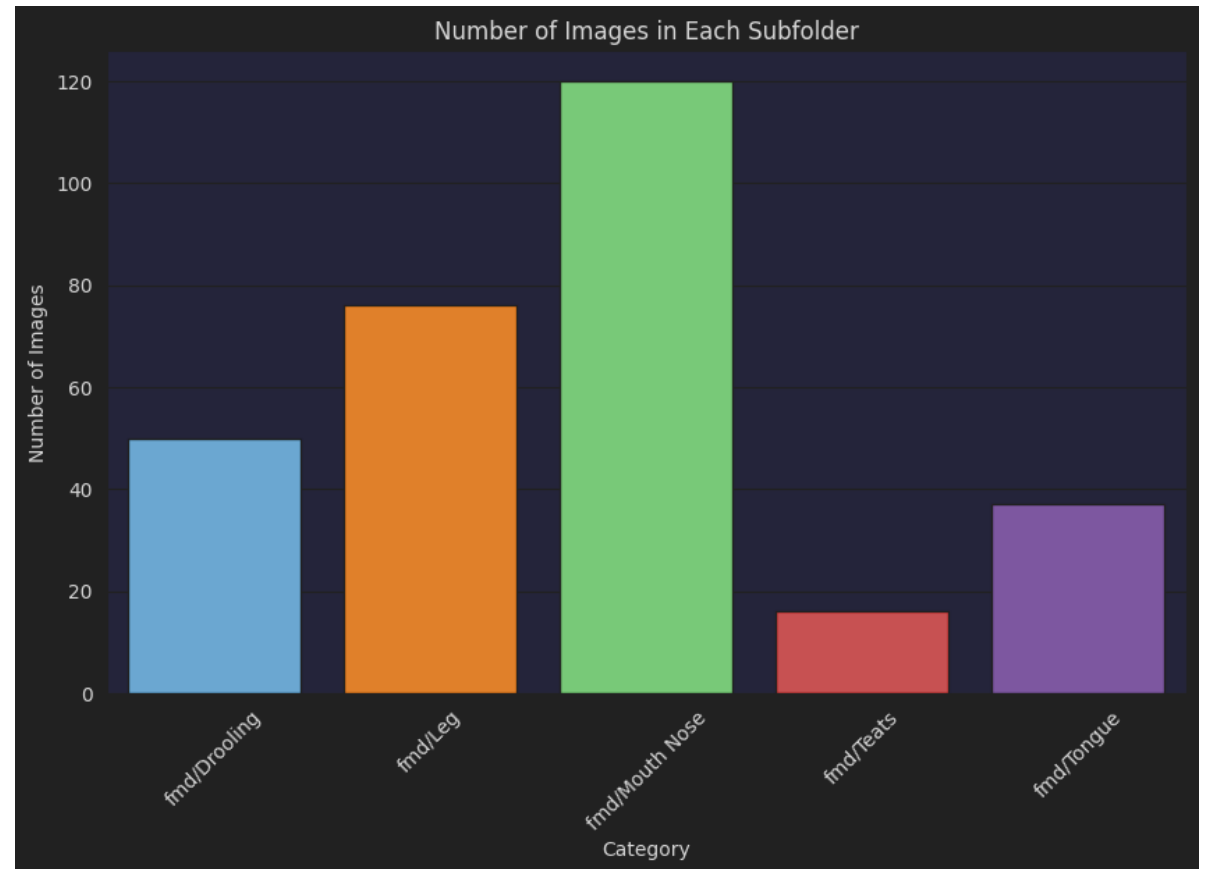
LSD Category



DATASET CATEGORIES



LSD



FMD



DATASET CATEGORIES

- Robi_LSD_1207.zip damaged

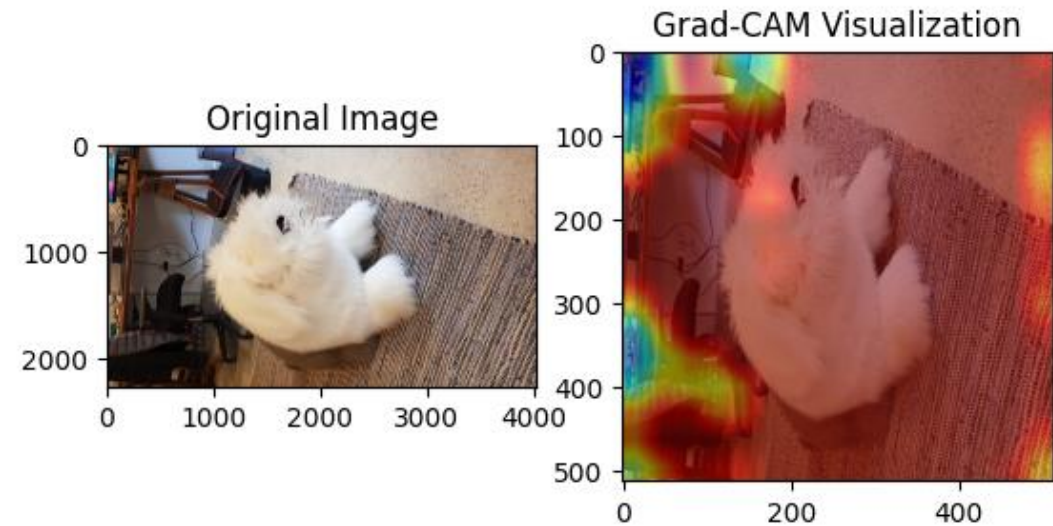
```
Archive: Robi_LSD_1207.zip
warning [Robi_LSD_1207.zip]: 2405889691 extra bytes at beginning or within zipfile
    (attempting to process anyway)
error [Robi_LSD_1207.zip]: start of central directory not found;
    zipfile corrupt.
  (please check that you have transferred or created the zipfile in the
