

# Deep Restore

## Architecture Comparision Server

September 20, 2018

## Description

- ▶ Densenet, Early, Late and Bottleneck use patches of size 128x128 + mirror padding (padding size depending on architecture)
- ▶ All testes architectures use the information of previous, current and next frame
- ▶ 1000 iterations
- ▶ augmented training set
- ▶ last activation function: sigmoid
- ▶ train and test data visualized for early stopping
- ▶ accuracy and loss for each architecture and early stopping
- ▶ dropout with 0.85 keep probability
- ▶ L2 regularization of weights (weight decay)
- ▶ batch normalization
- ▶ input normalization
- ▶ learning rate 0.001, weight decay 0.001, batch momentum 0.9

# Early Combine

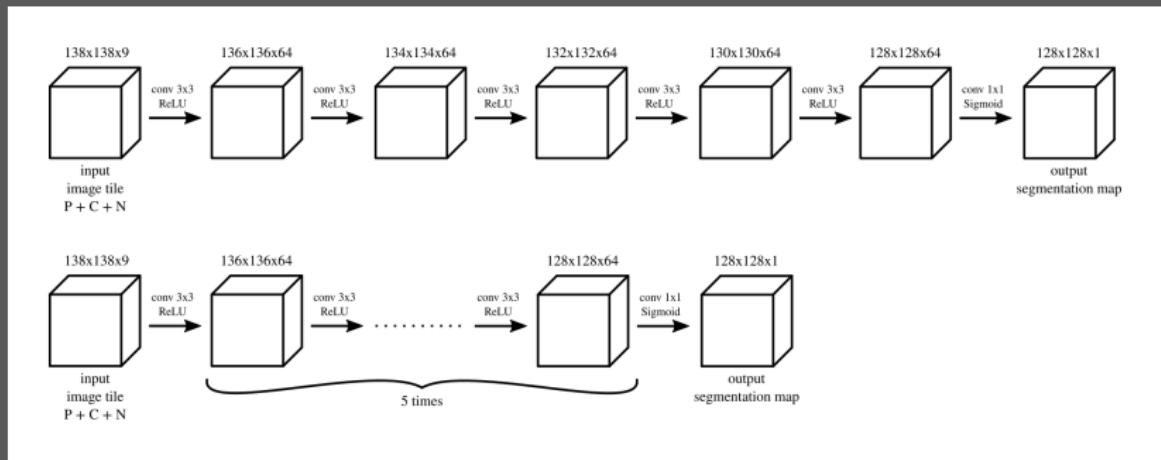


Figure: Early

# Late Combine

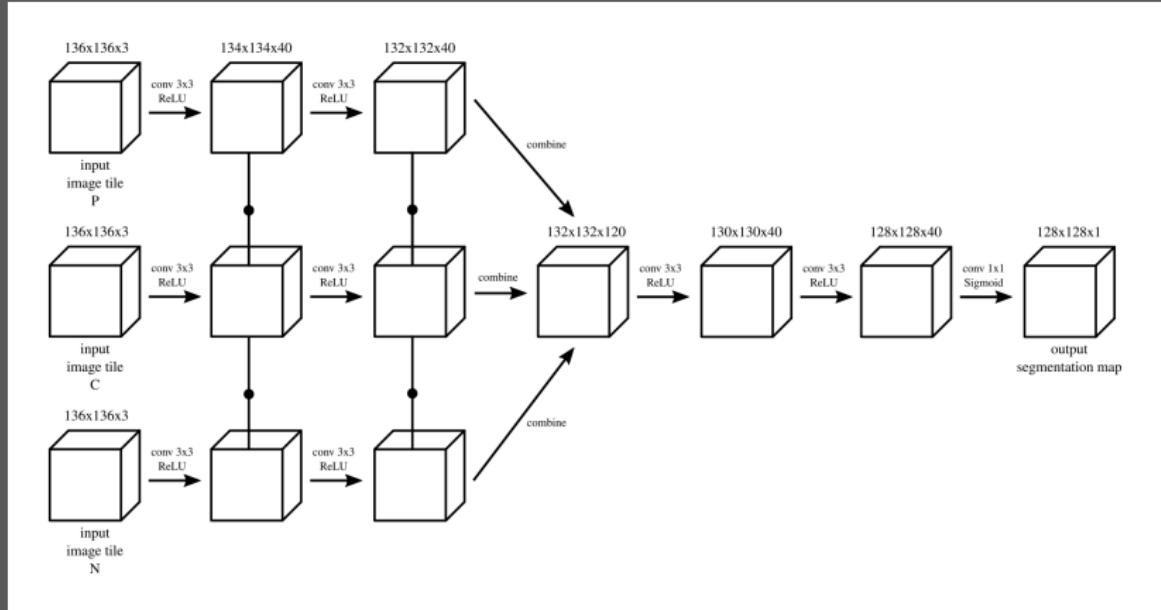


Figure: Late

# Densenet

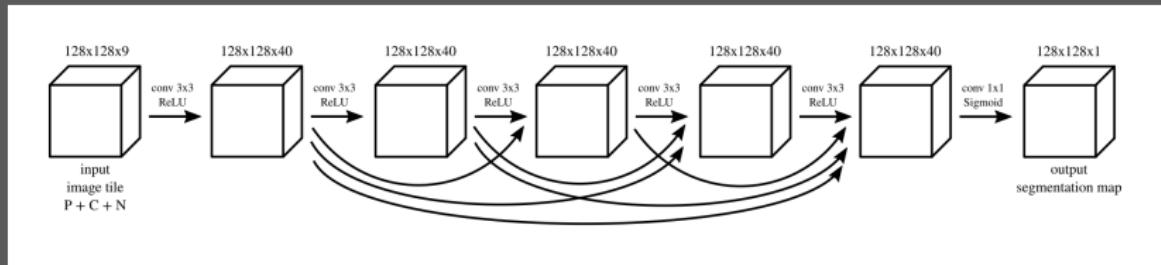


Figure: densenet

# Bottleneck

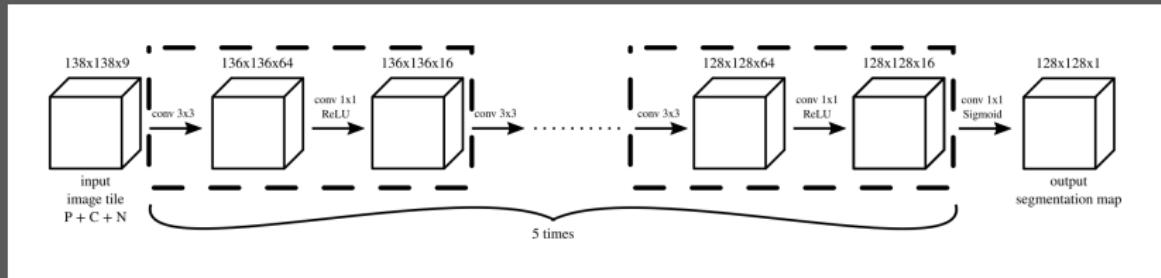


Figure: Bottleneck

# Densenet combined

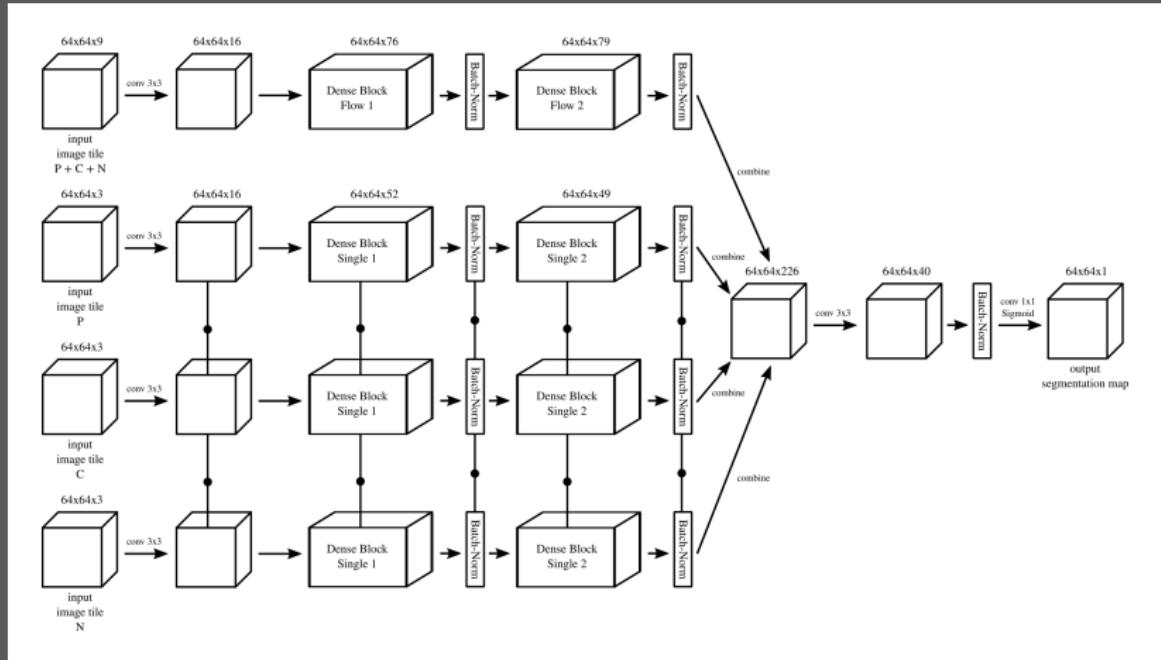


