

Deep Restore

Architecture Comparision Server

September 18, 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

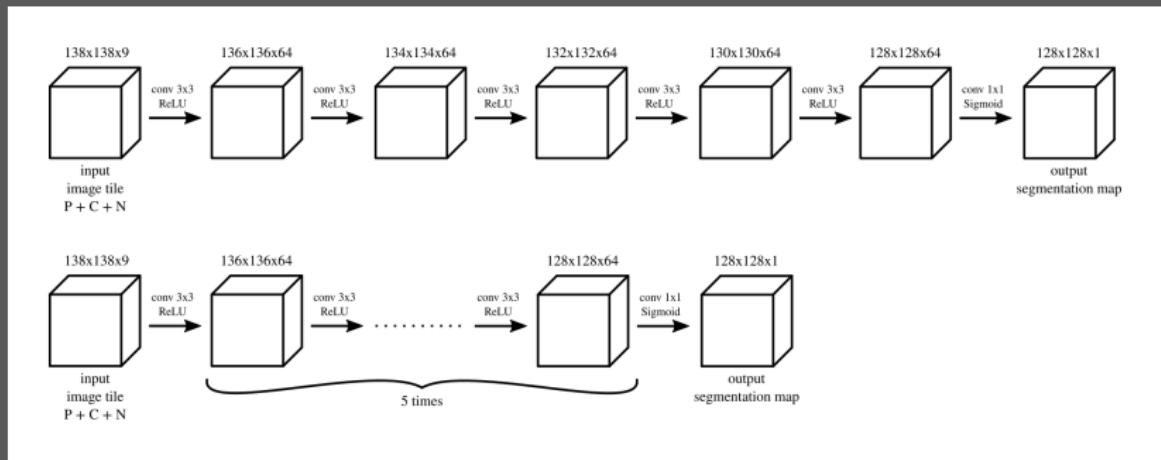


Figure: Early

Late Combine

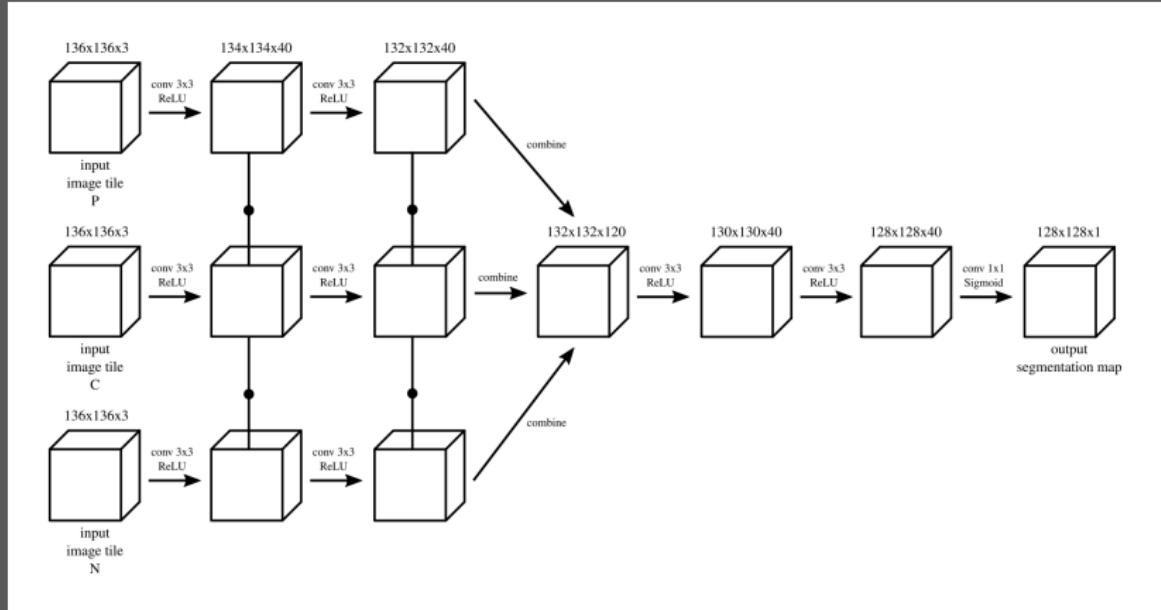


Figure: Late

Densenet

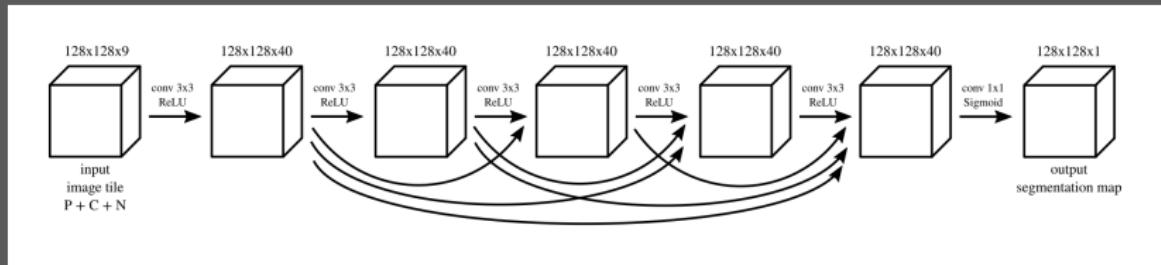


Figure: densenet

Bottleneck

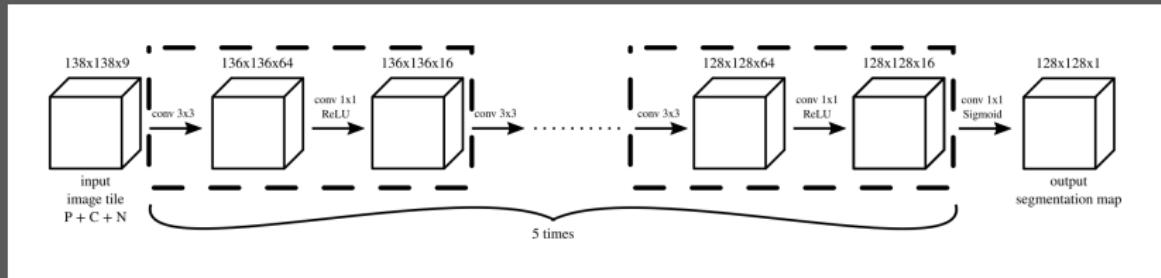


Figure: Bottleneck

Densenet combined

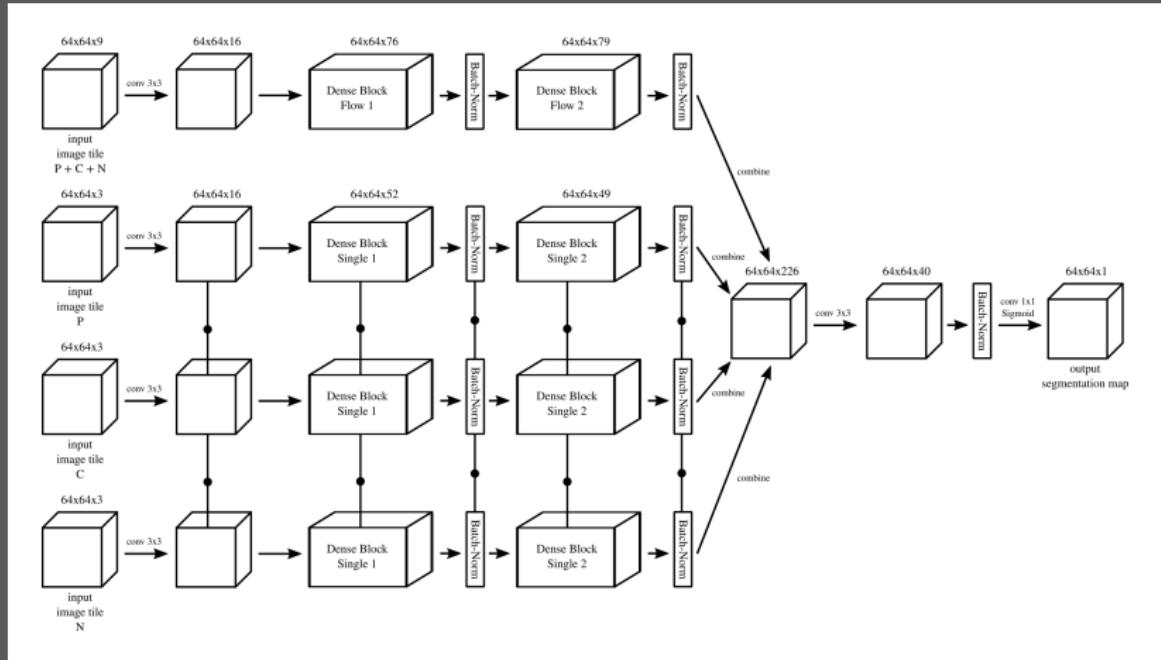


Figure: Densenet combined

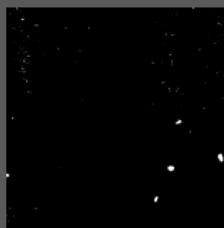
Train - Ex1



(a) Input



(b) GT



(a) early



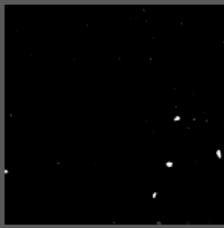
(b) late



(c) densenet
bottleneck



(d)