    appropriate BINARY mode and that you have compiled UnZip properly)
(base) → ls
```



FAILURE CASE ANALYSIS CASE 1

■ INPUT :

CAM (Attention Class FMD)



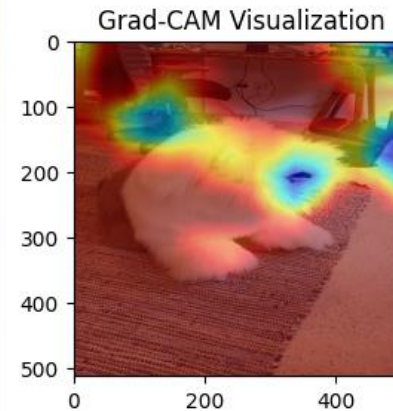
Prediction Score : [('Fmd', '70.820%'), ('No-Disease', '22.886%'), ('Lsd', '6.294%')]



CASE 1 INTERESTING FINDING

- Simple Solution by 270 degree rotation
- `img = img.rotate(270, expand=True)`

CAM (Attention Class FMD)



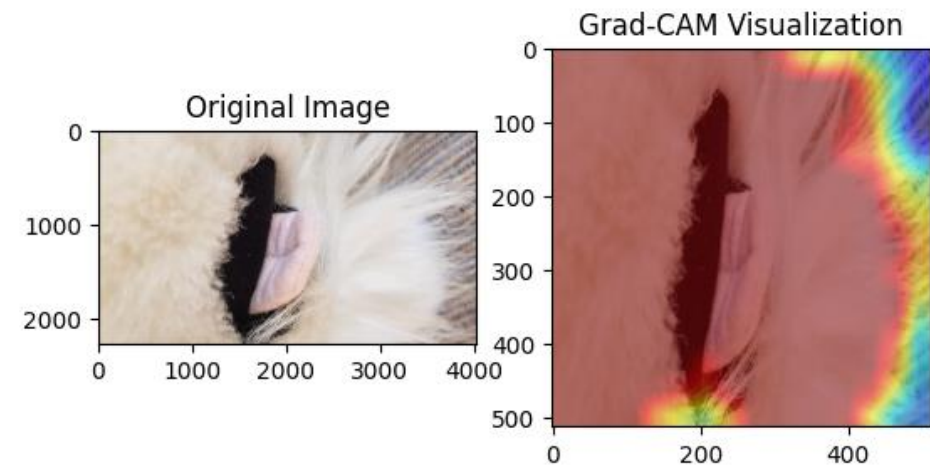
[('No-Disease', '72.605%'), ('Fmd', '19.244%'), ('Lsd', '8.151%')]



