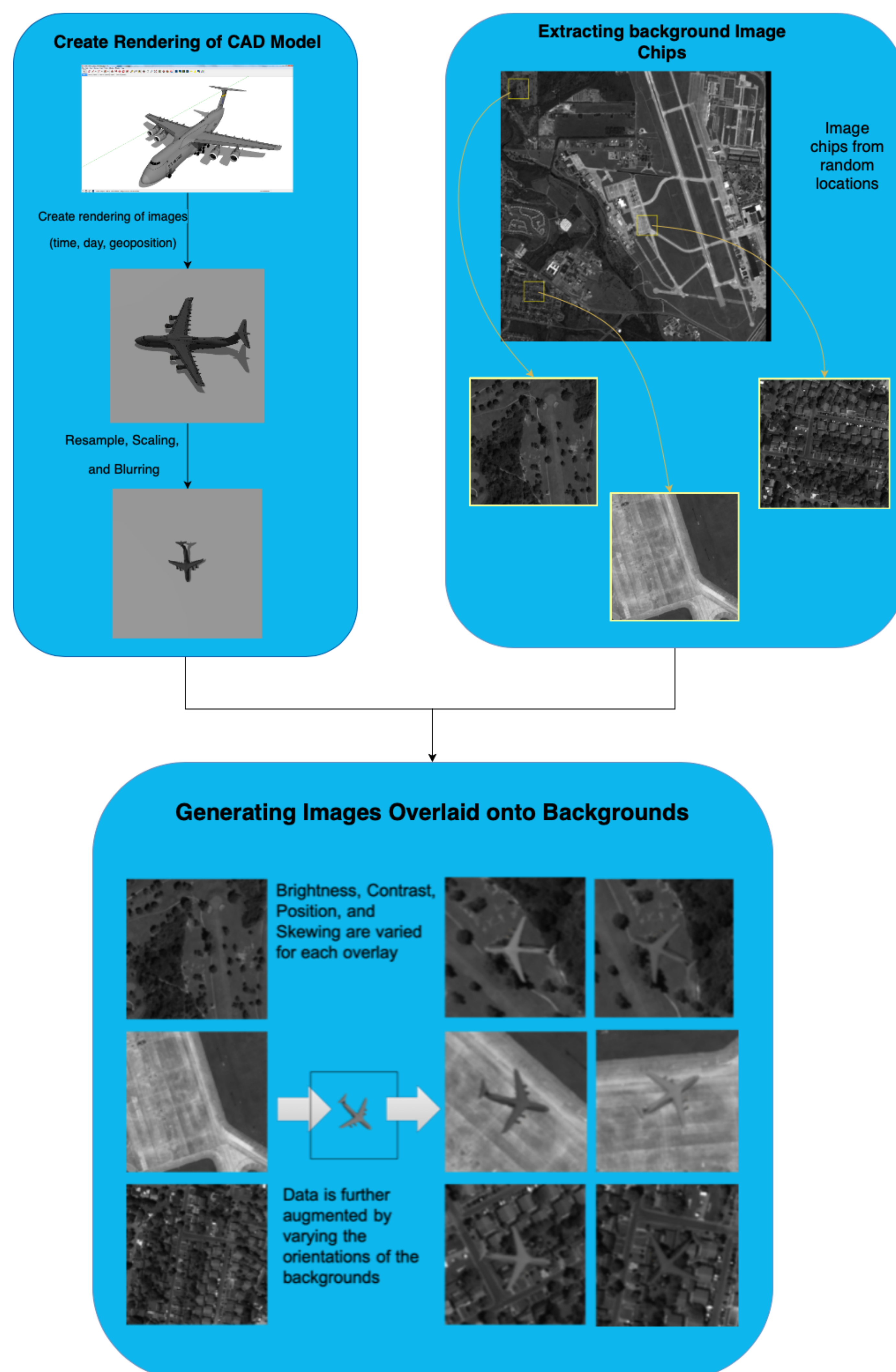


## Context

- Need to classify objects in overhead imagery, e.g. Aircraft, satellite
- CAD models are rarely seen in existing imagery
- Models need synthetic imagery with realism