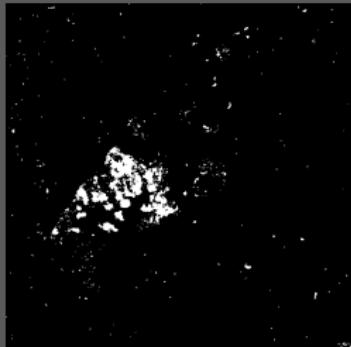


(e) densenet
comb

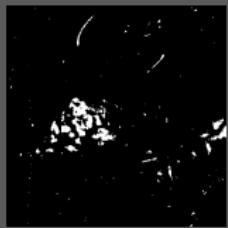
Train - Ex2



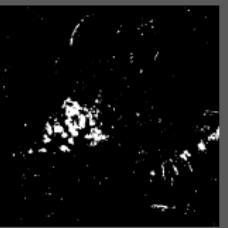
(a) Input



(b) GT



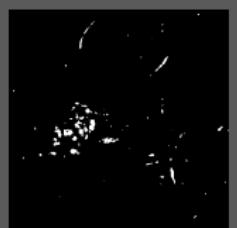
(a) early



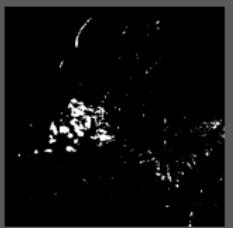
(b) late



(c) densenet



(d) bottleneck



(e) densenet
comb

Train - Ex3



(a) Input



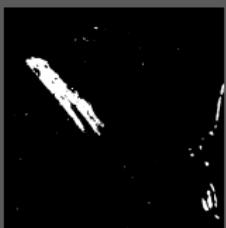
(b) GT



(a) early



(b) late



(c) densenet

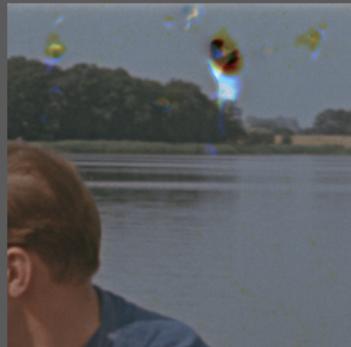


(d) bottleneck
bottleneck

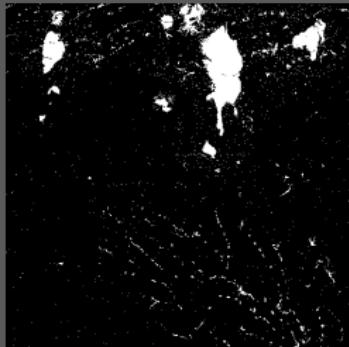


(e) densenet
comb

Train - Ex4



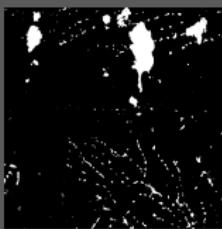
(a) Input



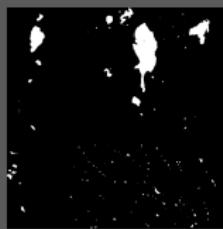
(b) GT



(a) early



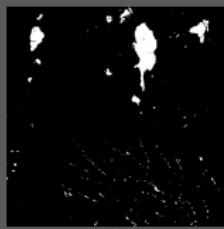
(b) late



(c) densenet



(d) bottleneck



(e) densenet
comb

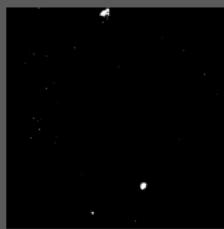
Train - Ex5



(a) Input



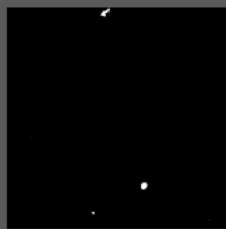
(b) GT



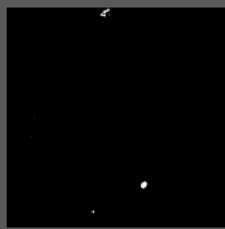
(a) early



(b) late



(c) densenet



(d) bottleneck



(e) densenet
comb

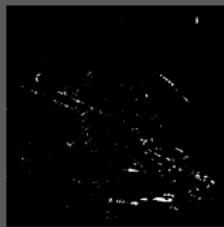
Train - Ex6



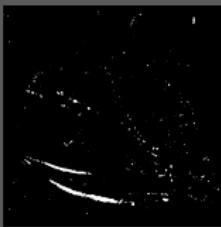
(a) Input



(b) GT



(a) early



(b) late



(c) densenet
bottleneck

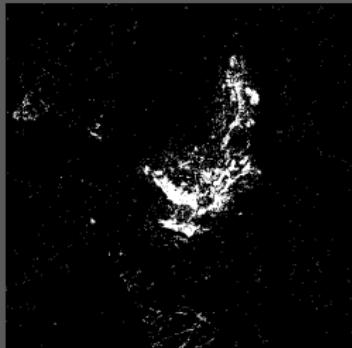


(d) bottleneck
(e) densenet
comb

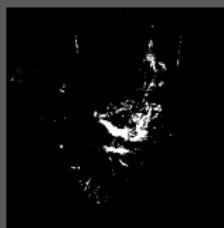
Train - Ex7



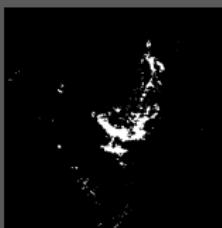
(a) Input



(b) GT



(a) early



(b) late



(c) densenet
bottleneck



(d) (e) densenet
bottleneck
comb

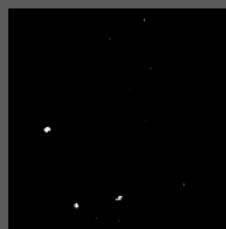
Train - Ex8



(a) Input



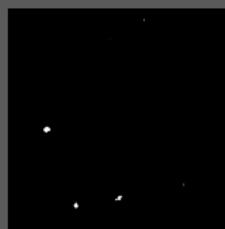
(b) GT



(a) early



(b) late



(c) densenet



(d) bottleneck



(e) densenet
comb

Train - Ex9



(a) Input



(b) GT



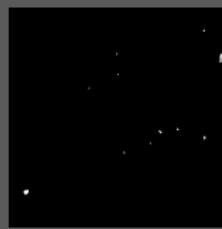
(a) early



(b) late



(c) densenet
bottleneck



(d)



(e) densenet
comb

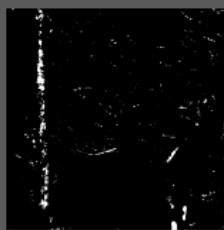
Train - Ex10



(a) Input



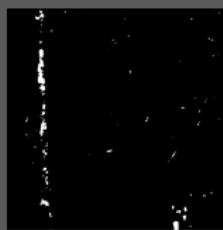
(b) GT



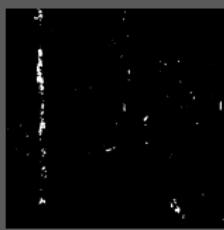
(a) early



(b) late

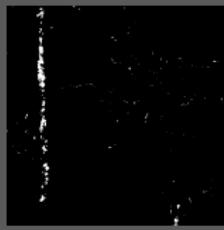


(c) densenet



(d)

bottleneck



(e) densenet
comb

Train - Ex11



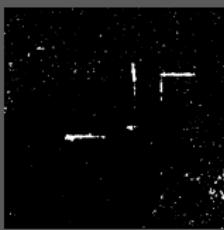
(a) Input



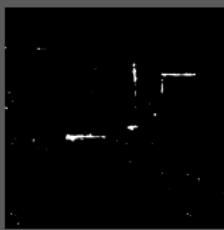
(b) GT



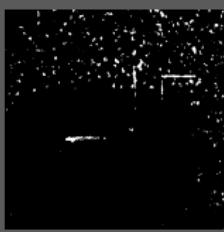
(a) early



(b) late



(c) densenet
bottleneck



(d) (e) densenet
comb

Train - Ex12



(a) Input



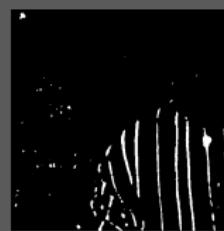
(b) GT



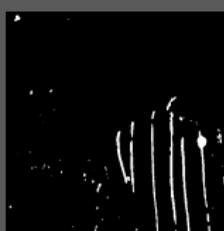
(a) early



(b) late



(c) densenet
bottleneck

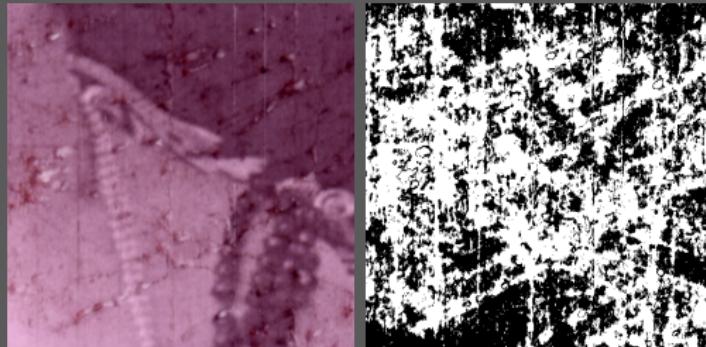


(d)



(e) densenet
comb

Train - Ex13

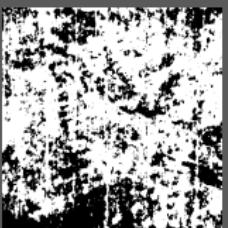


(a) Input

(b) GT



(a) early



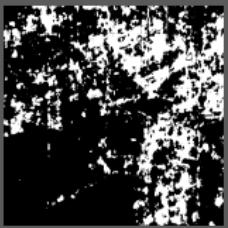
(b) late



(c) densenet



(d)
bottleneck

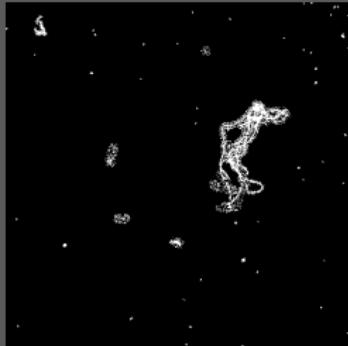


(e)
densenet
comb

Train - Ex14



(a) Input



(b) GT



(a) early



(b) late



(c) densenet
bottleneck



(d)



