Government College of Technology - Coimbatore

Transformative Image Captioning

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PROJECT TITLE

Transformative Image Captioning: Harnessing VisionEncoderDecoderModel and ViTImageProcessor

AGENDA

- Introduction to Image Captioning
- Problem Statement
- Project Overview
- End Users and Audience
- Solution and Value Proposition
- Key Features and Benefits
- Conclusion

PROBLEM STATEMENT

Challenge:

Inaccurate and Incomplete Image Descriptions

Goal:

Develop an AI-powered system for generating accurate and contextually relevant captions for images.

PROJECT OVERVIEW

- Introduction to VisionEncoderDecoderModel and ViTImageProcessor
- Key Components of the Project Pipeline:
- Image Loading and Preprocessing
- Feature Extraction
- Caption Generation
- Evaluation Metrics: BLEU Score, Accuracy, Relevance

WHO ARE THE END USERS?

- Individuals with Visual Impairments
- Content Creators and Publishers
- Image Search Engines and Platforms
- AI Researchers and Developers

YOUR SOLUTION AND ITS VALUE PROPOSITION

- ✓ Utilizing State-of-the-Art Transformer Models.
- ✓ Seamless Integration of Image Processing and Language Modeling.
- ✓ Accurate and Contextually Rich Image Captions.
- ✓ Enhanced Accessibility and User Experience.
- ✓ Potential for Improving Search Engine Optimization (SEO) for Visual Content.

THE WOW IN YOUR SOLUTION

AI-driven Accuracy: Generate Descriptive Captions with High Precision

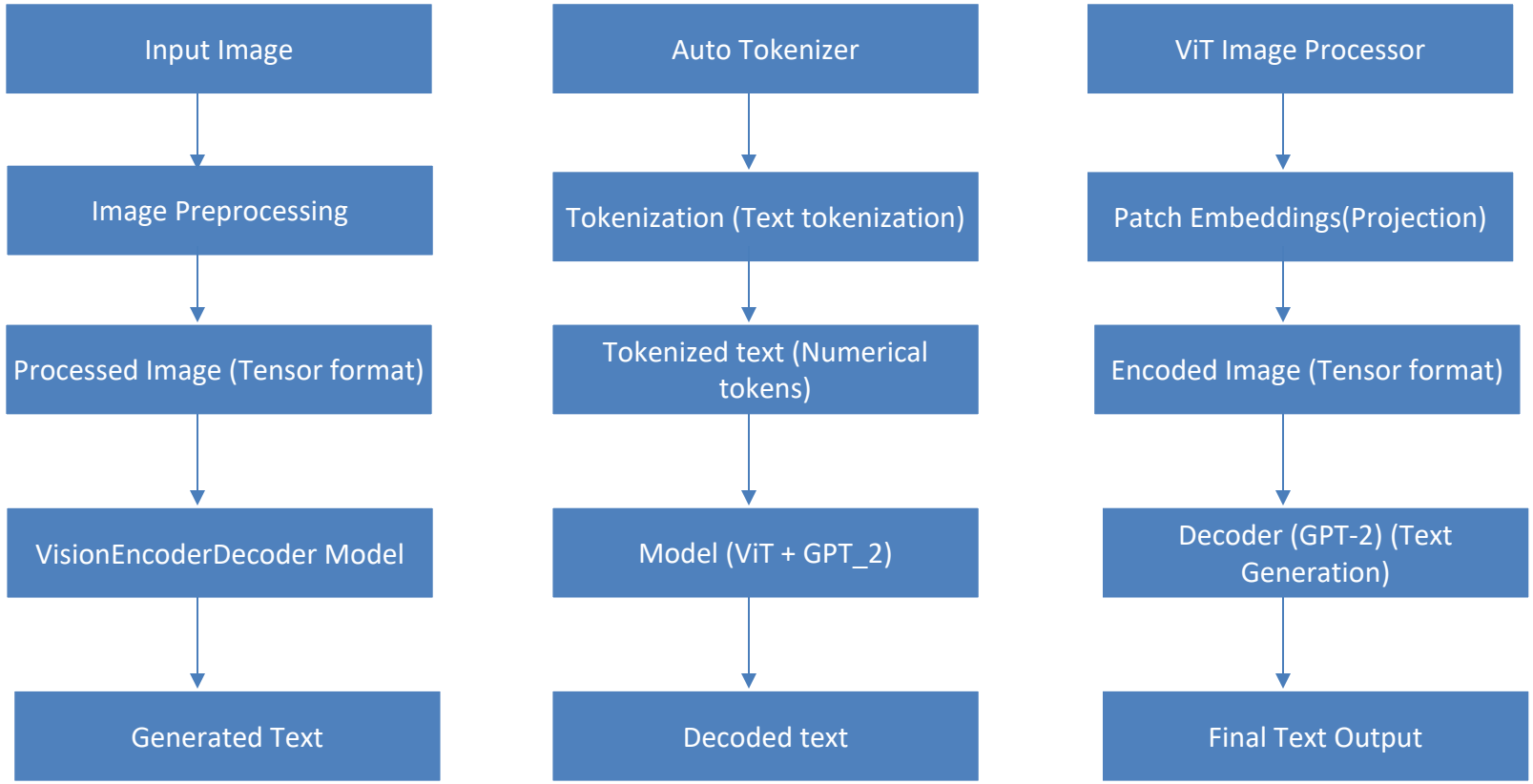
Scalability: Process a Wide Range of Images with Efficiency