## Generating Training Data

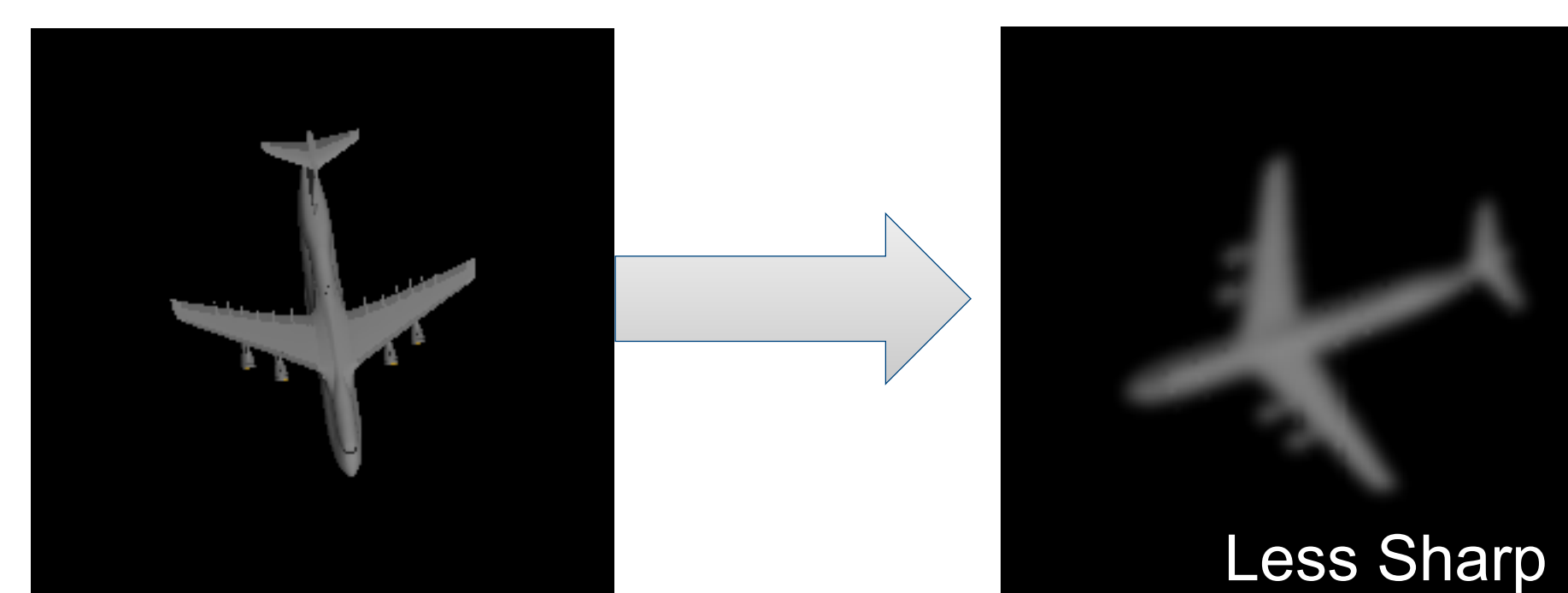


## Important Considerations

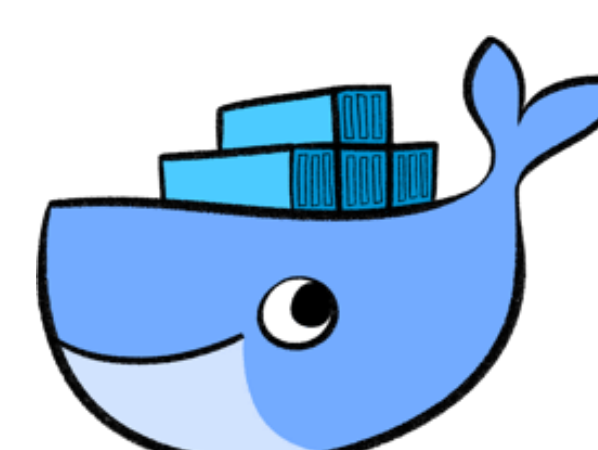
1. Realistic generation of images
2. Portable between operating systems
3. Convenient setup
4. Consistent implementation

## Methodology

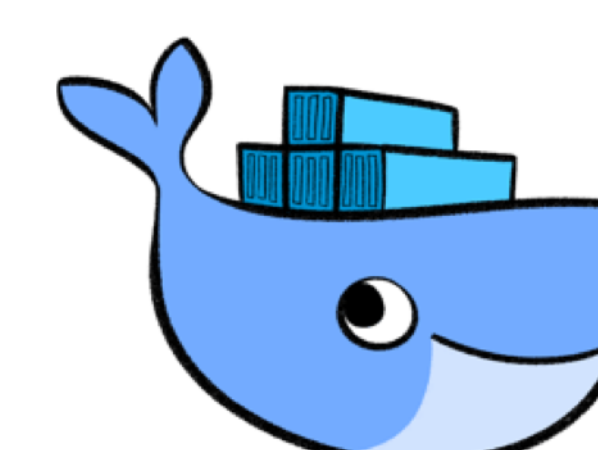
- 2D Gaussian sampling kernel used to apply appropriate blurring to rendered CAD model.