Figure: Densenet combined

# Densenet combined2

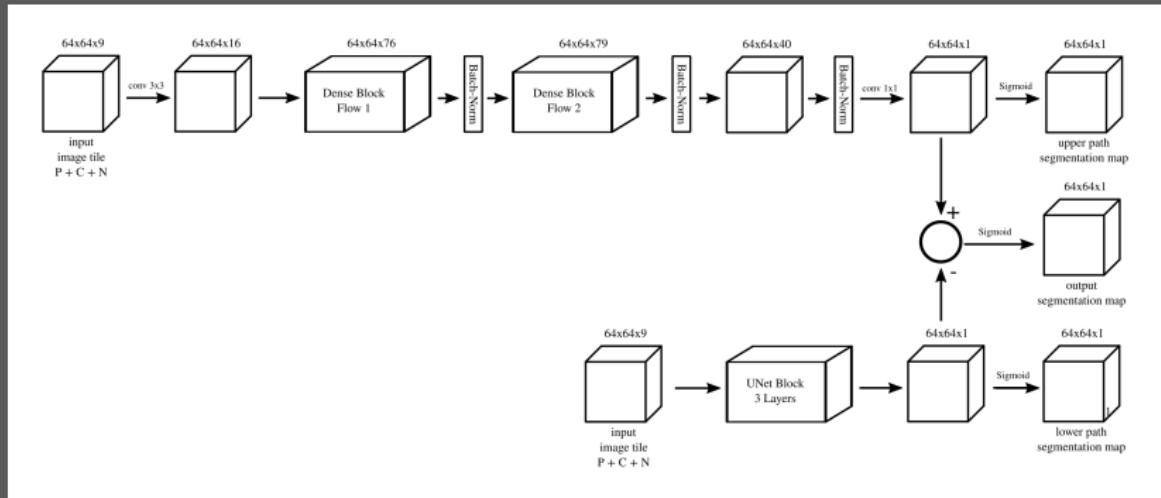


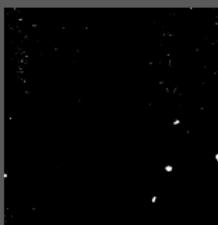
Figure: Densenet combined2

# Train - Ex1



(a) Input

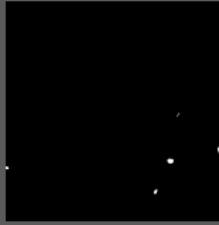
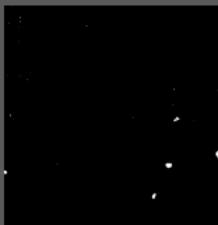
(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

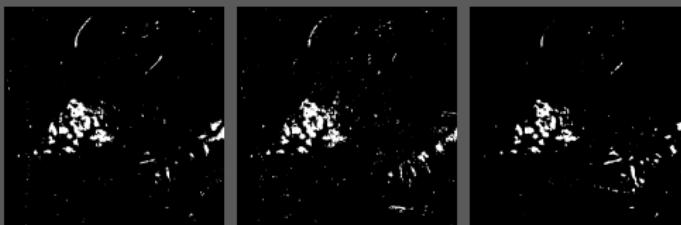
(f) densenet

# Train - Ex2



(a) Input

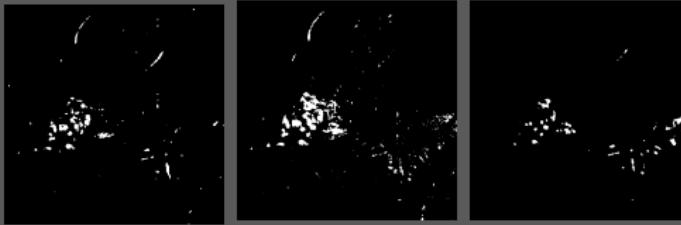
(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

(f) densenet

# Train - Ex3



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

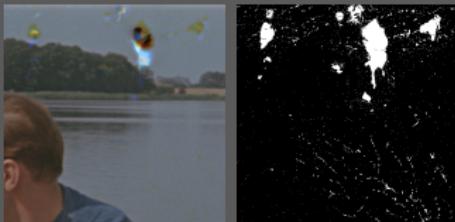


(d)

(e) densenet

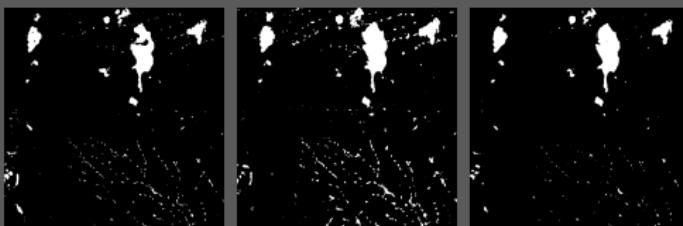
(f) densenet

# Train - Ex4



(a) Input

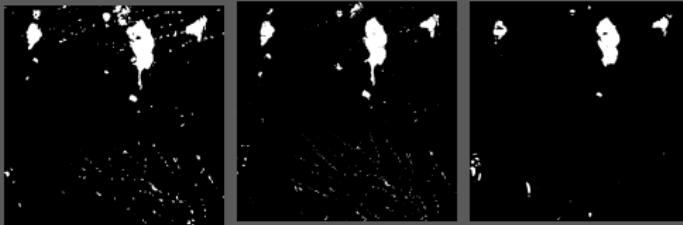
(b) GT



(a) early

(b) late

(c) densenet

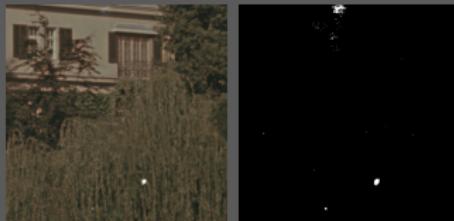


(d)

(e) densenet

(f) densenet

# Train - Ex5



(a) Input

(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

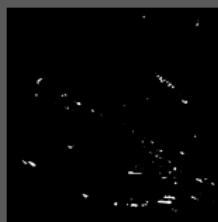
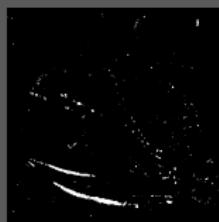
(f) densenet

