

Senior Project Proposal

Background:

I am currently pursuing a major in Data Science. After graduation, I plan to move back to Sterling, Virginia, and work as a Data Scientist for Noblis. I have successfully completed CS 450 and am currently enrolled in MATH 425 and MATH 488 this semester. My school email is tow22001@byui.edu.

Project Description:

I want to create a tool that analyzes an image and generates a short caption describing it. This tool can help visually impaired individuals understand pictures and automate tasks like tagging photos or creating captions for social media. I plan to use a dataset such as MS-COCO or Flickr8k, which contain thousands of images paired with captions, to train the model.

Domain to Investigate:

There are two main areas I need to study for this project:

1. Neural Network Models
 - Learn how to better use Convolutional Neural Networks (CNNs) to pull features from an image, like identifying objects or parts of a scene.
2. Natural Language Processing (NLP)
 - Work on models like LSTMs (Long Short-Term Memory) or Transformers to generate sentences.
 - Learn how to connect visual features from the image to meaningful words and phrases.

Project Deliverables:

- Cleaned Data: Get the dataset ready by organizing pictures and captions.
- Working Model: A part that looks at pictures (CNN) and a part that writes captions (LSTM/Transformer).
- Performance Check: Test how good the captions are
- Interactive Demo: A tool where someone can upload a picture, and it shows the caption.
- Visuals: Simple graphs to explain how the model works and where it focuses in the image.
- Write-Up: A short explanation of how the project works and why it's useful.

Faculty Request:

J. Hathaway