(e) densenet
comb

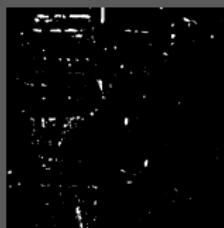
Train - Ex15



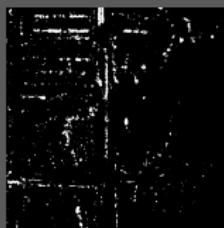
(a) Input



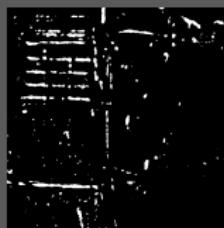
(b) GT



(a) early



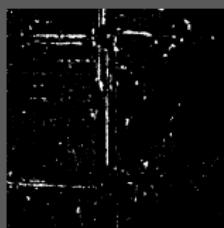
(b) late



(c) densenet

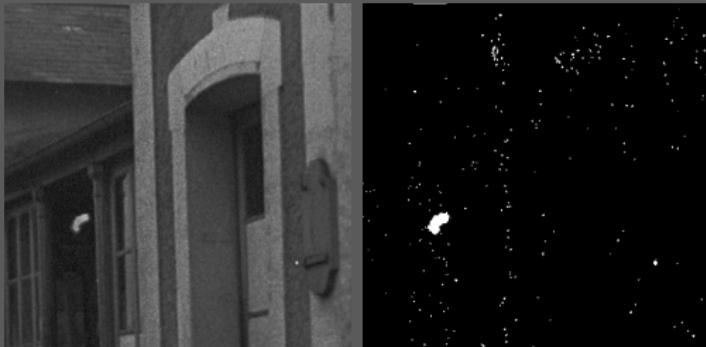


(d) bottleneck



(e) densenet
comb

Ex1



(a) Input

(b) GT



(a) early



(b) late



(c) densenet



(d) bottleneck



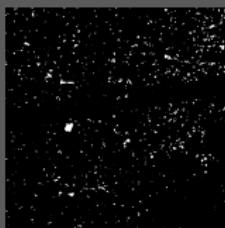
(e) densenet
comb



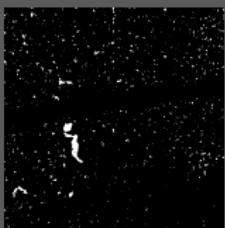
(a) Input



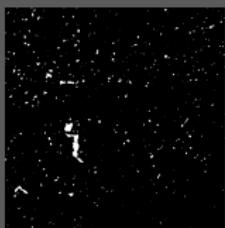
(b) GT



(a) early



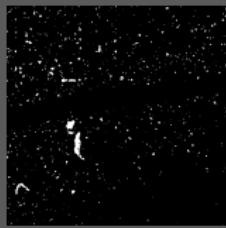
(b) late



(c) densenet



(d)
bottleneck

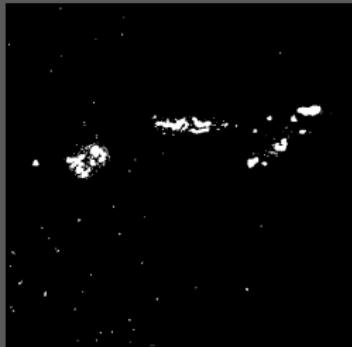


(e) densenet
comb

Ex3



(a) Input



(b) GT



(a) early



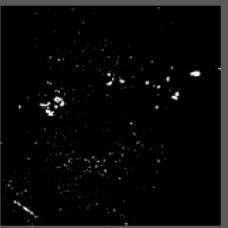
(b) late



(c) densenet



(d) bottleneck



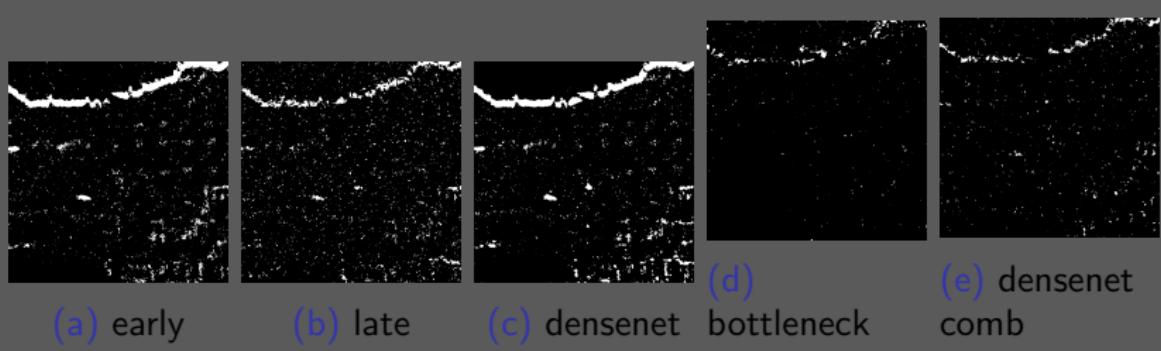
(e) densenet
comb

Ex4



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

(d) bottleneck

(e) densenet
comb

Ex5



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

(d)

bottleneck

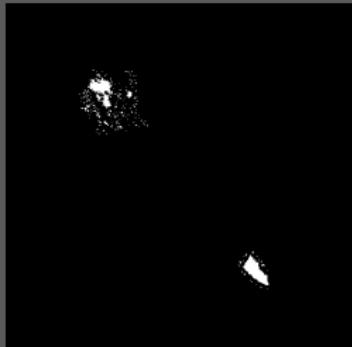
(e) densenet

comb

Ex6



(a) Input



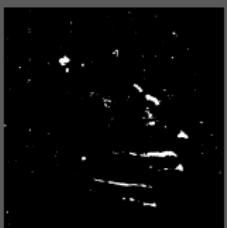
(b) GT



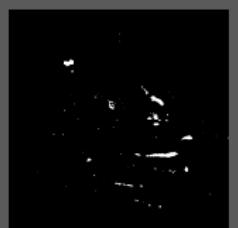
(a) early



(b) late



(c) densenet
bottleneck



(d) densenet
comb



Ex7



(a) Input



(b) GT



(a) early



(b) late



(c) densenet
bottleneck



(d) (e) densenet
bottleneck
comb

Ex8



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

(d) bottleneck

(e) densenet
comb

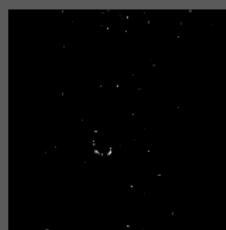
Ex9



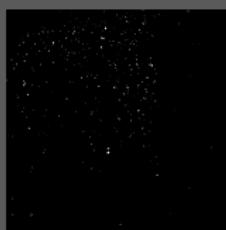
(a) Input



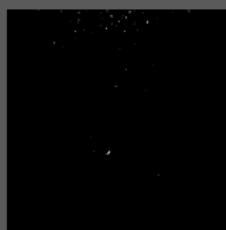
(b) GT



(a) early



(b) late



(c) densenet
bottleneck

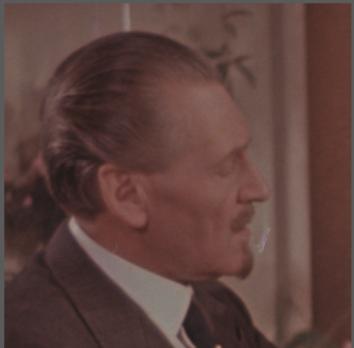


(d)