Customization: Fine-Tune the Model for Specific Domains or Use Cases

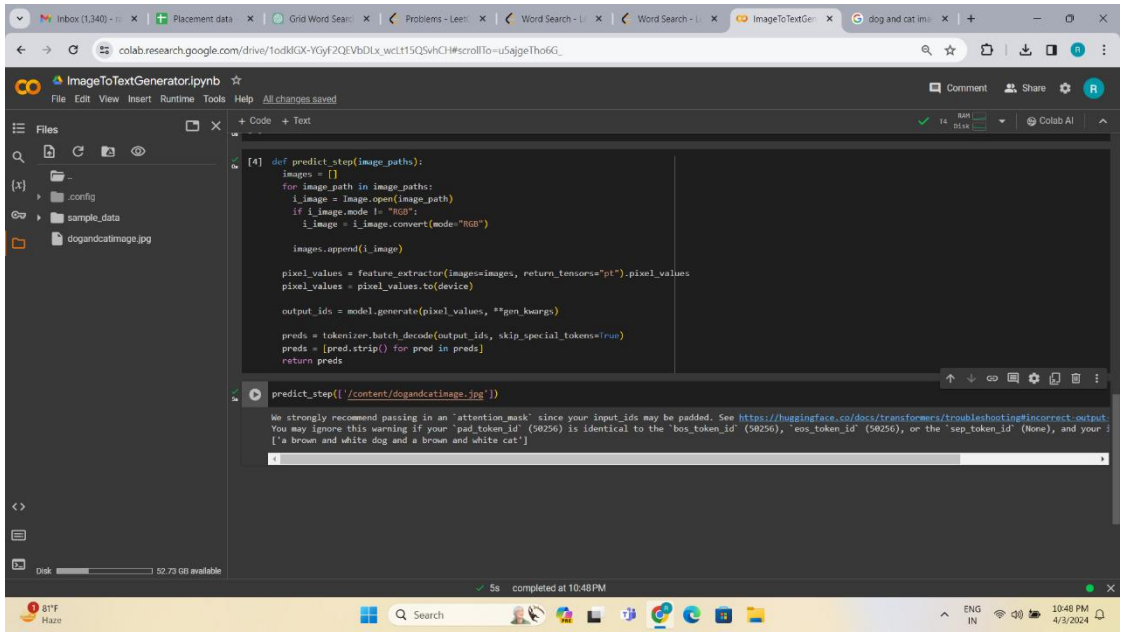
Real-World Impact: Improve Accessibility and User Interaction with Visual Content

Future Potential: Expand to Multimodal AI Applications for Comprehensive Content Understanding

MODELLING


Input Image
Image Preprocessing
Processed Image (Tensor format)
VisionEncoderDecoder Model
Generated Text
Auto Tokenizer
Tokenization (Text tokenization)
Tokenized text (Numerical tokens)
Model (ViT + GPT_2)
Decoded text
ViT Image Processor
Patch Embeddings(Projection)
Encoded Image (Tensor format)
Decoder (GPT-2) (Text Generation)
Final Text Output

RESULTS


ImageToTextGenerator.ipynb
colab.research.google.com/drive/1odklGX-YGyf2QEVbDLx_wcLt15QSvhCH#scrollTo=u5ajgeTho6G_
File Edit View Insert Runtime Tools Help All changes saved
Comment
Share
Files
+ Code + Text
Colab AI
.config
sample_data
dogandcatimage.jpg
[4] def predict_step(image_paths):
images = []
for image_path in image_paths:
i_image = Image.open(image_path)
if i_image.mode != "RGB":
i_image = i_image.convert(mode="RGB")
images.append(i_image)
pixel_values = feature_extractor(images=images, return_tensors="pt").pixel_values
pixel_values = pixel_values.to(device)
output_ids = model.generate(pixel_values, **gen_kwargs)
preds = tokenizer.batch_decode(output_ids, skip_special_tokens=True)
preds = [pred.strip() for pred in preds]
return preds
predict_step(['/content/dogandcatimage.jpg'])
['a brown and white dog and a brown and white cat']
Disk 52.73 GB available
5s completed at 10:48PM
81°F Haze
Search
ENG IN
10:48 PM 4/3/2024