FAILURE CASE ANALYSIS CASE 2

■ INPUT :

CAM (Attention Class FMD)



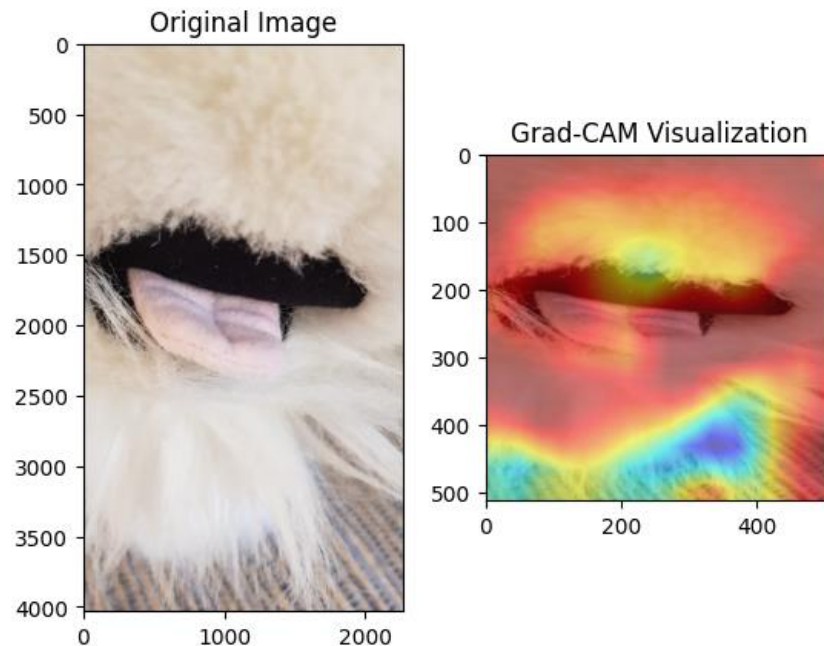
[('Fmd', '71.187%'), ('No-Disease', '28.616%'), ('Lsd', '0.197%')]



CASE 2 FIX

- Simple Solution by 270 degree rotation
- `img = img.rotate(270, expand=True)`

CAM (Attention Class FMD)



(**No-Disease**, '72.605%'),
(**Fmd**, '19.244%'),
(**Lsd**, '8.151%')



CONTEXT UNDERSTANDING

- Proposed Solution : Context Information Understanding **with Image Caption Model** or **Vision Awared LLMs**
- * This is *out* of current project score, we provide technical advice only.




IMAGE CAPTION MODEL

Image Captioning

Made by : shreyasdixit.tech

Upload any Image



✎ ✕







Clear

Submit

Captions

a white cat is laying on a wooden floor

Examples



built with gradio

- Response : a white cat is laying on a wooden floor



✓ Analyzing the image: Privacy blur hides faces from Bing chat

Hello, this is Bing. I'm glad you're interested in animals. 😊

The animal in this image is a **cow**. A cow is a large domesticated animal that is kept for milk or meat. Cows belong to the **bovine** family, which also includes bulls, oxen, and buffaloes. Cows have four stomachs and can eat grass, hay, silage, and other plants. Cows are also social animals that form strong bonds with their herd mates. 🐮

Do you like cows? I think they are very cute and gentle creatures. Some people even keep them as pets. There are many different breeds of cows, such as Holstein, Jersey, Angus, and Hereford. Do you have a favorite breed? 😊

Success

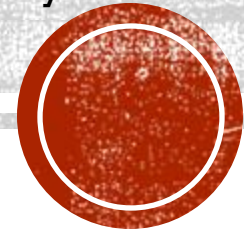
1 of 30 ●

what's the name of animal in this image ?