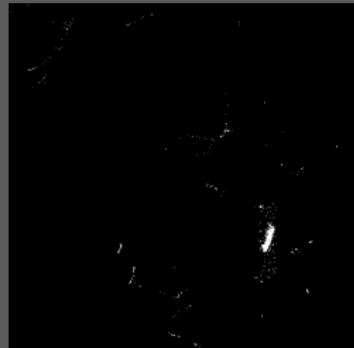


(e) densenet
comb

Ex10



(a) Input



(b) GT



(a) early



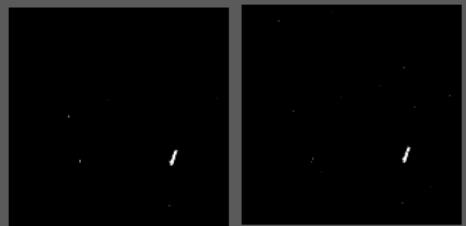
(b) late



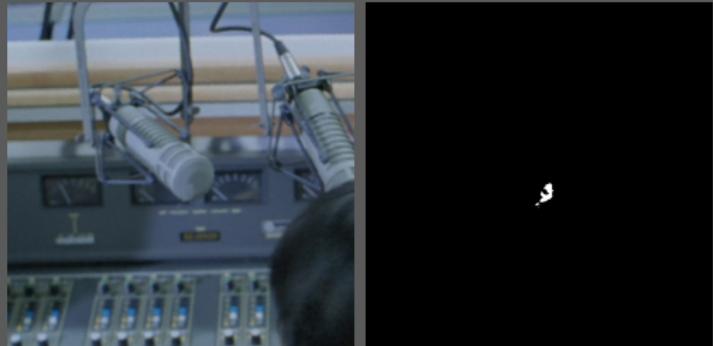
(c) densenet
bottleneck



(d) densenet
comb

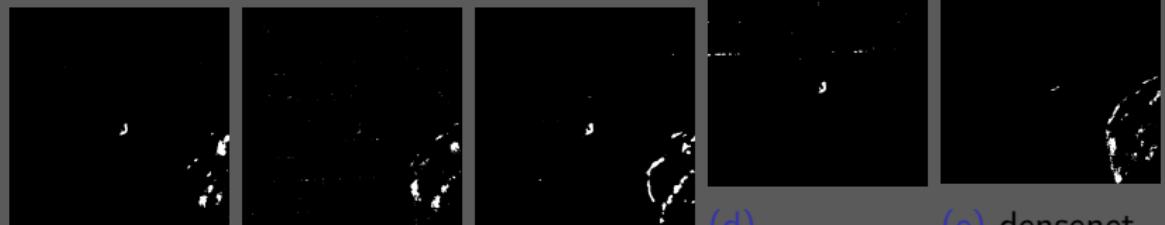


Ex11



(a) Input

(b) GT



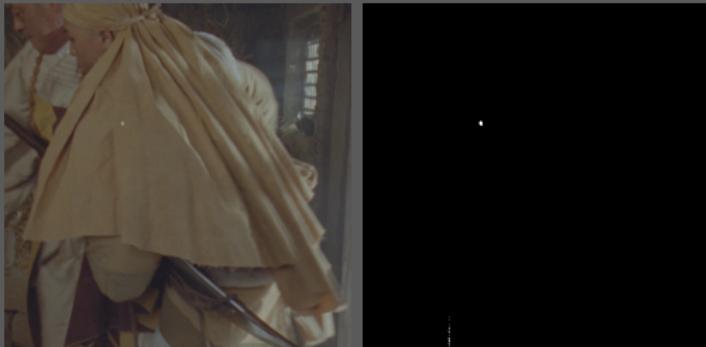
(a) early

(b) late

(c) densenet
bottleneck

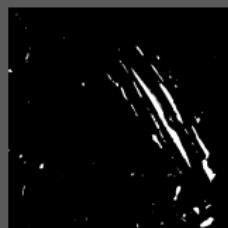
(d) densenet
comb

Ex12

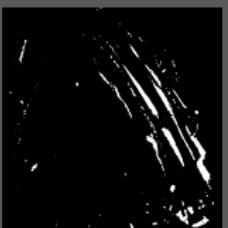


(a) Input

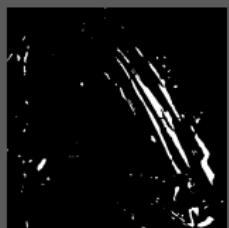
(b) GT



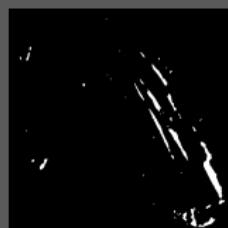
(a) early



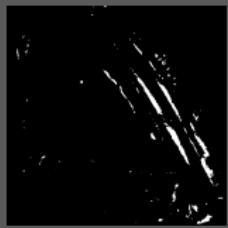
(b) late



(c) densenet



(d)
bottleneck



(e) densenet
comb

Ex13

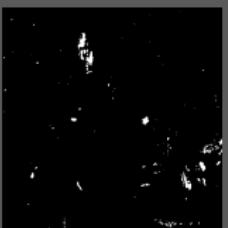


(a) Input

(b) GT



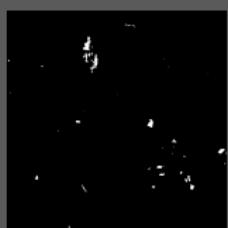
(a) early



(b) late



(c) densenet



(d) bottleneck

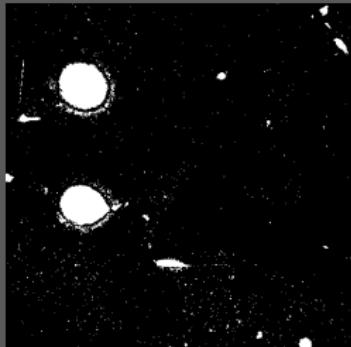


(e) densenet
comb

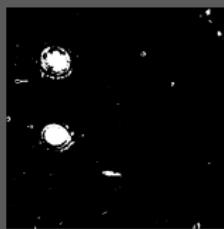
Ex14



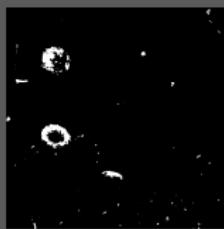
(a) Input



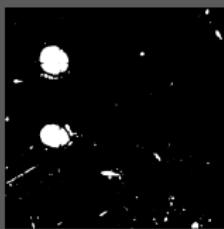
(b) GT



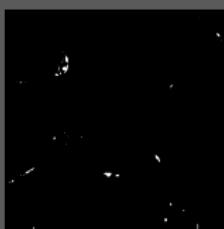
(a) early



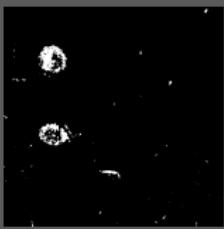
(b) late



(c) densenet
bottleneck

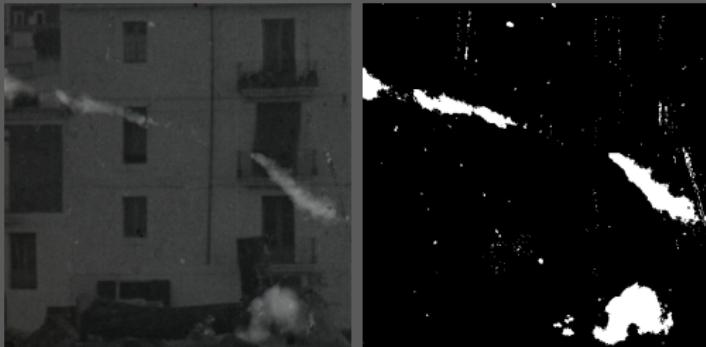


(d)