- Use Docker to solve considerations 2-4

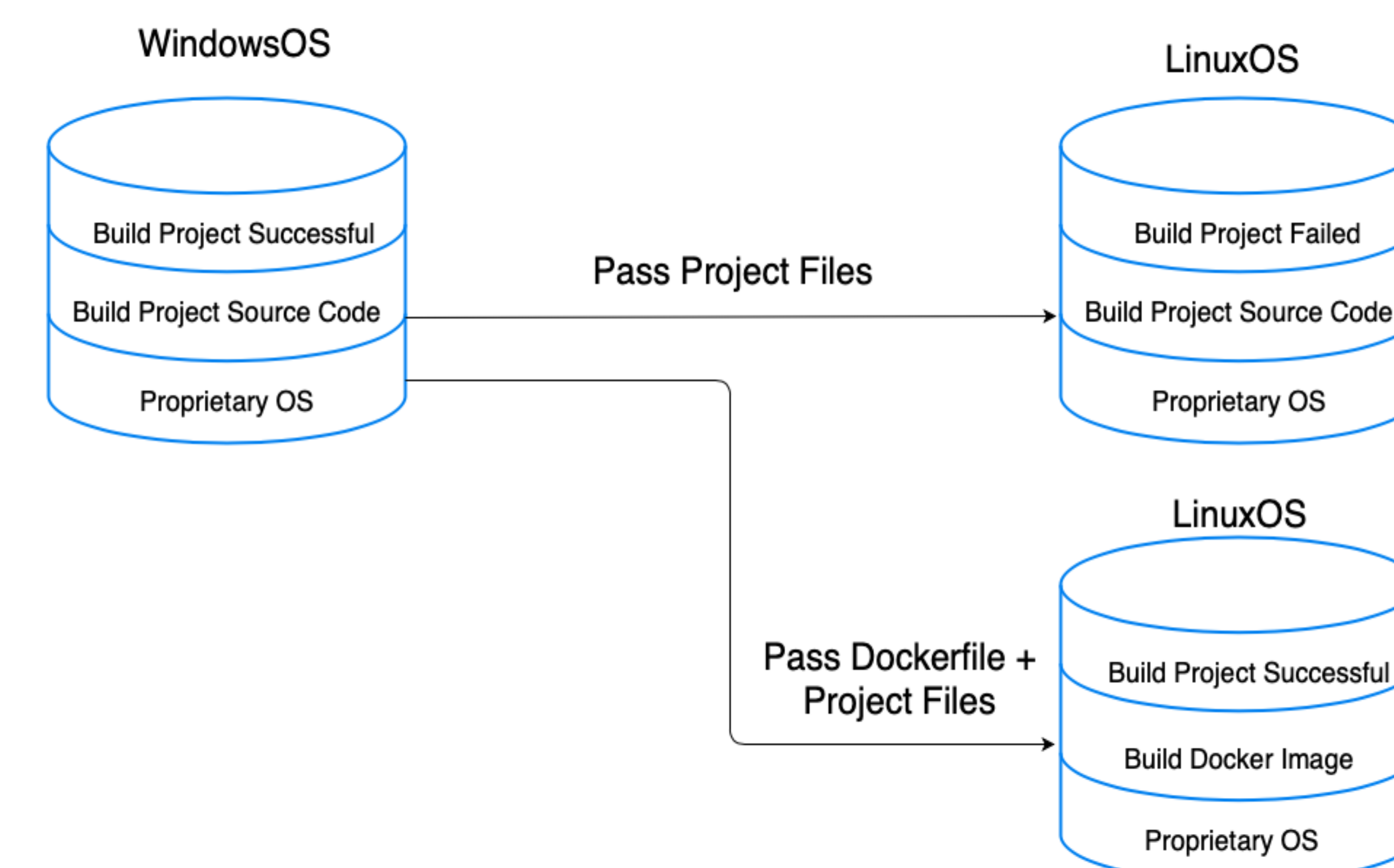


## Why Docker?



- The specifications of a project are all stored in a Docker file so using docker guarantees everything will function exactly the same on any system that supports Docker
- Easier to keep track of your application when sharing with team members because the environment is constant across all members.
- Dependencies within Docker file won't have any adverse effects on any configurations on your host machine so the project can build properly.

## Implementation



## Conclusion

- Our goal is to provide training data that will allow a deep neural network (DNN) to differentiate between background images without the object, and background images with the object
- Synthetic training data enables machine learning when few real examples exist.
- Docker turns the generation of synthetic training data for machine learning into a service

## Future Work

- Diagnose features being used by applying deconvolutional networks
- Improve training process by providing examples of additional, unrelated, rendered objects to DNN, forcing it to learn a larger, more discriminative set of object features