# Train - Ex6



(a) Input

(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

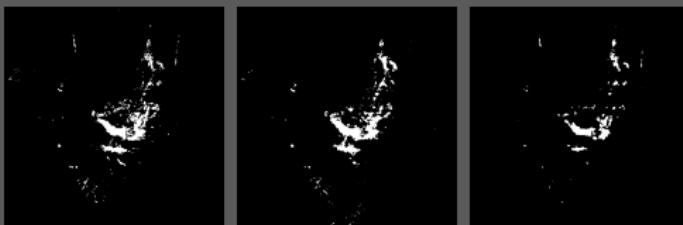
(f) densenet

# Train - Ex7



(a) Input

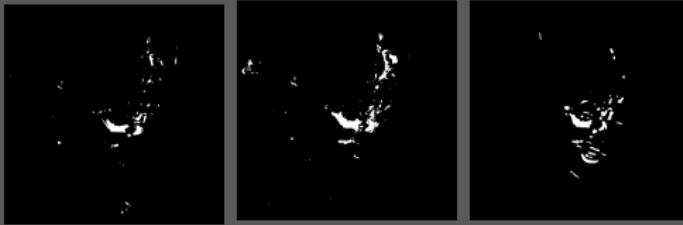
(b) GT



(a) early

(b) late

(c) densenet

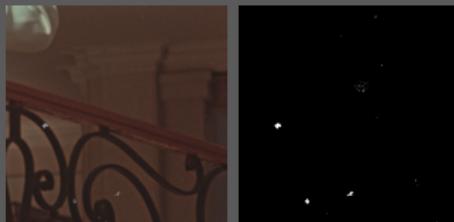


(d)

(e) densenet

(f) densenet

# Train - Ex8



(a) Input

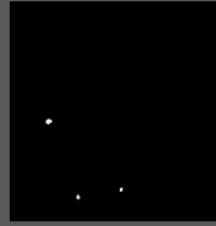
(b) GT



(a) early

(b) late

(c) densenet

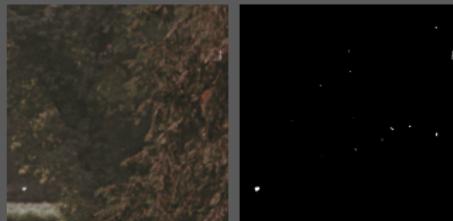


(d)

(e) densenet

(f) densenet

# Train - Ex9



(a) Input

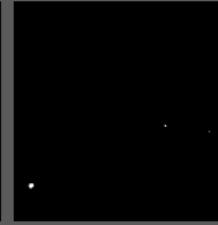
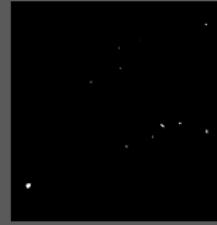
(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

(f) densenet

# Train - Ex10



(a) Input

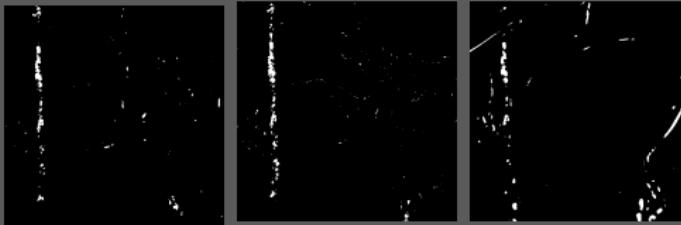
(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

(f) densenet

# Ex1



(a) Input

(b) GT



(a) early



(b) late



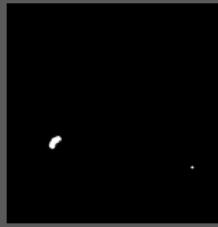
(c) densenet



(d)

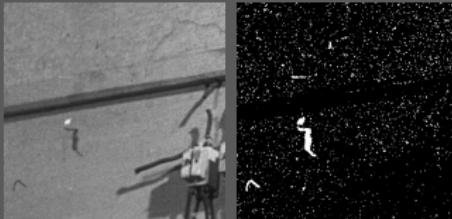


(e) densenet



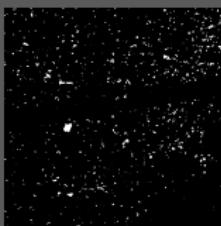
(f) densenet

## Ex2



(a) Input

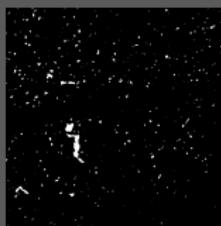
(b) GT



(a) early



(b) late



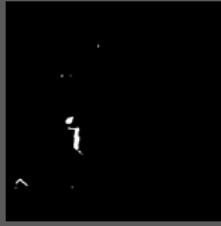
(c) densenet



(d)

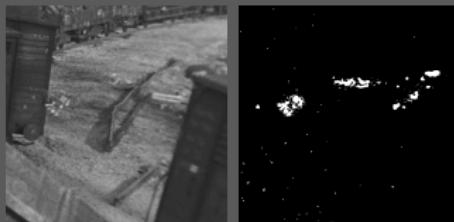


(e) densenet



(f) densenet

# Ex3



(a) Input

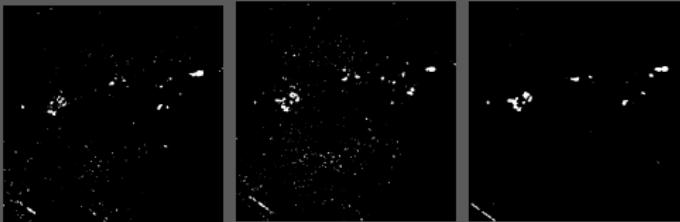
(b) GT



(a) early

(b) late

(c) densenet

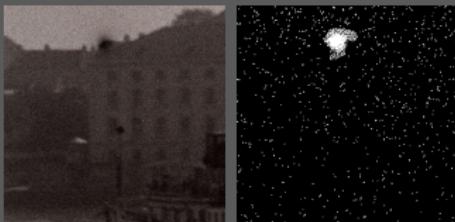


(d)

(e) densenet

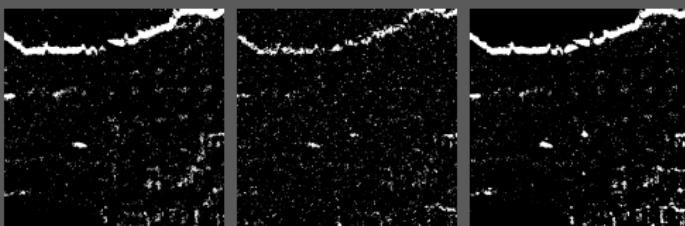
(f) densenet

## Ex4



(a) Input

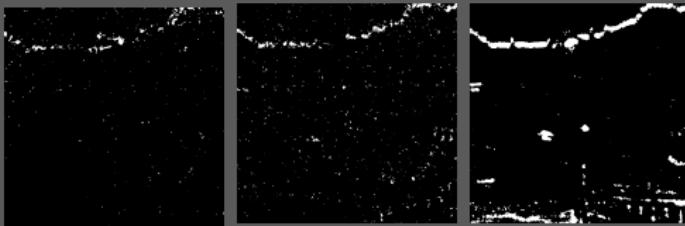
(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

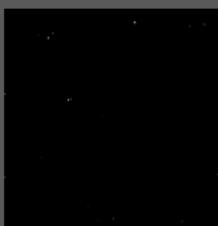
(f) densenet

# Ex5



(a) Input

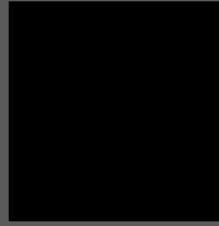
(b) GT



(a) early

(b) late

(c) densenet

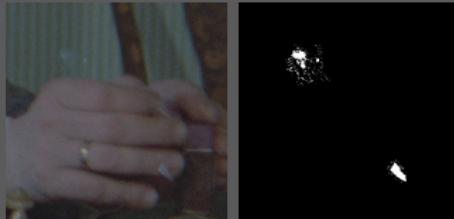


(d)