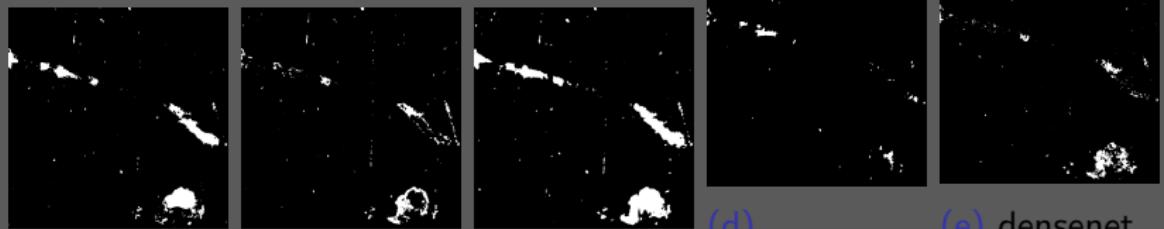
(e) densenet
comb

Ex15



(a) Input

(b) GT



(a) early

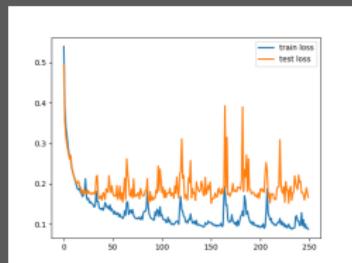
(b) late

(c) densenet

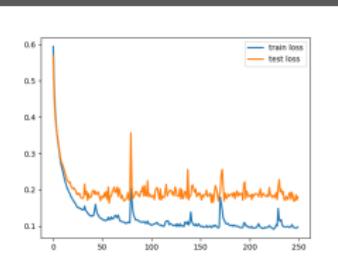
(d) bottleneck

(e) densenet
comb

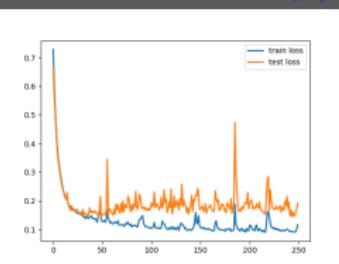
Trainingsloss



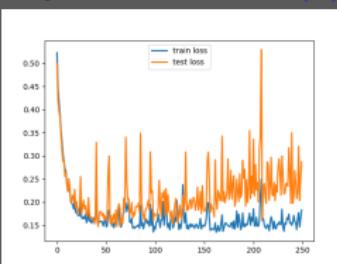
(a) early



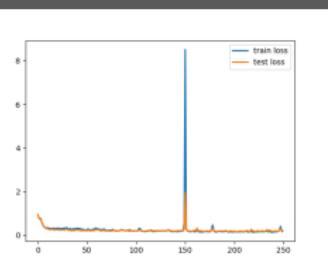
(b) late



(c) densenet

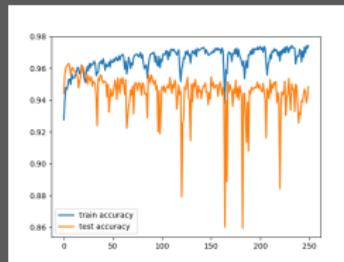


(d) bottleneck

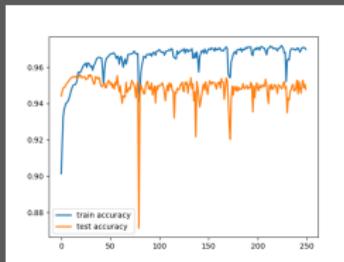


(e) densenet comb

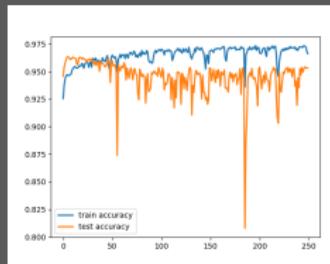
Accuracy



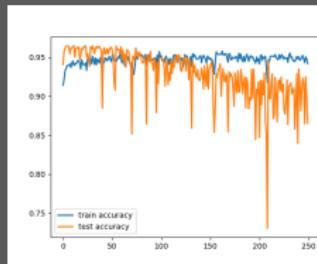
(a) early



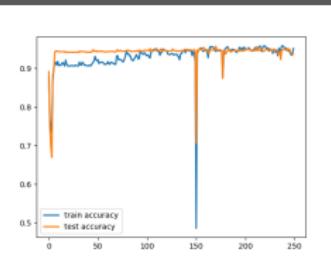
(b) late



(c) densenet

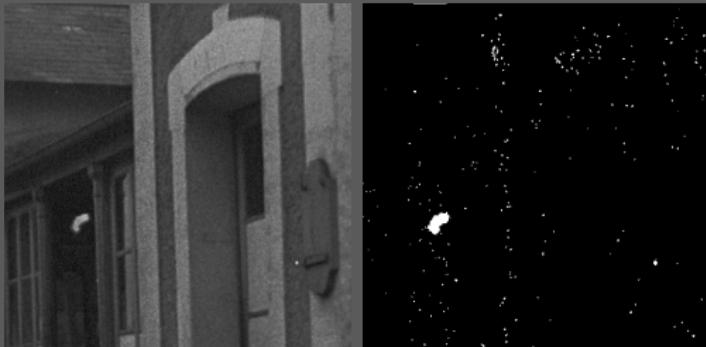


(d) bottleneck



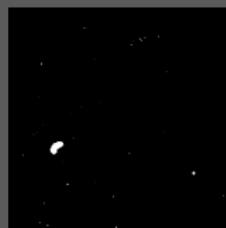
(e) densenet comb

Ex1



(a) Input

(b) GT



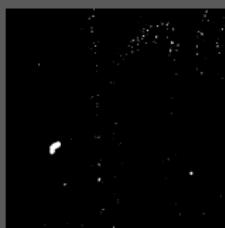
(a) early



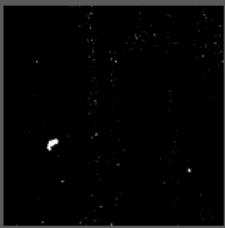
(b) late



(c) densenet

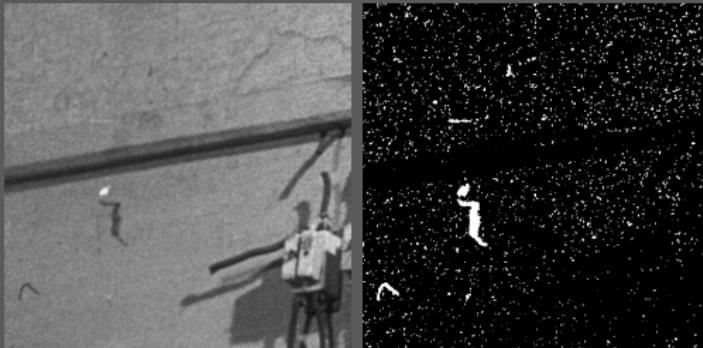


(d)
bottleneck



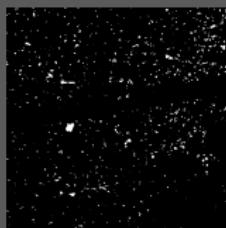
(e)
densenet
comb

Ex2



(a) Input

(b) GT



(a) early



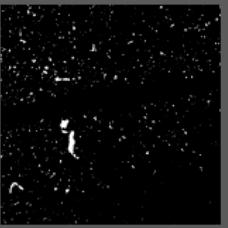
(b) late



(c) densenet



(d) bottleneck

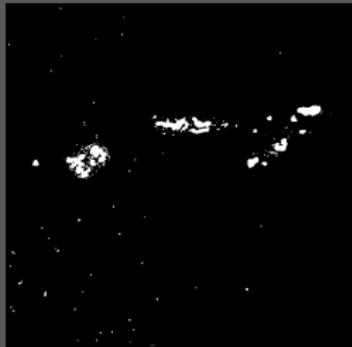


(e) densenet
comb

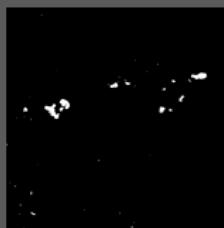
Ex3



(a) Input



(b) GT



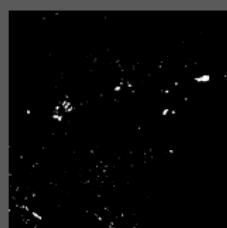
(a) early



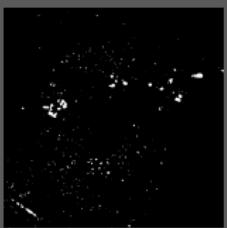
(b) late



(c) densenet



(d) bottleneck



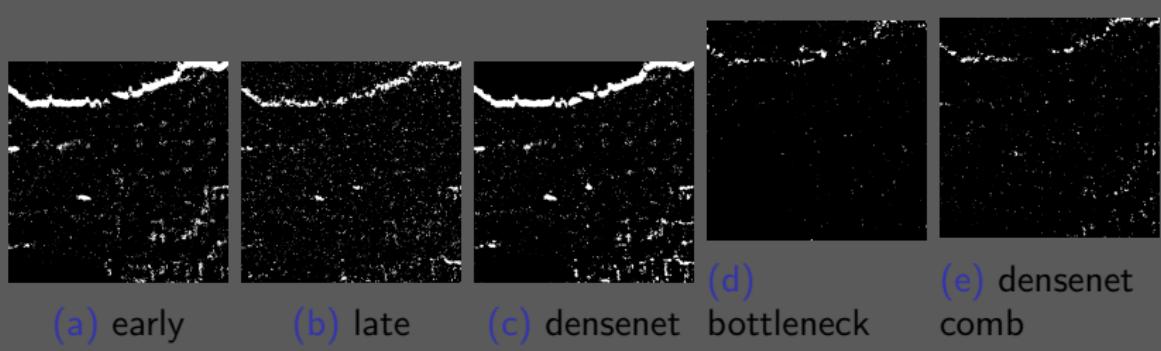
(e) densenet
comb

Ex4



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

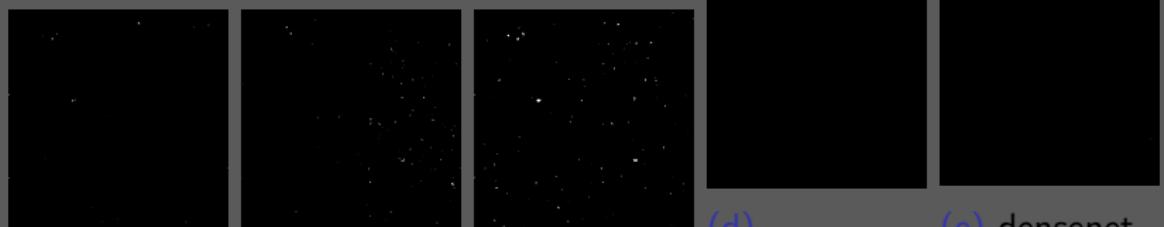
(d) bottleneck
(e) densenet
comb

Ex5



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

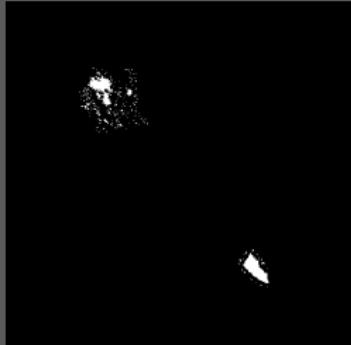
bottleneck

(d) densenet
comb

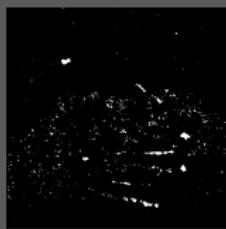
Ex6



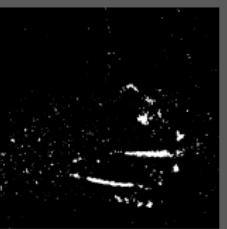
(a) Input



(b) GT



(a) early



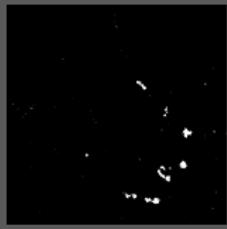
(b) late



(c) densenet
bottleneck



(d)



(e) densenet
comb

Ex7



(a) Input



(b) GT



(a) early



(b) late



(c) densenet
bottleneck



(d)



(e) densenet
comb

Ex8



(a) Input

(b) GT



(a) early



(b) late



(c) densenet



(d)
bottleneck



(e)
densenet
comb

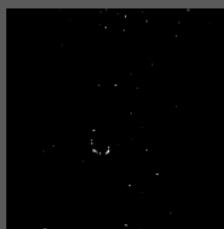
Ex9



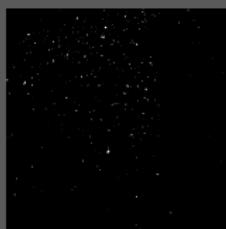
(a) Input



(b) GT



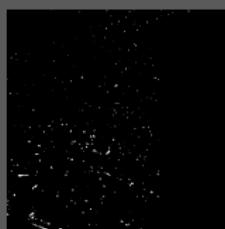
(a) early



(b) late



(c) densenet

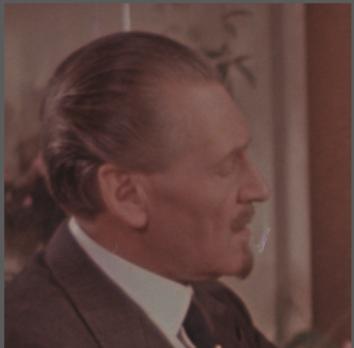


(d) bottleneck

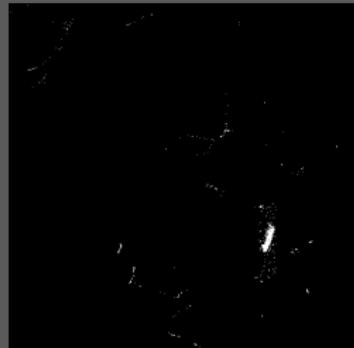


(e) densenet
comb

Ex10



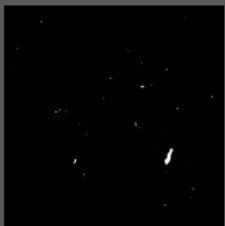
(a) Input



(b) GT



(a) early



(b) late



(c) densenet
bottleneck



(d)

