

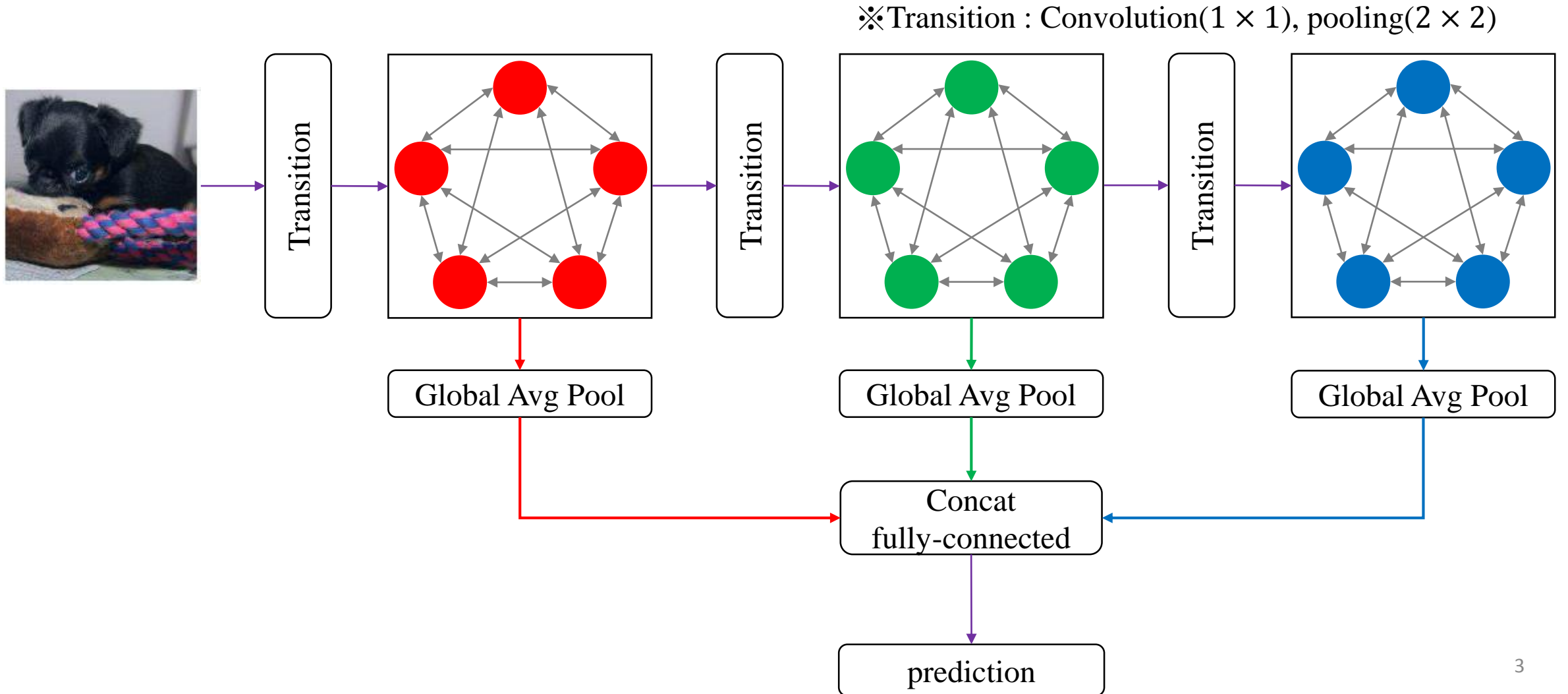
Convolutional Neural Networks with Alternately Updated Clique