(e) densenet

(f) densenet

## Ex6



(a) Input

(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

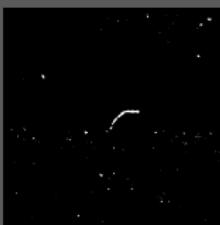
(f) densenet

# Ex7



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

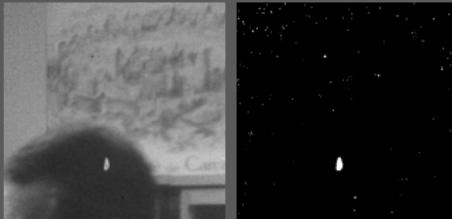


(d)

(e) densenet

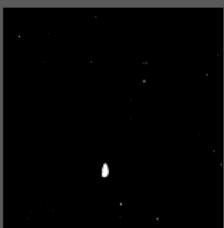
(f) densenet

## Ex8



(a) Input

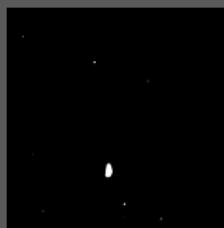
(b) GT



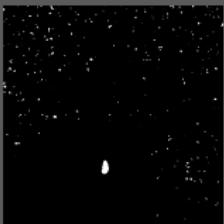
(a) early



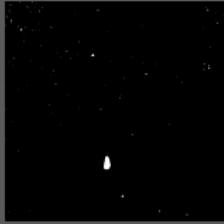
(b) late



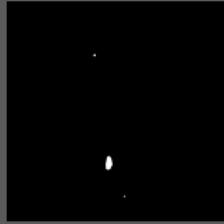
(c) densenet



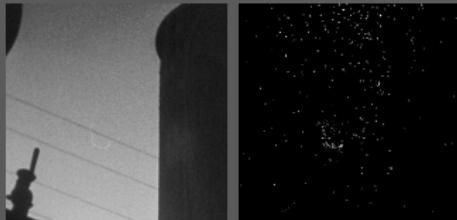
(d)



(e) densenet



(f) densenet



(a) Input

(b) GT



(a) early



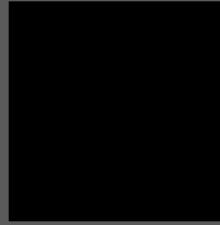
(b) late



(c) densenet



(e) densenet



# Ex10



(a) Input

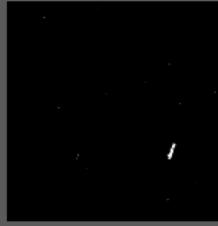
(b) GT



(a) early

(b) late

(c) densenet

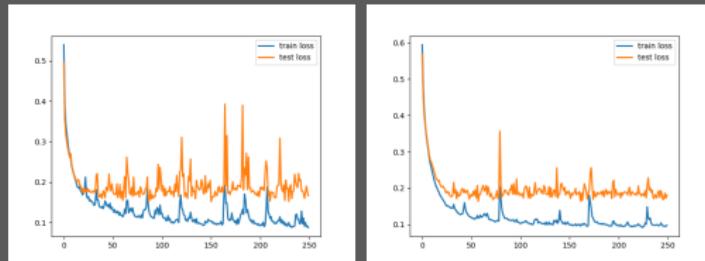


(d)

(e) densenet

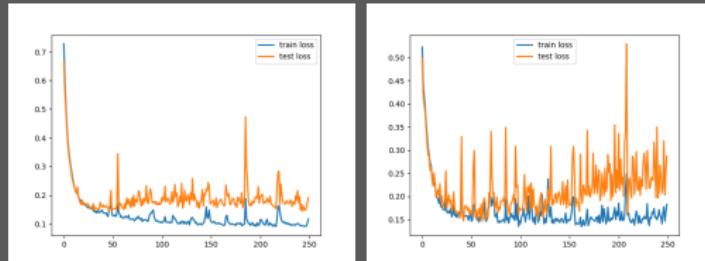
(f) densenet

# Trainingsloss



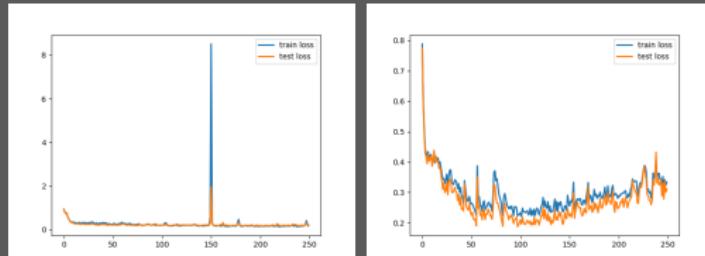
(a) early

(b) late

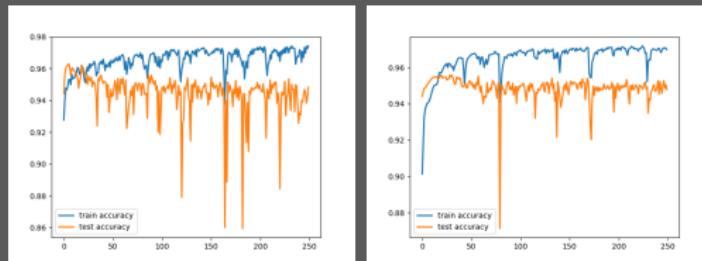


(c) densenet

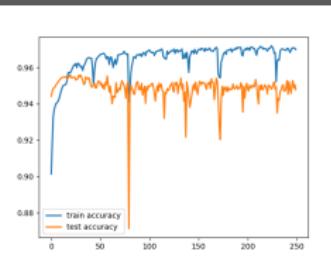
(d) bottleneck



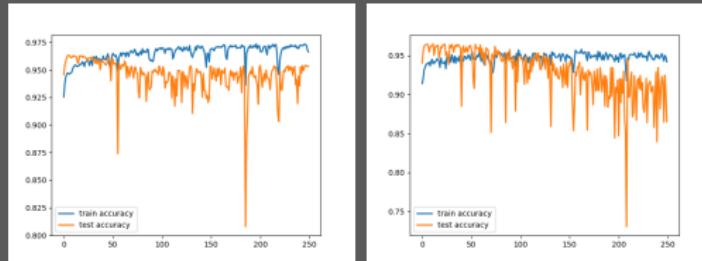
# Accuracy



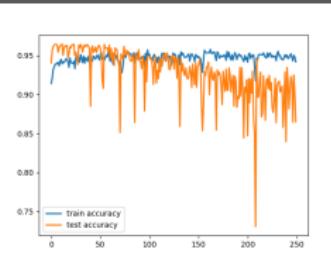
(a) early



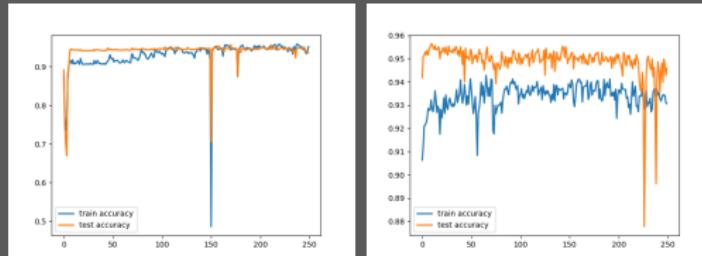
(b) late



(c) densenet

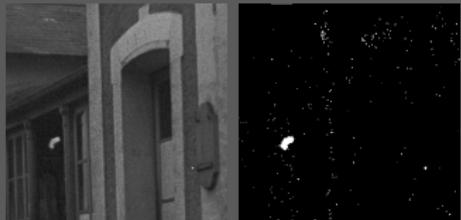


(d) bottleneck





# Ex1



(a) Input

(b) GT



(a) early



(b) late



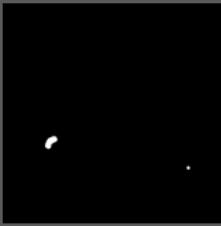
(c) densenet



(d)