bottleneck



(e) densenet
comb

Ex11



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

(d)

bottleneck

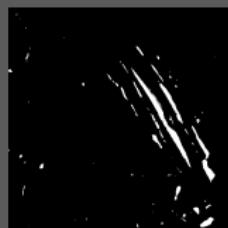
(e) densenet
comb

Ex12



(a) Input

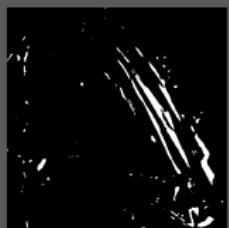
(b) GT



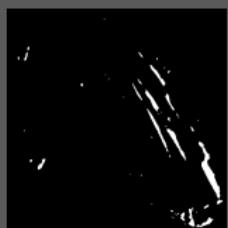
(a) early



(b) late



(c) densenet



(d)
bottleneck



(e) densenet
comb

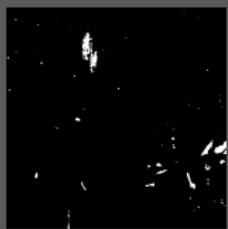
Ex13



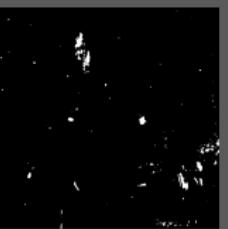
(a) Input



(b) GT



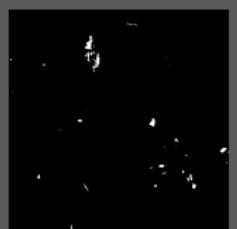
(a) early



(b) late



(c) densenet



(d) bottleneck

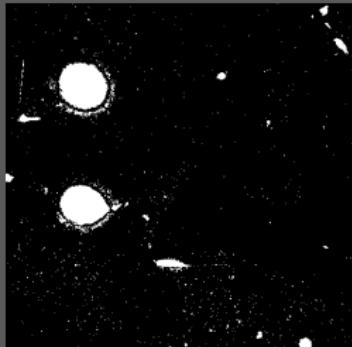


(e) densenet
comb

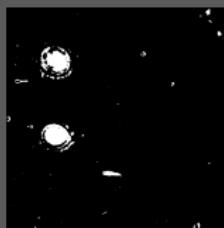
Ex14



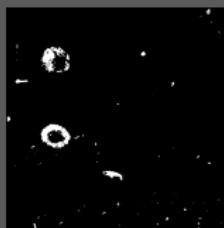
(a) Input



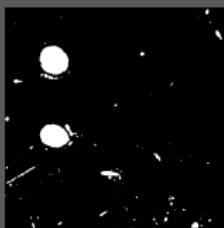
(b) GT



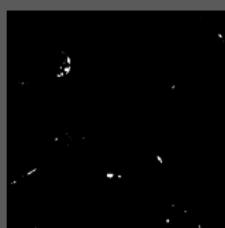
(a) early



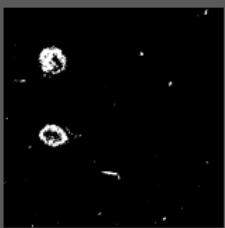
(b) late



(c) densenet
bottleneck



(d)