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Introduction

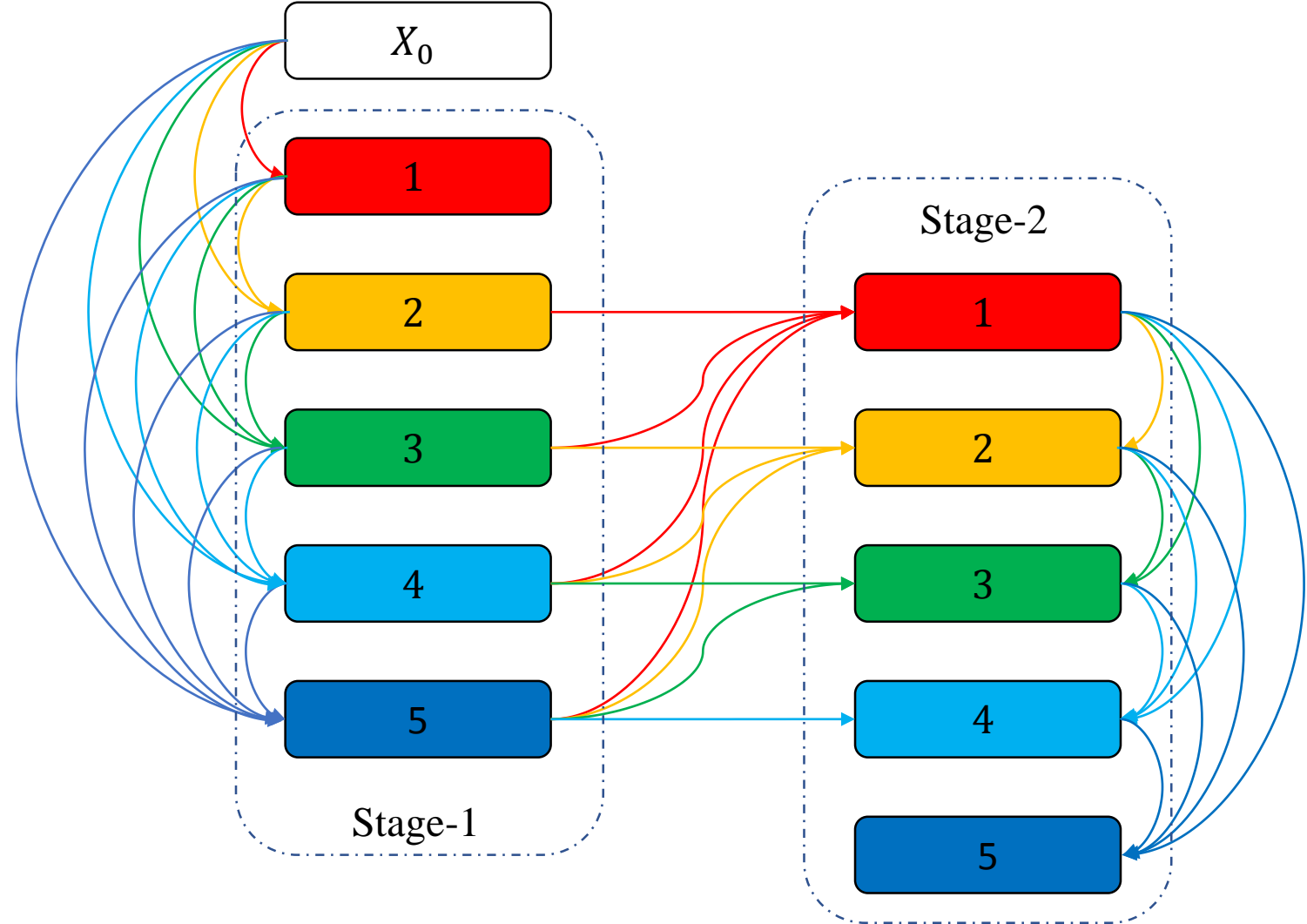
- This paper propose a new convolutional neural network architecture with alternately updated clique (CliqueNet).
- Parameters are reused for multiple times.
- It is both the input and output of any other layer in the same block