(e) densenet



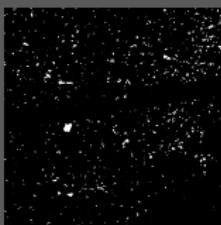
(f) densenet

## Ex2



(a) Input

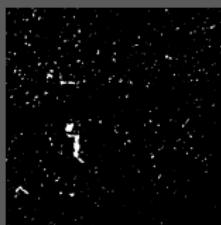
(b) GT



(a) early



(b) late



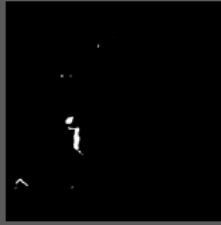
(c) densenet



(d)

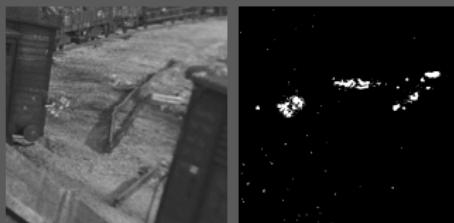


(e) densenet



(f) densenet

# Ex3



(a) Input

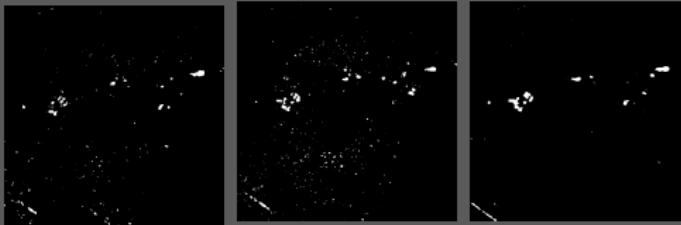
(b) GT



(a) early

(b) late

(c) densenet

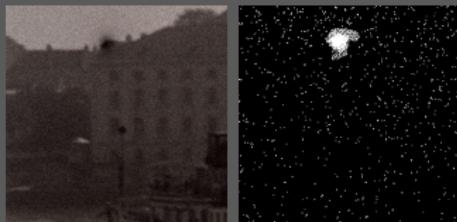


(d)

(e) densenet

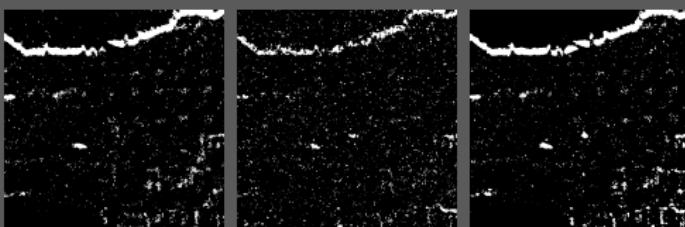
(f) densenet

## Ex4



(a) Input

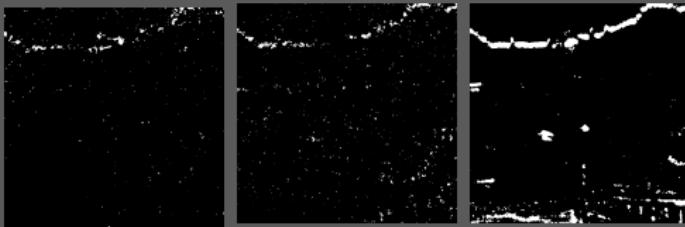
(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

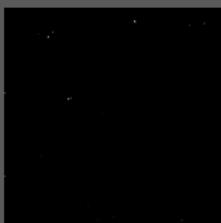
(f) densenet

## Ex5



(a) Input

(b) GT



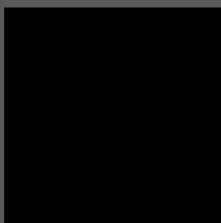
(a) early



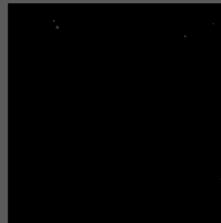
(b) late



(c) densenet



(d)

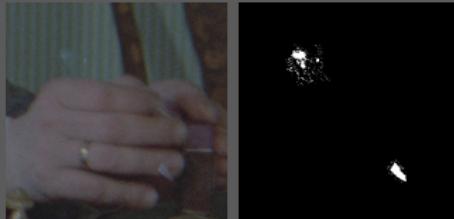


(e) densenet



(f) densenet

## Ex6



(a) Input

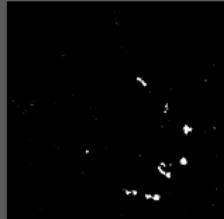
(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

(f) densenet

## Ex7



(a) Input

(b) GT



(a) early



(b) late



(c) densenet



(d)

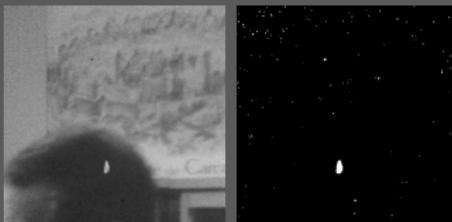


(e) densenet



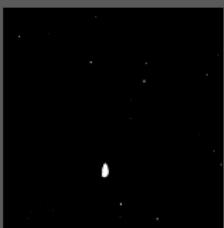
(f) densenet

# Ex8



(a) Input

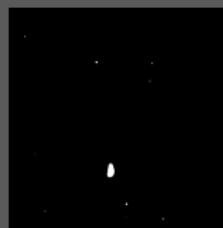
(b) GT



(a) early



(b) late



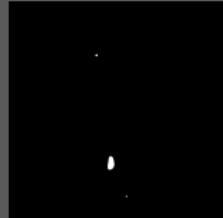
(c) densenet



(d)

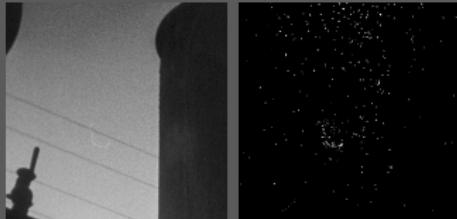


(e) densenet



(f) densenet

# Ex9



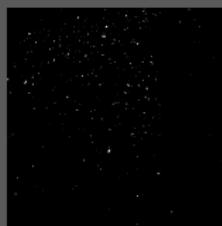
(a) Input



(b) GT



(a) early



(b) late



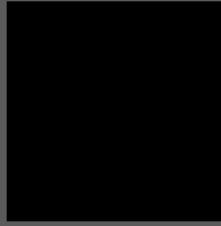
(c) densenet



(d)



(e) densenet



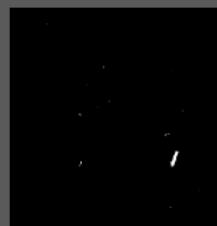
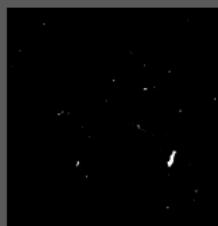
(f) densenet

# Ex10



(a) Input

(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

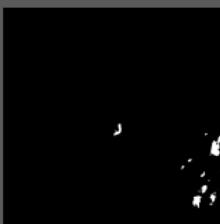
(f) densenet

# Ex11

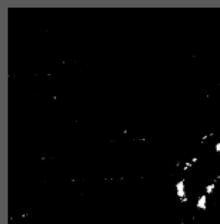


(a) Input

(b) GT



(a) early



(b) late



(c) densenet



(d)



(e) densenet



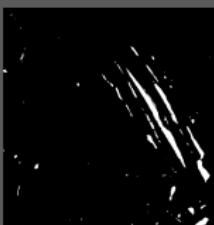
(f) densenet

## Ex12

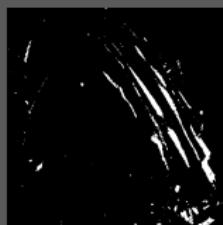


(a) Input

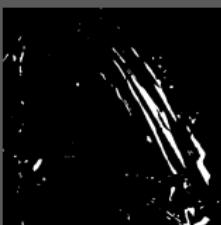
(b) GT



(a) early



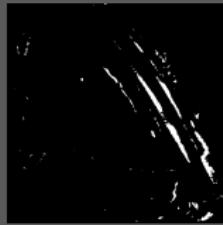
(b) late



(c) densenet



(d)