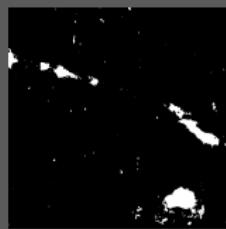
(e) densenet
comb

Ex15

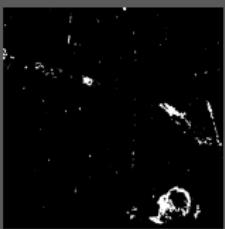


(a) Input

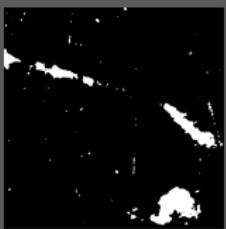
(b) GT



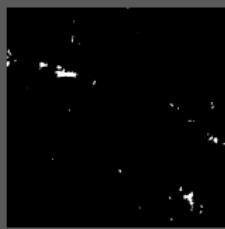
(a) early



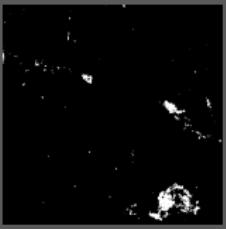
(b) late



(c) densenet

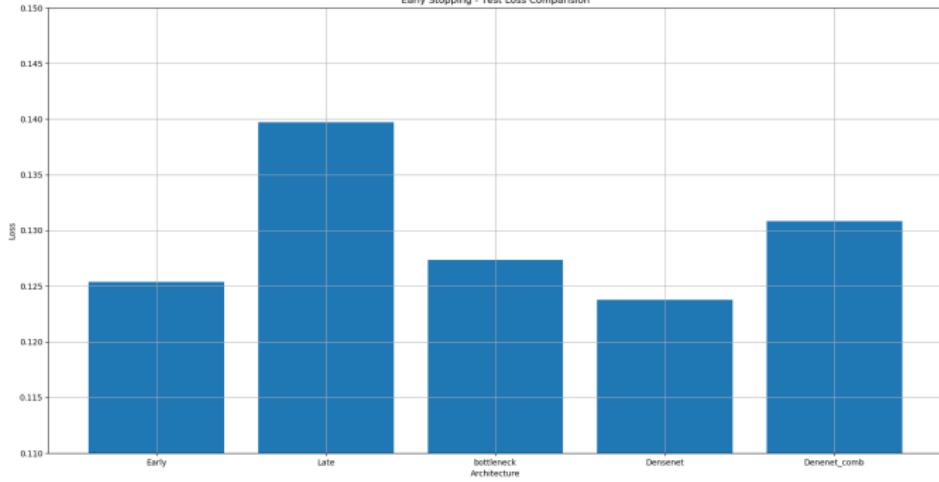


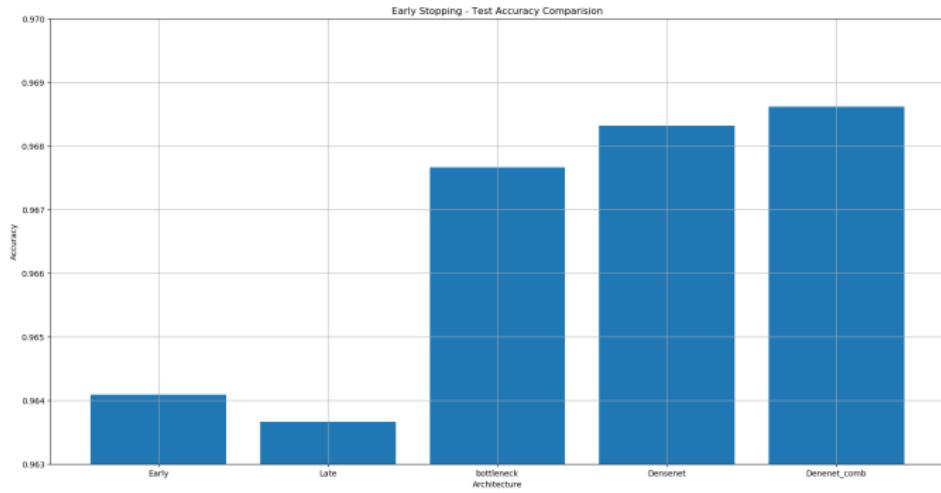
(d)
bottleneck



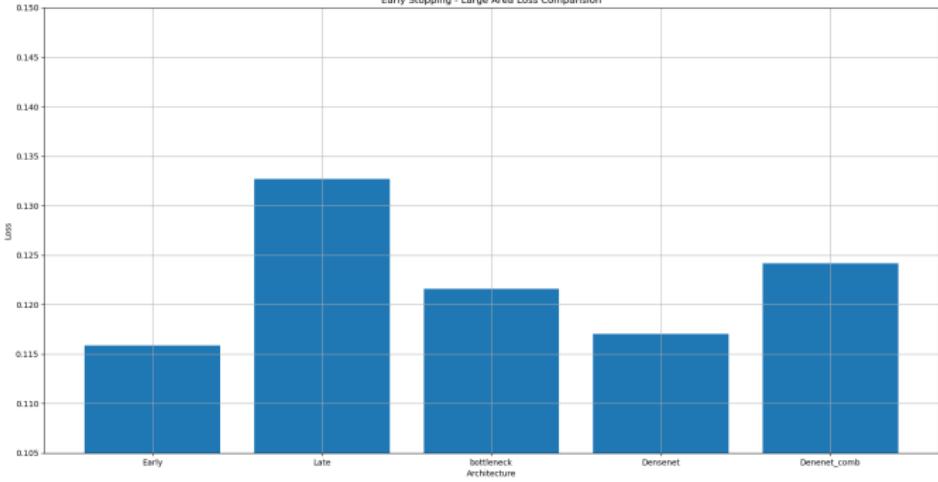
(e) densenet
comb

Early Stopping - Test Loss Comparision

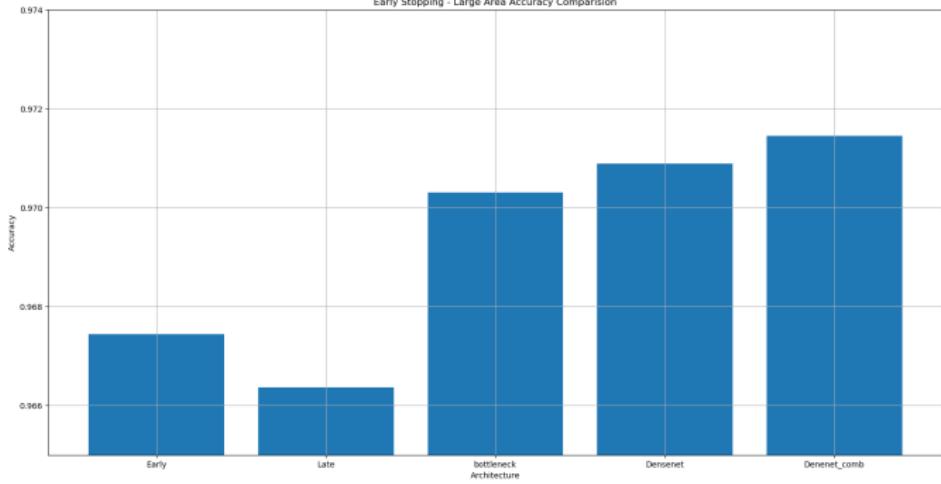




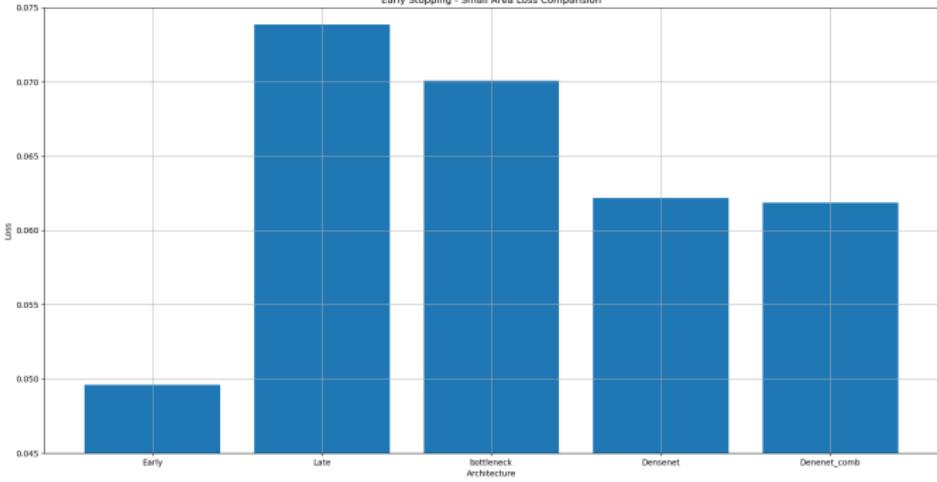
Early Stopping - Large Area Loss Comparison



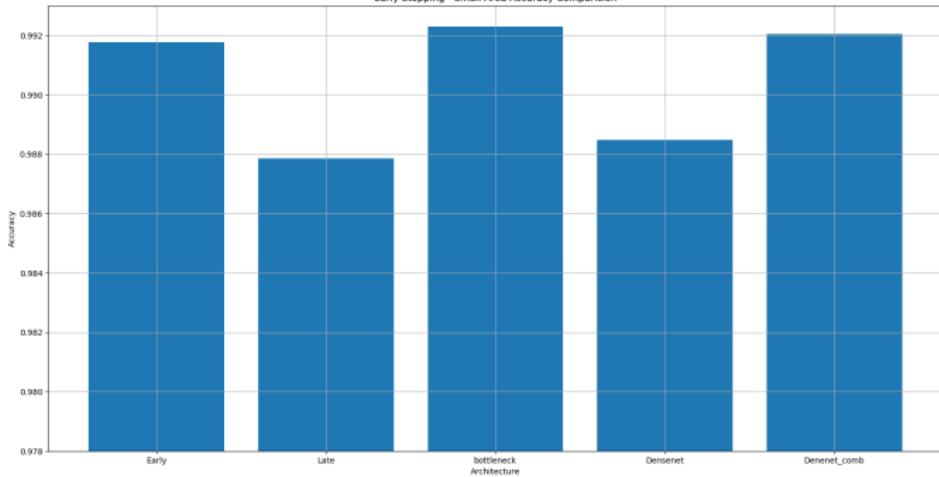
Early Stopping - Large Area Accuracy Comparision



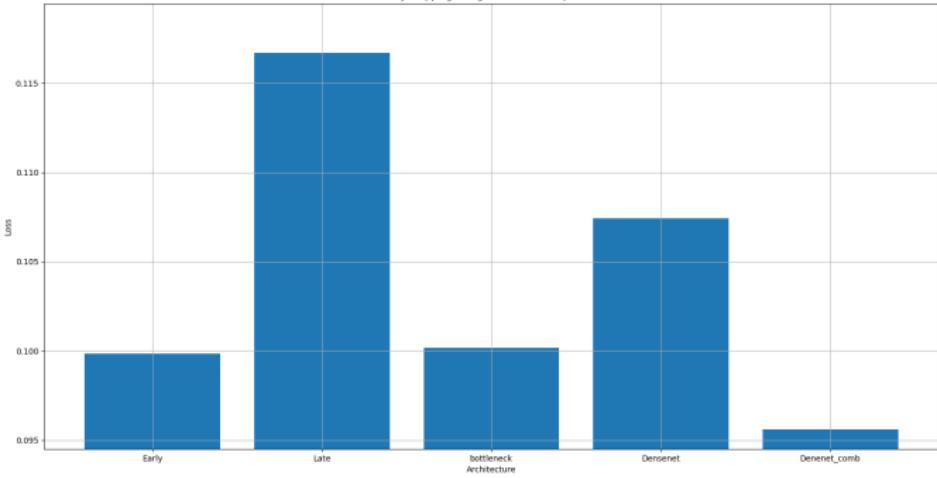
Early Stopping - Small Area Loss Comparison



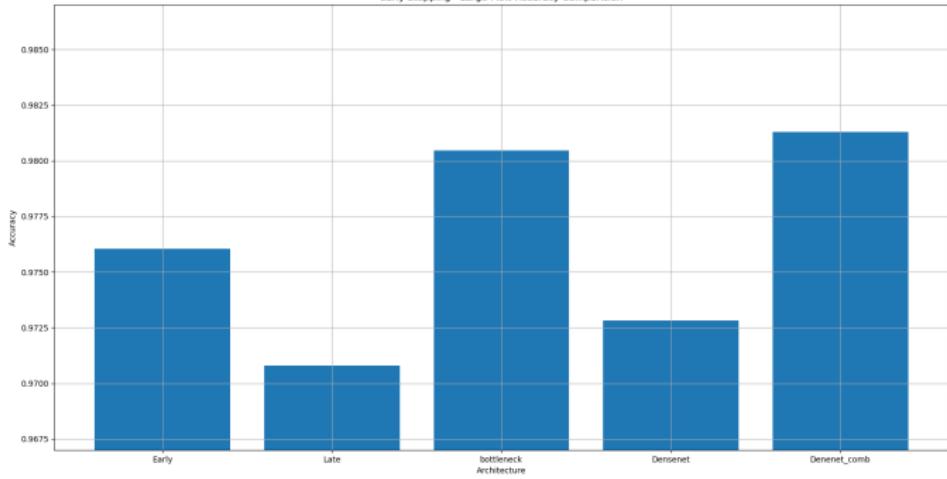
Early Stopping - Small Area Accuracy Comparision



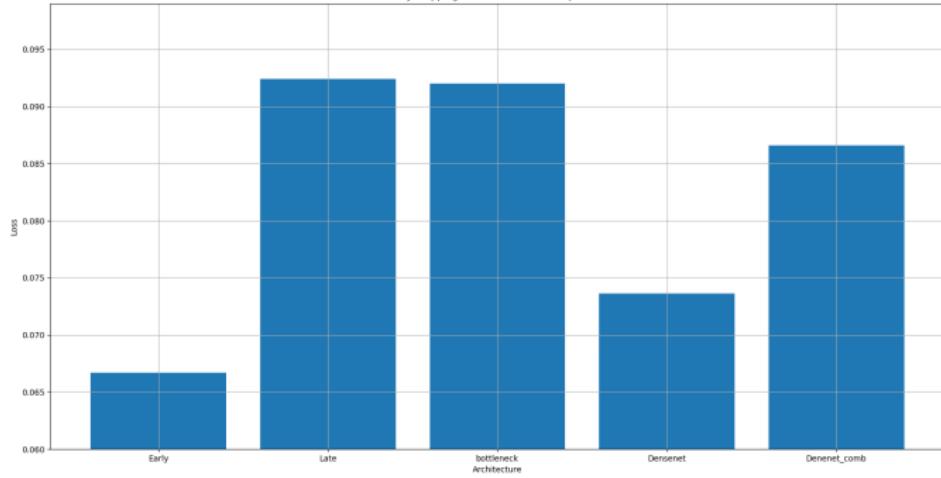
Early Stopping - Large Flow Loss Comparison