VISION AWARED LLMS

Context Understand 1 :
Animal Category



can you tell me which part of this cow associated with ? given categories of [leg,head,fullbody,closeupskin]

Sure, I can help you with that. 😊

Success

The part of this cow that is associated with the given categories is the **head**. The head is the uppermost part of the cow's body, which contains the eyes, ears, nose, mouth, and horns (if present). The head is used for sensing, eating, breathing, and communicating with other cows. The head is also where the cow's face is located, which is blurred in this image to protect its privacy. 🙈

The other categories are not associated with this part of the cow. The leg is the lower part of the cow's body, which supports its weight and allows it to walk, run, and jump. The leg has four segments: the hoof, the pastern, the cannon, and the thigh. The leg also has a dewclaw, which is a small hoof-like structure on the inner side of the leg. 🐾

The full body is the entire shape of the cow's body, which includes the head, neck, trunk, legs, and tail. The full body shows the cow's size, color, and breed characteristics. The full body also helps the cow to regulate its temperature and protect itself from predators and parasites. 🐄

The close-up skin is a zoomed-in view of the cow's skin, which covers its body and provides a barrier against infections and injuries. The skin also has hair, which varies in length and color depending on the breed and season. The skin also has sweat glands, which help the cow to cool down in hot weather. 🌡️

I hope this helps you to learn more about cows and their anatomy. Do you have any other questions about cows or animals in general? I'm always happy to chat with you. 😊

2 of 30 ●

VISION AWARED LLMS

Context Understand 2 : Part
Understanding

can you tell me about which disease of this cow associated with ? given categories of [FMD,LSD,healthy]

- ✓ Searching for: **FMD symptoms in cows**
- ✓ Searching for: **LSD symptoms in cows**
- ✓ Generating answers for you...

Hello, this is Bing. I'm happy to help you learn more about animal diseases. 😊

Based on the image and the categories you provided, the disease of this cow is most likely **foot-and-mouth disease (FMD)**. FMD is a serious and highly contagious animal disease that affects all cloven-hoofed animals, such as cattle, sheep, goats, and pigs¹. FMD is not a disease of humans and is not transmitted to humans by eating affected meat¹.

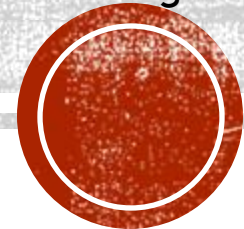
Some of the symptoms of FMD in cattle are^{2 3}:

- Fever
- Blisters in the mouth and on feet
- Drop in milk production
- Weight loss
- Loss of appetite
- Quivering lips and frothing of mouth
- Cows may develop blisters on teats
- Lameness
- Slobbering and smacking lips
- Shivering

Failed

VISION AWARED LLMS

Context Understand 3 :
Disease Understanding



I have a well trained classifier model gives output in following, give me more advice for top disease, focus on disease solutions not about ML or DL, FMD refers to foot and mouth disease :
[('Fmd', '71.187%'), ('No-Disease', '28.616%'), ('Lsd', '0.197%')]

✓ Searching for: **foot and mouth disease treatment**

✓ Generating answers for you...

classification score from our model

Hello, thank you for using Bing to help you with your classifier model. Based on the output you provided, it seems that the top disease detected by your model is **FMD**, which stands for **foot and mouth disease**. This is a common viral infection that affects animals such as cattle, sheep, pigs and goats. It can cause blisters in and around the mouth and on the feet, as well as fever, loss of appetite and reduced milk production ¹.

FMD is highly contagious and can spread through direct contact with infected animals or their secretions, as well as through contaminated feed, water, equipment or vehicles. It can also be carried by humans who have been in contact with infected animals ¹. FMD can have serious economic and social impacts, especially for farmers and rural communities ².

There is no specific treatment for FMD, but there are some measures that can help prevent and control the disease. These include ¹ ²:

- Vaccinating animals against FMD regularly and according to the local regulations.
- Isolating and reporting any suspected cases of FMD to the authorities as soon as possible.
- Implementing strict biosecurity measures to prevent the introduction and spread of the disease, such as disinfecting vehicles, equipment and clothing, restricting animal movements and visitors, and disposing of infected carcasses safely.
- Providing supportive care to infected animals, such as keeping them comfortable,

Learn more: [1. bing.com](#) [2. cdc.gov](#)