(e) densenet



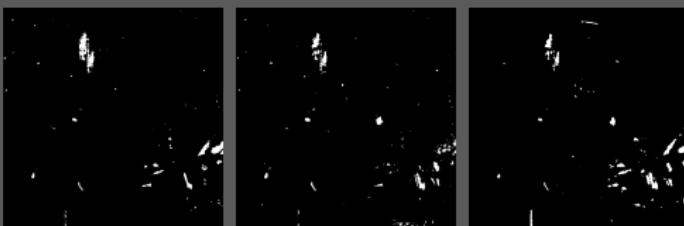
(f) densenet

# Ex13



(a) Input

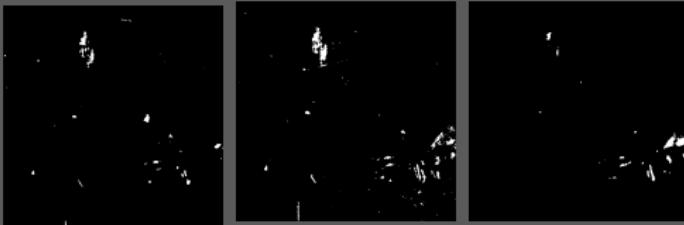
(b) GT



(a) early

(b) late

(c) densenet



(d)

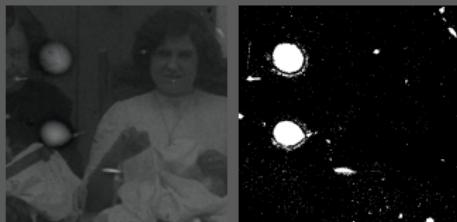
(e) densenet

(f)

densenet

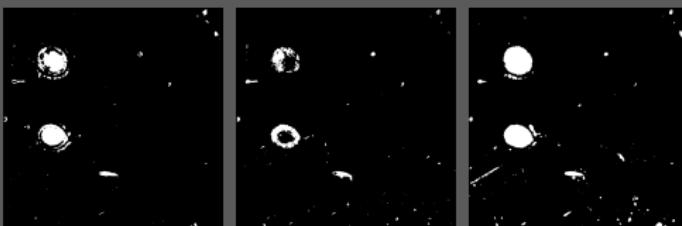


# Ex14



(a) Input

(b) GT



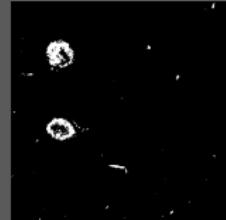
(a) early

(b) late

(c) densenet



(d)



(e) densenet



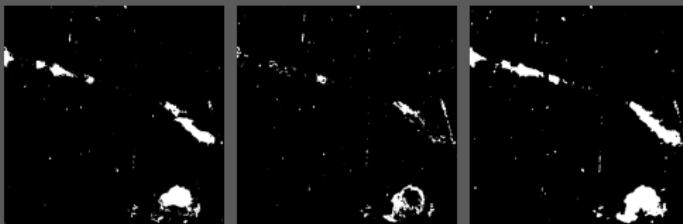
(f) densenet

# Ex15



(a) Input

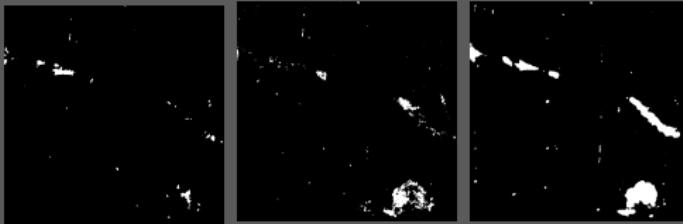
(b) GT



(a) early

(b) late

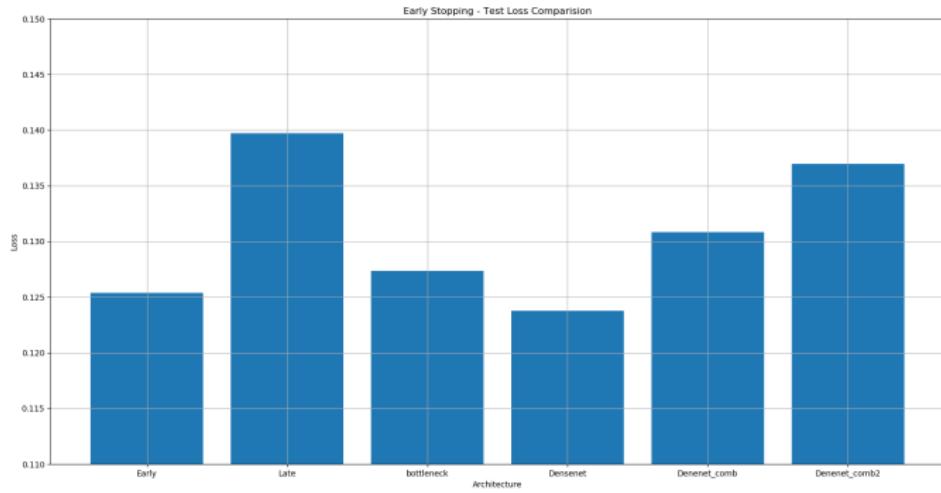
(c) densenet

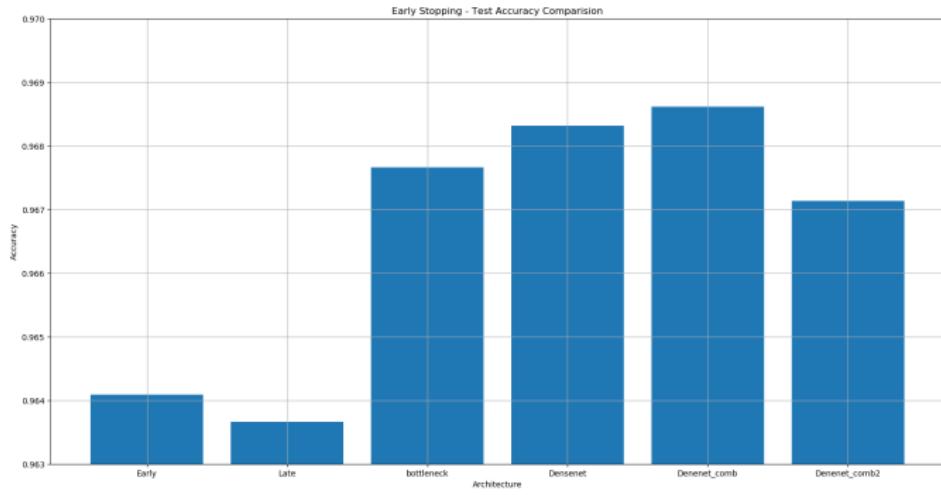


(d)