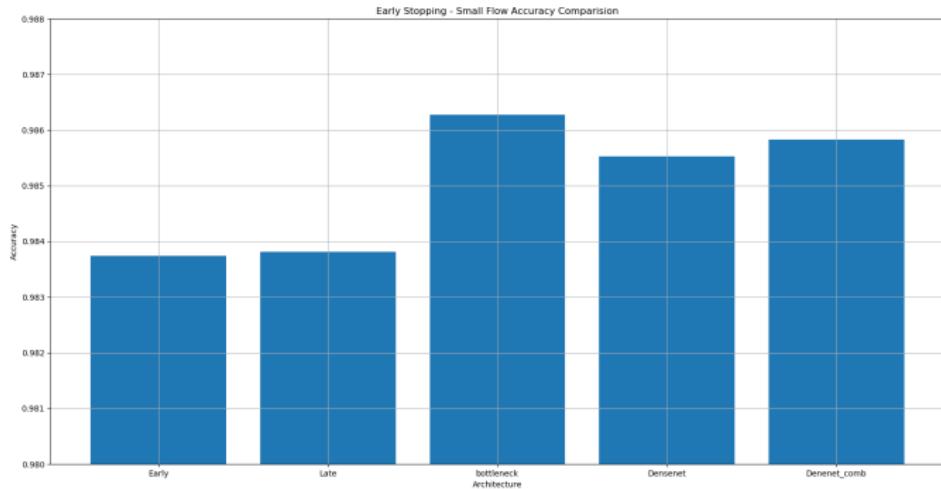


Early Stopping - Large Flow Accuracy Comparison

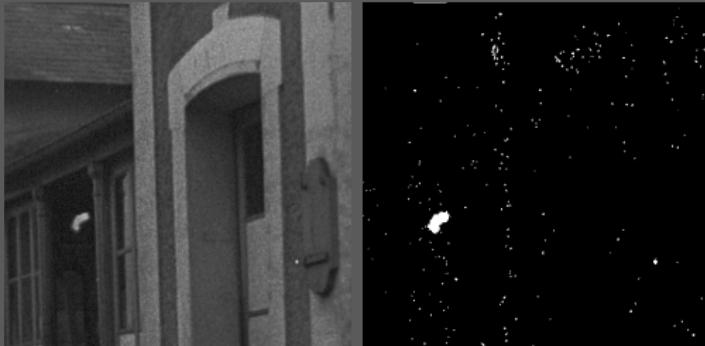


Early Stopping - Small Flow Loss Comparison



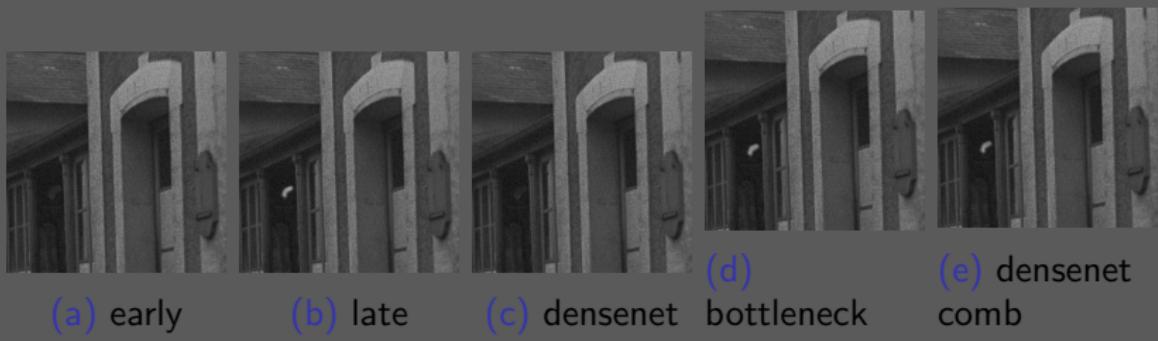


Ex1



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

(d)

bottleneck

(e) densenet
comb

Ex2



(a) Input



(b) GT



(a) early



(b) late



(c) densenet



(d)
bottleneck

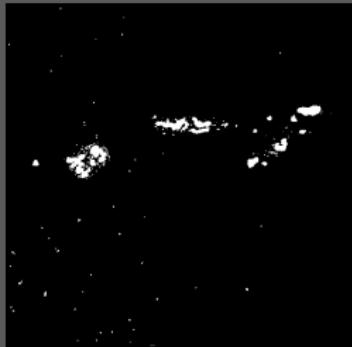


(e)
densenet
comb

Ex3



(a) Input



(b) GT



(a) early



(b) late



(c) densenet
bottleneck



(d)

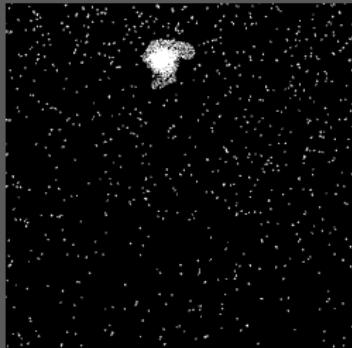


(e) densenet
comb

Ex4



(a) Input



(b) GT



(a) early



(b) late



(c) densenet



(d) bottleneck



(e) densenet
comb

Ex5



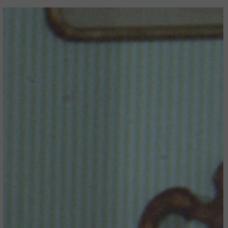
(a) Input



(b) GT



(a) early



(b) late



(c) densenet
bottleneck



(d)

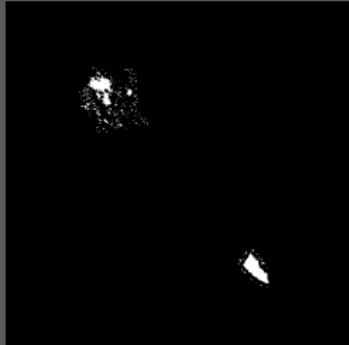


(e) densenet
comb

Ex6



(a) Input



(b) GT



(a) early



(b) late



(c) densenet
bottleneck



(d) densenet
comb



Ex7



(a) Input



(b) GT



(a) early



(b) late



(c) densenet
bottleneck



(d)



(e) densenet
comb

Ex8



(a) Input

(b) GT



(a) early



(b) late



(c) densenet



(d)
bottleneck



(e)
densenet
comb

Ex9



(a) Input



(b) GT



(a) early



(b) late



(c) densenet
bottleneck



(d)



(e) densenet
comb

Ex10



(a) Input



(b) GT



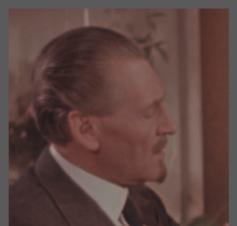
(a) early



(b) late



(c) densenet
bottleneck

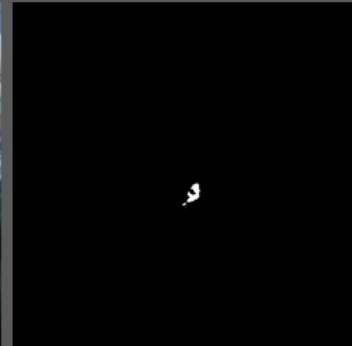


(d) (e) densenet
comb

Ex11



(a) Input



(b) GT



(a) early



(b) late



(c) densenet



(d)
bottleneck

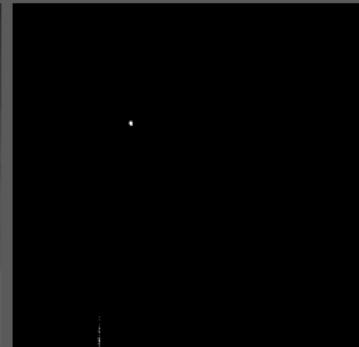


(e)
densenet
comb

Ex12



(a) Input



(b) GT



(a) early



(b) late



(c) densenet



(d)
bottleneck



(e)
densenet
comb

Ex13



(a) Input



(b) GT



(a) early



(b) late



(c) densenet
bottleneck

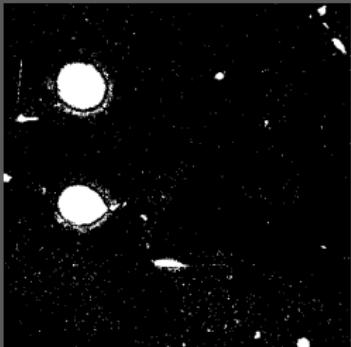


(d)
(e) densenet
comb

Ex14



(a) Input



(b) GT



(a) early



(b) late



(c) densenet

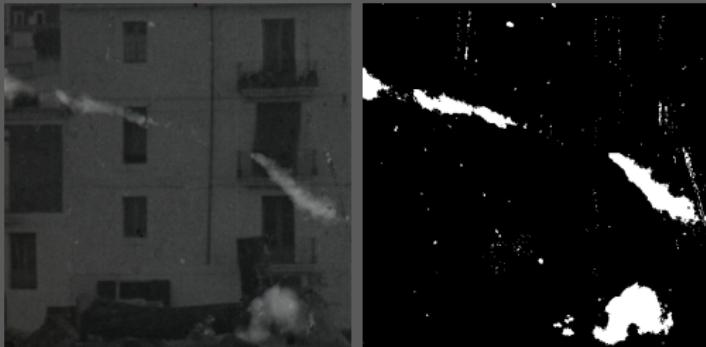


(d)
bottleneck



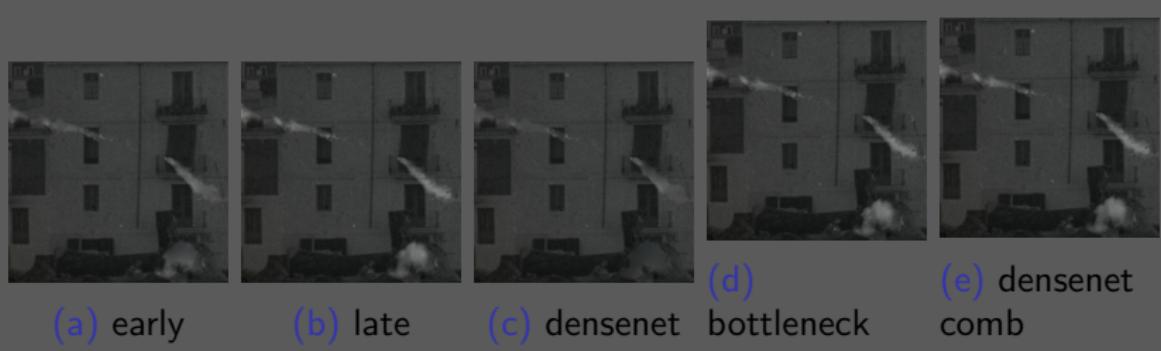
(e) densenet
comb

Ex15



(a) Input

(b) GT



(a) early

(b) late

(c) densenet

(d)
bottleneck

(e) densenet
comb