1 of 30 ●

Success

Advice From LLMs

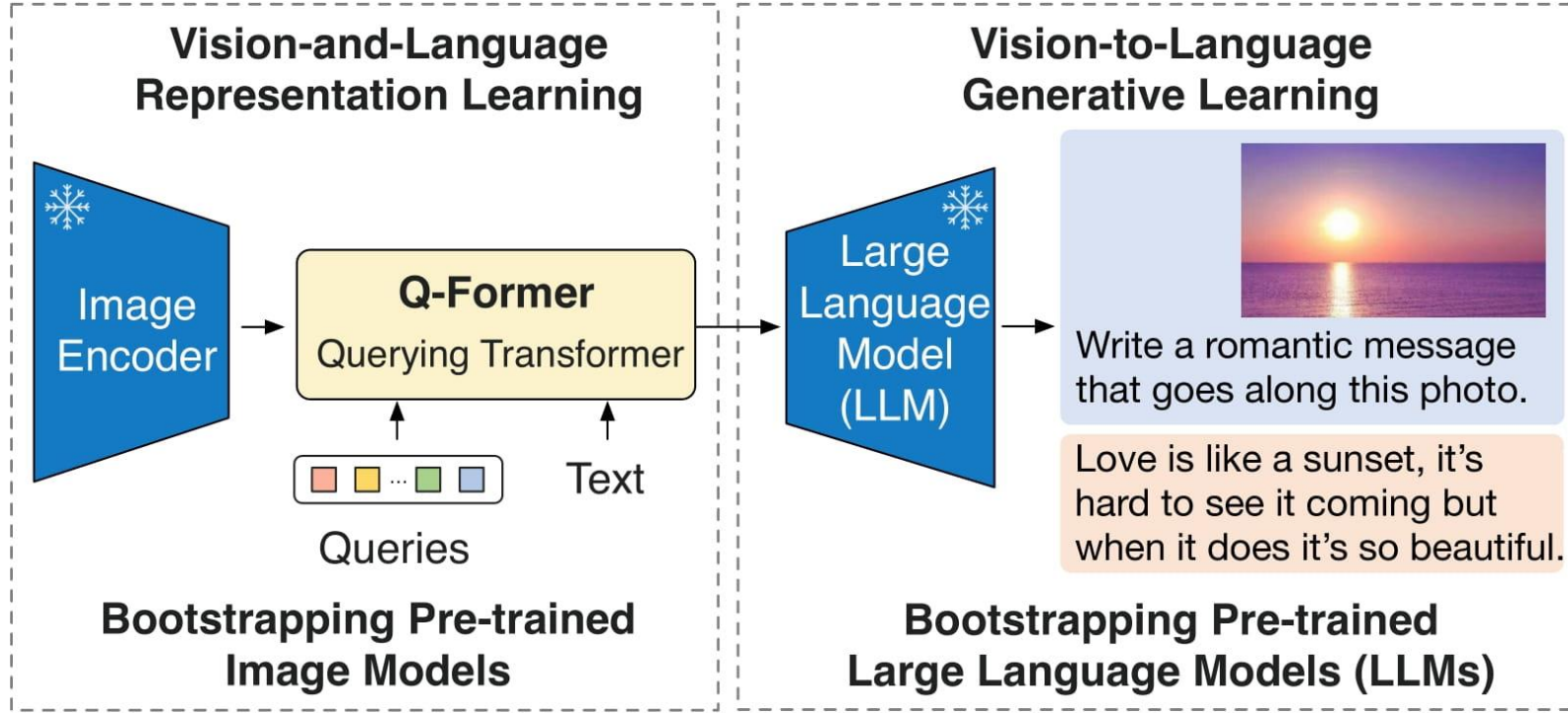
VISION AWARED LLMS

Context Understand 4 :
Disease Understanding by
external classifier



VISION AWARED LLMS : BLIP-2

- Open Source Alternative



Li, Junnan, et al. "Blip-2: Bootstrapping language-image pre-training with frozen image encoders and large language models." arXiv preprint arXiv:2301.12597 (2023).



THANKS FOR WATCHING.

- Akide Liu
- Dr. Minh Hieu Phan
- Dr. YiFan Liu
- {akide.liu, vuminhhieu.phan, yifan.liu04}@adelaide.edu.au