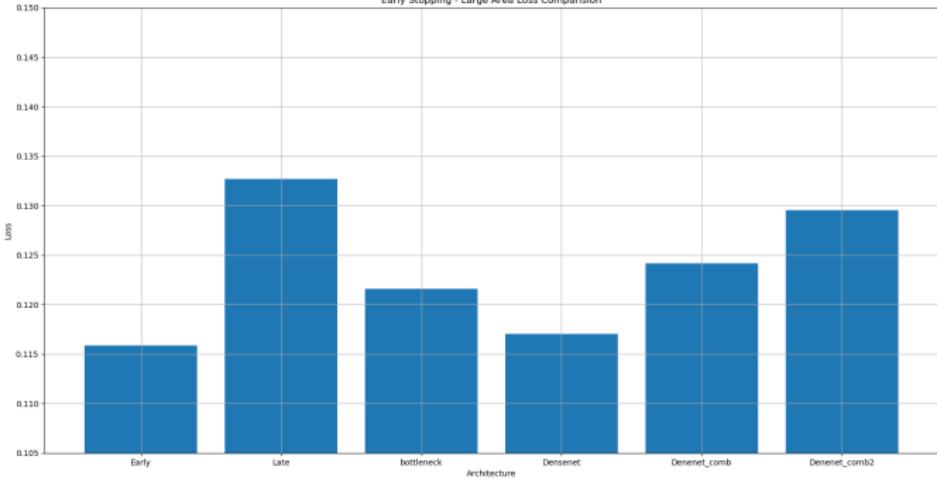
(e) densenet

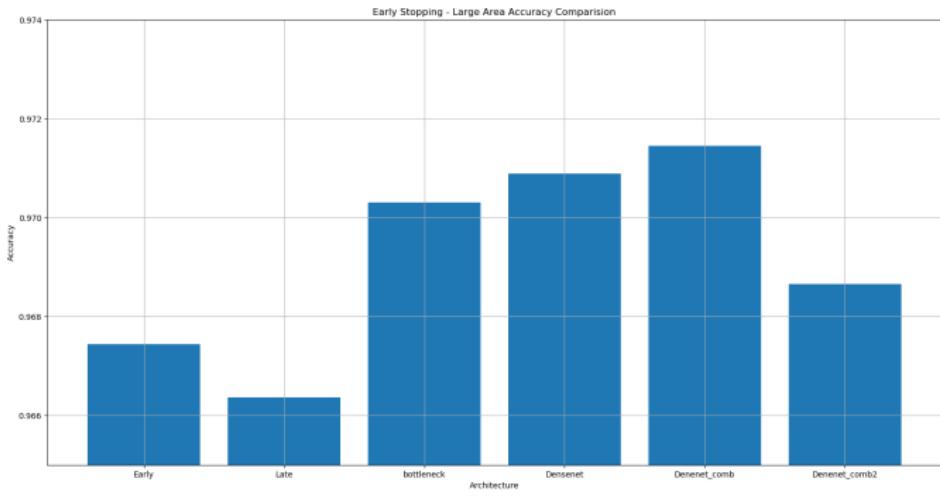
(f) densenet



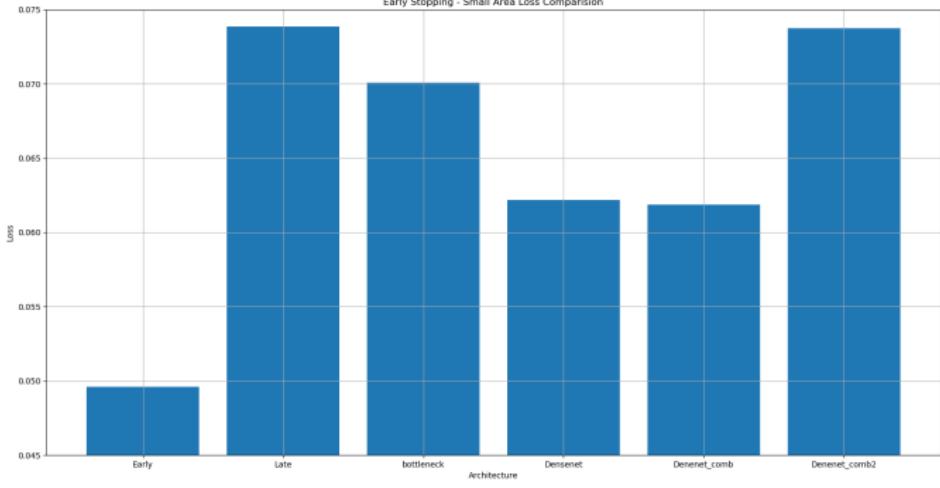


Early Stopping - Large Area Loss Comparison

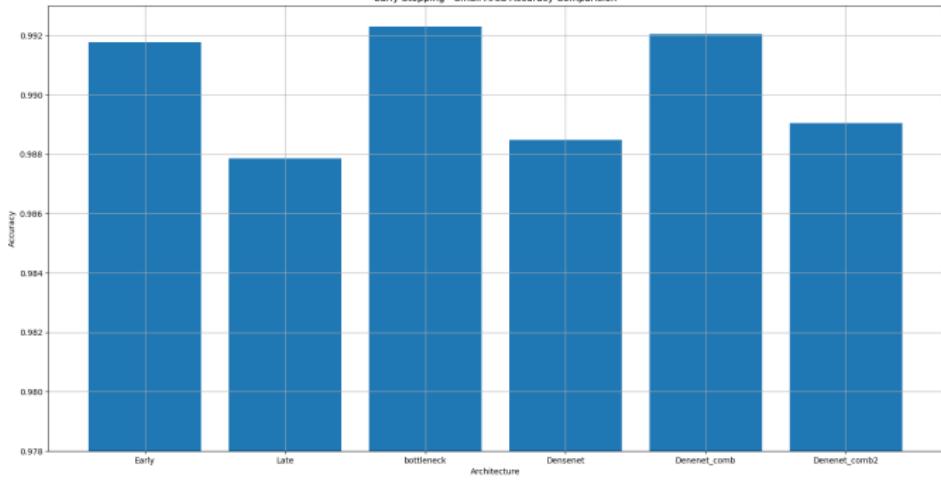




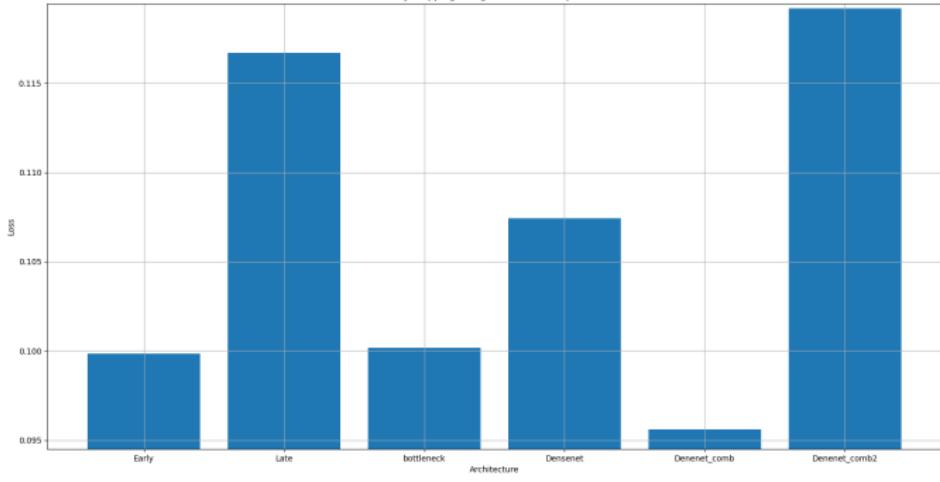
Early Stopping - Small Area Loss Comparison



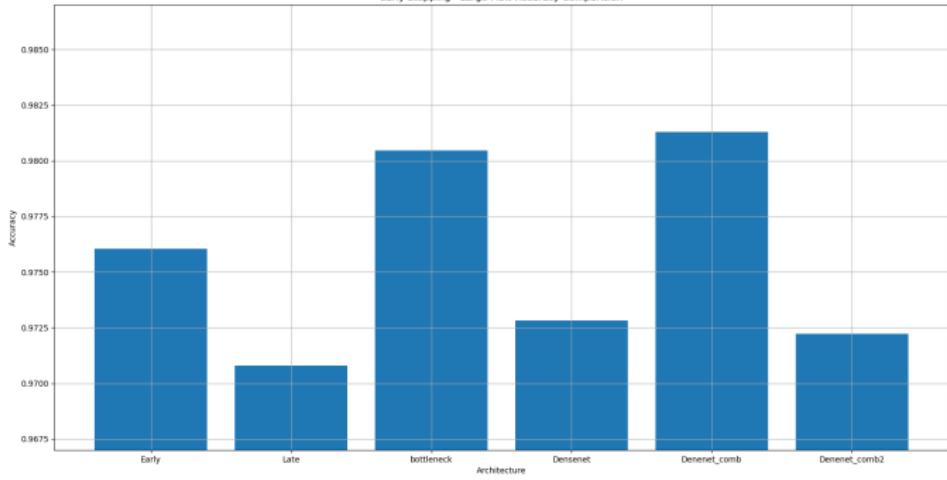
Early Stopping - Small Area Accuracy Comparision



