Person Re-Identification: Tracking the World

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Buffalo State
The State University of New York

Student Research and Creativity Conference

Abstract

Person Re-Identification is the use of multiple videos or camera angles to track individuals over time. Someone walking down the street might be in several camera angles at once, but the task is to combine the videos or snapshots to show it is the same person. One problem with this idea is that pictures can have many different variations that affect the accuracy. The plan is to use multiple training libraries to find if this improves identification. Person Re-Identification is a rising topic in the Cybersecurity field and will have a lot of potential for progress. PyCharm will be used as the IDE for this program because all the learning processes are stored in libraries in Python code. There are couple of options regarding which learning dataset to use, CUHK01, iLIDS-VID, and RPIField being a few of them. The libraries will train the program with artificial intelligence to track a person and store images of them for future queries. Since most of the time libraries are used individually, there should be an increase in accuracy by combining them. The expectation is to see a clear advantage of training methods when used together and also identify the single most efficient library. The goal is to find a different combination of these training techniques to allow the program's artificial intelligence to be more accurate and adaptable. The results of this research project will show the differences and benefits of using multiple image libraries.

References

PyCharm (Community Ed): https://www.jetbrains.com/pycharm/

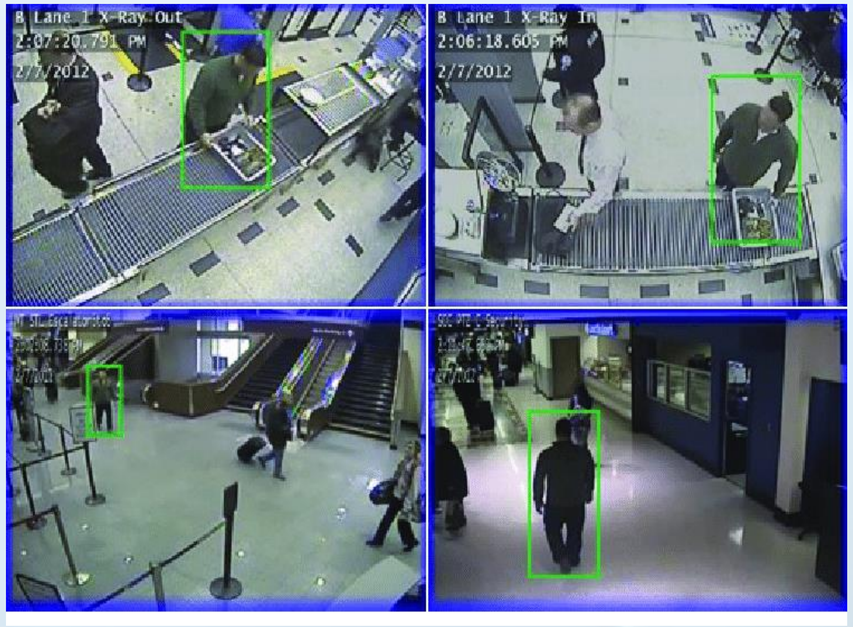
Market-1501: https://deepai.org/dataset/market-1501

ResNet : https://www.resnet.us/

PyTorch: https://pytorch.org/

Methods

This project uses PyCharm and PyTorch to train artificial intelligence or deep learning. Market-1501 will be the dataset. This library includes a variety of images that have multiple camera angles and different individuals. The next step of the process is to crop the data and set it up for the learning process. It begins with determining the batch size of the images. Deep learning is taught slowly, with small chunks of data at a time. If there is too big a batch, the computer makes more general rules that might influence the results. With several thousand images separated into small parts, the AI learns and adjusts as more data goes through the process. Eventually, the program develops filters to sort which data is needed and what should be assumed unnecessary for the query made.



Results

The code starts with preparation, taking the folder full of images and organizing them based on numbers. All the data is in separate folders according to their id. With this done, the next step is training the AI. This project uses a pre-trained model called ResNet that contains layers to sort the data. These layers look at the similarity between the images and will be used to find similar photos later. With the model completed, the training process can begin. Training runs in epochs or batches of images at a time. This design slowly adjusts the AI over time rather than making multiple changes all at once. After a set of photos, assumptions are made based on those images and past learning. The goal of this is to reduce loss and increase accuracy over time. After training, the code conducts a test. This test shows which images are correct and which ones are the wrong individual.

Conclusions

The goal of the original project was to compare libraries based on training type and accuracy. The project shifted to focusing on the learning process with the models that teach AI. The ResNet model, for example, can be adjusted for different accuracy with multiple layers. The model is called a neural network, which is a system for organizing the data. Each step of the process changes the number of images that become the output with the query. This network, with batch learning, should be the goal when looking for optimization. Person Re-Identification will be the future for recognition, and the way technology is advancing makes it a high priority.

Acknowledgements

This project is supported by the Computer Information Systems Department and the Office of Undergraduate Research. Dr. Banerjee provided guidance and support while working on the project.