Model

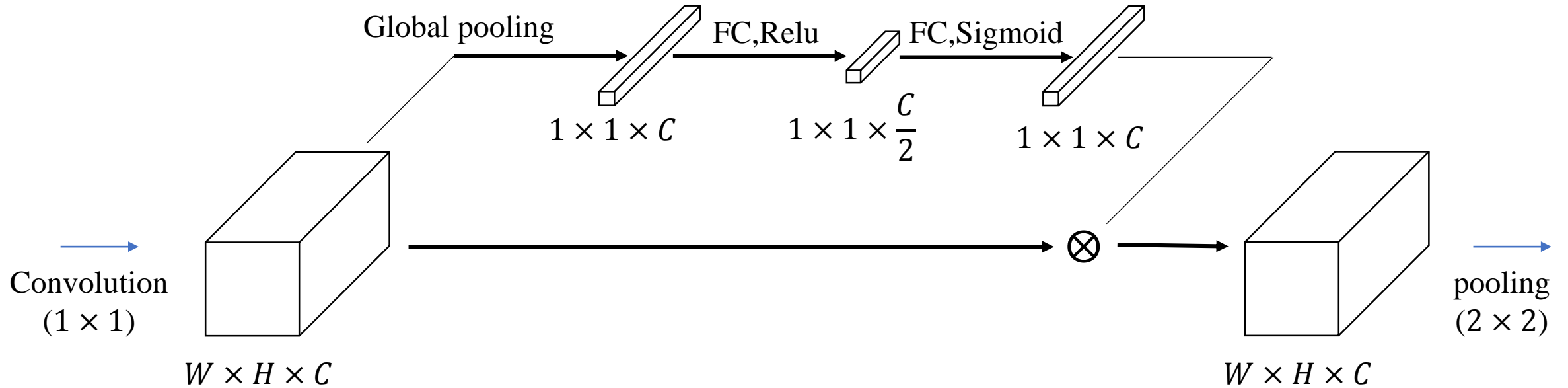


Model-block

Bottom Layers	Weights	Top Layer	Feature
X_0	W_{01}	$X_1^{(1)}$	Stage-I
$\{X_0, X_1^{(1)}\}$	$\{W_{02}, W_{12}\}$	$X_2^{(1)}$	
$\{X_0, X_1^{(1)}, X_2^{(1)}\}$	$\{W_{03}, W_{13}, W_{23}\}$	$X_3^{(1)}$	
$\{X_0, X_1^{(1)}, X_2^{(1)}, X_3^{(1)}\}$	$\{W_{04}, W_{14}, W_{24}, W_{34}\}$	$X_4^{(1)}$	
$\{X_0, X_1^{(1)}, X_2^{(1)}, X_3^{(1)}, X_4^{(1)}\}$	$\{W_{05}, W_{15}, W_{25}, W_{35}, W_{45}\}$	$X_5^{(1)}$	
$\{X_2^{(1)}, X_3^{(1)}, X_4^{(1)}, X_5^{(1)}\}$	$\{W_{21}, W_{31}, W_{41}, W_{51}\}$	$X_1^{(2)}$	Stage-II
$\{X_3^{(1)}, X_4^{(1)}, X_5^{(1)}, X_1^{(2)}\}$	$\{W_{32}, W_{42}, W_{52}, W_{12}\}$	$X_2^{(2)}$	
$\{X_4^{(1)}, X_5^{(1)}, X_1^{(2)}, X_2^{(2)}\}$	$\{W_{43}, W_{53}, W_{13}, W_{23}\}$	$X_3^{(2)}$	
$\{X_5^{(1)}, X_1^{(2)}, X_2^{(2)}, X_3^{(2)}\}$	$\{W_{54}, W_{14}, W_{24}, W_{34}\}$	$X_4^{(2)}$	
$\{X_1^{(2)}, X_2^{(2)}, X_3^{(2)}, X_4^{(2)}\}$	$\{W_{15}, W_{25}, W_{35}, W_{45}\}$	$X_5^{(2)}$	
...			