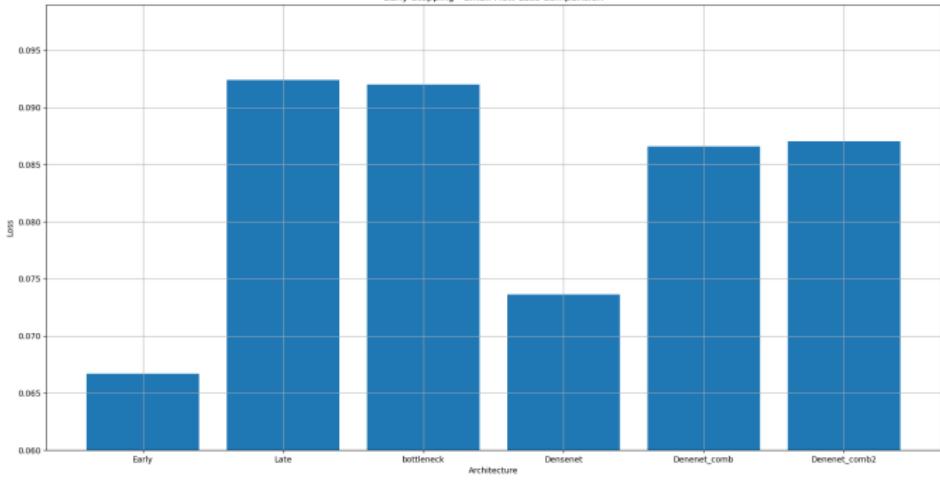
Early Stopping - Large Flow Loss Comparison

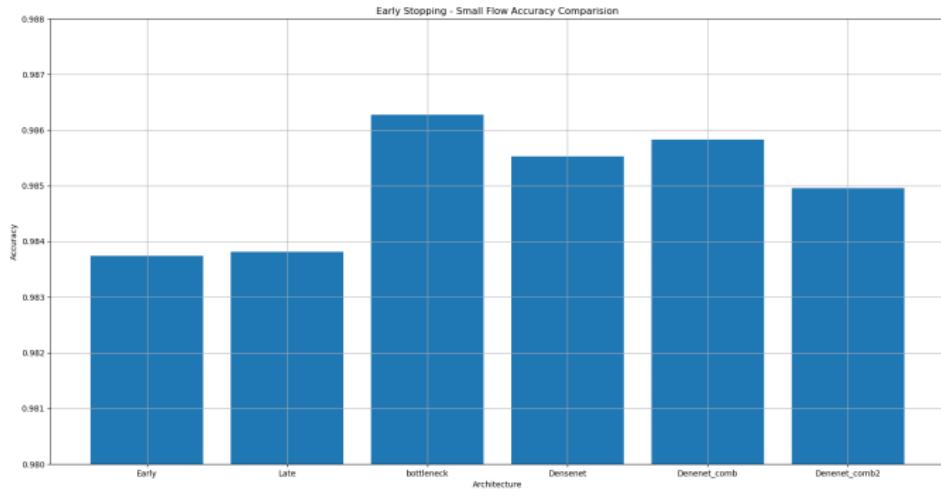


Early Stopping - Large Flow Accuracy Comparison



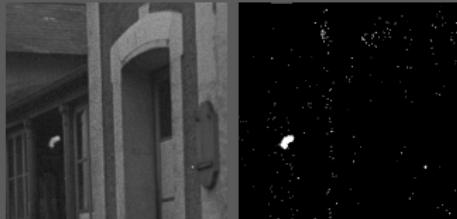
Early Stopping - Small Flow Loss Comparison







# Ex1



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

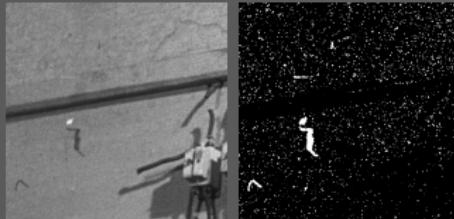


(d)

(e) densenet

(f) densenet

## Ex2



(a) Input

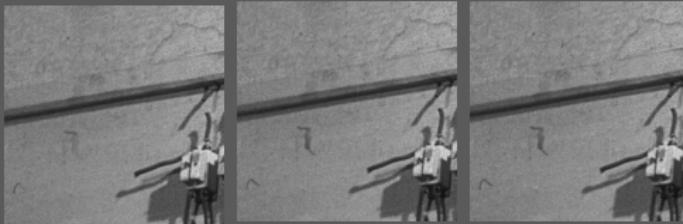
(b) GT



(a) early

(b) late

(c) densenet

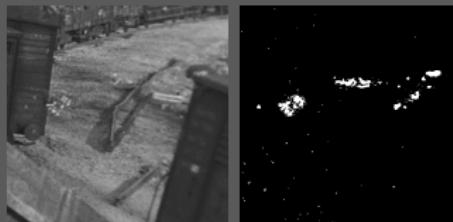


(d)

(e) densenet

(f) densenet

# Ex3



(a) Input

(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

(f) densenet

## Ex4



(a) Input

(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

(f) densenet

# Ex5



(a) Input

(b) GT



(a) early

(b) late

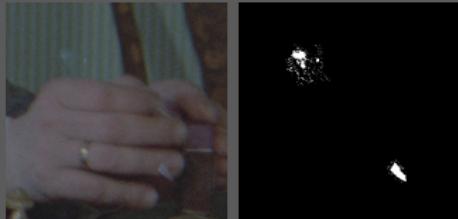
(c) densenet



(d)

(e) densenet

(f) densenet



(a) Input

(b) GT



(a) early

(b) late

(c) densenet



(e) densenet

(f) den

# Ex7



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

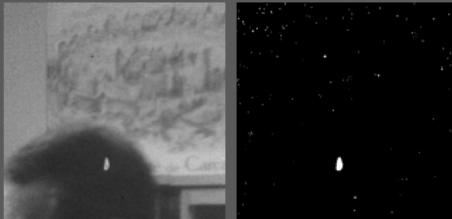


(d)

(e) densenet

(f) densenet

## Ex8



(a) Input



(b) GT



(a) early



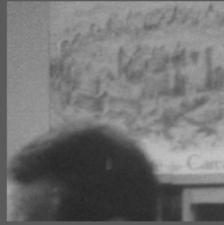
(b) late



(c) densenet



(d)

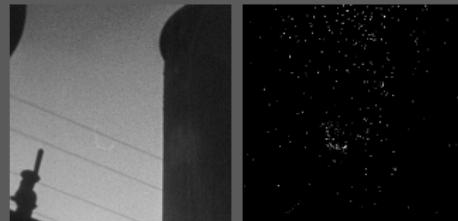


(e) densenet



(f) densenet

# Ex9



(a) Input

(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

(f) densenet

# Ex10



(a) Input

(b) GT



(a) early



(b) late



(c) densenet



(d)



(e) densenet



(f) densenet

# Ex11



(a) Input

(b) GT



(a) early



(b) late



(c) densenet



(d)

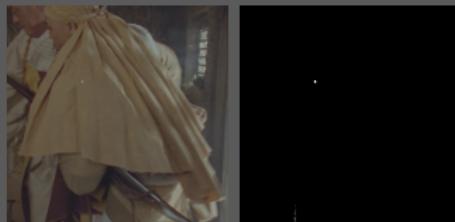


(e) densenet



(f) densenet

## Ex12



(a) Input

(b) GT



(a) early



(b) late



(c) densenet



(d)



(e) densenet



(f) densenet

# Ex13



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

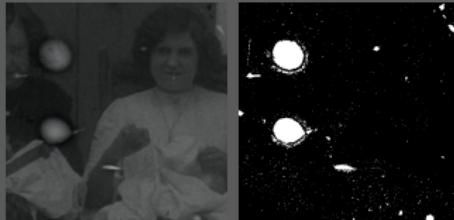


(d)

(e) densenet

(f) densenet

# Ex14



(a) Input

(b) GT



(a) early

(b) late

(c) densenet



(d)

(e) densenet

(f) densenet

# Ex15