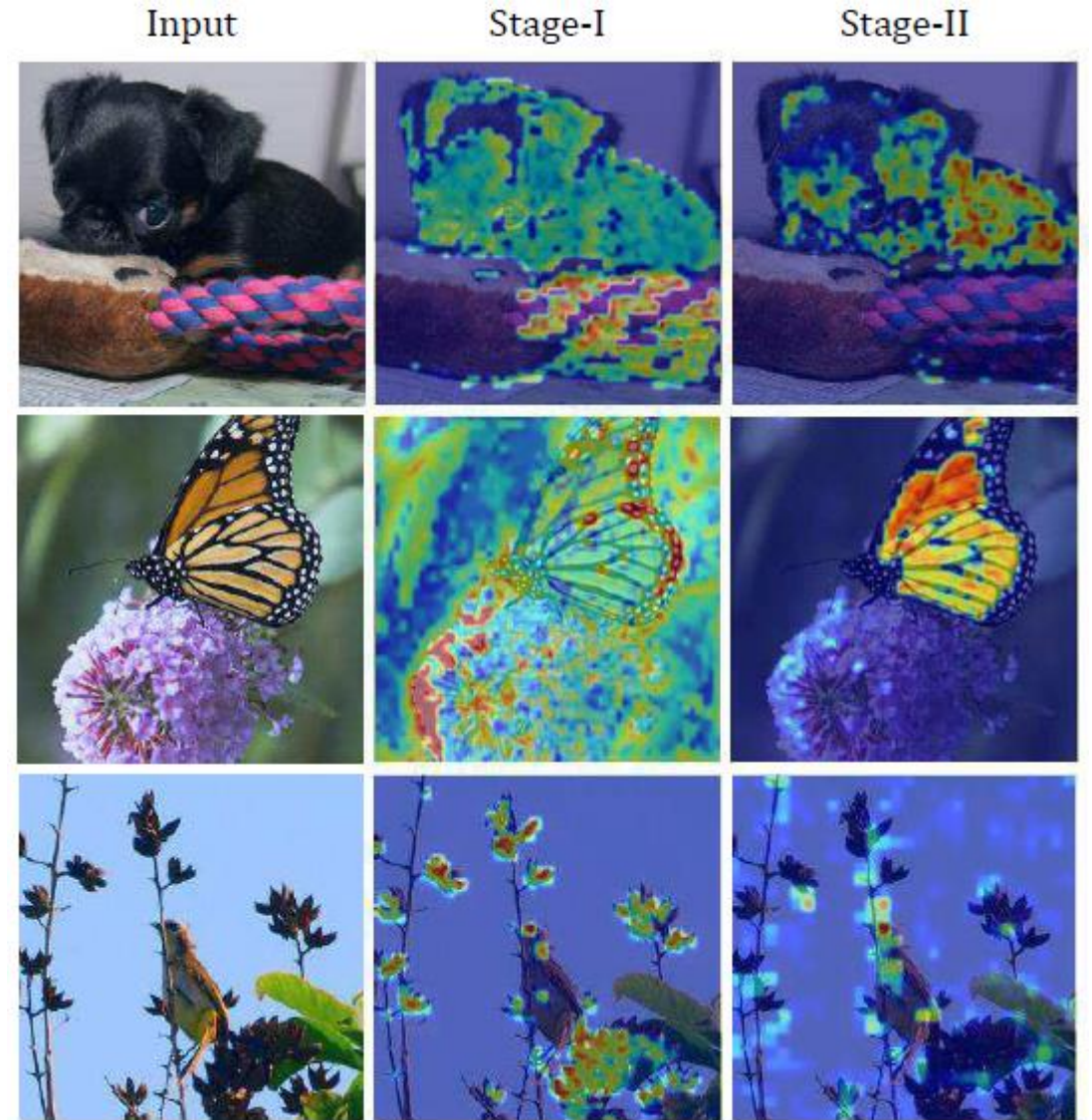


Model-Transition



Conclusion

- Stage-II is able to repress the noises or background of images and focus more activations on the region that characterize the target object.



References

- G. Huang, Z. Liu, L. van der Maaten, and K. Q. Weinberger. Densely connected convolutional networks. In CVPR, July 2017.