

# CARS: Continuous Evolution for Efficient Neural Architecture Search (Supplementary Material)

Zhaohui Yang<sup>1,2</sup>, Yunhe Wang<sup>2</sup>, Xinghao Chen<sup>2</sup>, Boxin Shi<sup>3,4</sup>,  
Chao Xu<sup>1</sup>, Chunjing Xu<sup>2</sup>, Qi Tian<sup>2\*</sup>, Chang Xu<sup>5</sup>

<sup>1</sup> Key Lab of Machine Perception (MOE), Dept. of Machine Intelligence, Peking University.

<sup>2</sup> Noah's Ark Lab, Huawei Technologies. <sup>3</sup> NELVT, Dept. of CS, Peking University. <sup>4</sup> Peng Cheng Laboratory.

<sup>5</sup> School of Computer Science, Faculty of Engineering, University of Sydney.

{zhaohuiyang, shiboxin}@pku.edu.cn; xuchao@cis.pku.edu.cn

{yunhe.wang, xinghao.chen, tian.qil, xuchunjing}@huawei.com; c.xu@sydney.edu.au

## 1. Appendix

We list all the searched architectures in Table 1 and Table 2. Table 1 considers the performance and the latency on HUAWEI P30 Pro. Table 2 considers the performance and the model size.

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\*Corresponding author.

Table 1. The architectures searched by CARS. The search phase considers the performance and device-aware objective, the latency on HUAWEI P30 Pro. Notations are same with DARTS. 'N' denotes the intermediate node.

Architecture	Top-1 (%)	Latency (ms)	Cell Type	N1	N2	N3	N4
CARS-Lat-A	62.6	41.9	Normal	Skip C(k-2) Max3 C(k-1)	Avg3 C(k-2) Max3 C(k-1)	Skip N1 Skip N2	Skip N1 Skip N2
			Reduce	Skip C(k-2) Sep5 C(k-1)	Dil5 C(k-2) Max3 N1	Skip C(k-2) Max3 C(k-1)	Skip C(k-1) Avg3 N3
CARS-Lat-B	67.8	44.9	Normal	Skip C(k-2) Skip C(k-1)	Skip C(k-1) Dil3 N1	Skip N1 Skip N2	Max3 C(k-2) Max3 N1
			Reduce	Max3 C(k-2) Max3 C(k-1)	Skip C(k-1) Max3 C(k-2)	Sep3 C(k-2) Max3 C(k-1)	Dil5 C(k-2) Avg3 N1
CARS-Lat-C	69.5	45.6	Normal	Skip C(k-2) Avg3 C(k-1)	Skip C(k-2) Skip C(k-1)	Max3 C(k-1) Skip N2	Dil3 N1 Skip N3
			Reduce	Skip C(k-2) Sep5 C(k-1)	Avg3 C(k-1) Sep5 N1	Max3 C(k-2) Max3 C(k-1)	Dil5 N1 Skip N3
CARS-Lat-D	71.9	57.6	Normal	Sep3 C(k-2) Skip C(k-1)	Skip C(k-2) Skip C(k-1)	Skip C(k-1) Avg3 N2	Dil3 N1 Skip N3
			Reduce	Dil5 C(k-2) Sep5 C(k-1)	Avg3 C(k-1) Sep5 N1	Max3 C(k-2) Max3 C(k-1)	Dil5 N1 Skip N3
CARS-Lat-E	72.0	60.8	Normal	Dil5 C(k-2) Skip C(k-1)	Skip C(k-1) Avg3 N1	Skip C(k-1) Avg3 N1	Skip C(k-2) Max3 C(k-1)
			Reduce	Skip C(k-2) Dil3 C(k-1)	Sep3 C(k-2) Sep3 N1	Dil3 C(k-2) Avg3 N2	Sep3 C(k-1) Sep5 N1
CARS-Lat-F	72.2	64.5	Normal	Sep5 C(k-2) Skip C(k-1)	Skip C(k-2) Avg3 C(k-1)	Dil3 C(k-1) Max3 C(k-2)	Skip C(k-2) Skip C(k-1)
			Reduce	Sep5 C(k-2) Max3 C(k-1)	Sep5 C(k-1) Skip N1	Sep5 C(k-2) Sep5 C(k-1)	Sep5 N2 Dil3 N3
CARS-Lat-G	74.0	89.3	Normal	Sep5 C(k-2) Skip C(k-1)	Sep3 C(k-2) Sep5 N1	Dil3 C(k-1) Max3 C(k-2)	Skip C(k-2) Skip C(k-1)
			Reduce	Sep5 C(k-2) Max3 C(k-1)	Sep3 C(k-2) Avg3 N1	Sep5 C(k-2) Sep5 C(k-1)	Sep5 N2 Dil3 N3

Table 2. The architectures searched by CARS. The search phase considers the performance and device-agnostic objective, the model size. Notations are same with DARTS. 'N' denotes the intermediate node.

Architecture	Cell Type	N1	N2	N3	N4
CARS-A	Normal	Skip C(k-2) Sep5 C(k-1)	Max3 C(k-2) Avg3 C(k-1)	Max3 C(k-2) Max3 C(k-1)	Sep3 C(k-2) Dil5 N1
	Reduce	Avg3 C(k-2) Max3 C(k-1)	Max3 C(k-2) Skip C(k-1)	Max3 C(k-2) Dil5 C(k-1)	Dil5 C(k-2) Skip N1
CARS-B	Normal	Sep5 C(k-2) Dil3 C(k-1)	Sep3 C(k-2) Avg3 N1	Dil3 C(k-2) Max3 C(k-1)	Avg3 C(k-2) Skip C(k-1)
	Reduce	Sep5 C(k-2) Skip C(k-1)	Sep3 C(k-2) Max3 C(k-1)	Avg3 C(k-2) Avg3 C(k-1)	Dil3 N2 Max3 C(k-2)
CARS-C	Normal	Sep5 C(k-2) Skip C(k-1)	Skip C(k-2) Skip C(k-1)	Skip C(k-2) Max3 C(k-1)	Sep5 C(k-2) Sep3 C(k-1)
	Reduce	Max3 C(k-2) Max3 C(k-1)	Sep5 C(k-2) Sep5 C(k-1)	Dil5 C(k-2) Max3 C(k-1)	Sep5 C(k-2) Dil3 C(k-1)
CARS-D	Normal	Sep5 C(k-2) Dil3 C(k-1)	Skip C(k-2) Avg3 C(k-1)	Skip C(k-2) Max3 C(k-1)	Sep5 C(k-2) Sep3 C(k-1)
	Reduce	Max3 C(k-2) Max3 C(k-1)	Max3 C(k-2) Sep3 C(k-1)	Dil5 C(k-2) Max3 C(k-1)	Sep5 C(k-1) Dil3 C(k-1)
CARS-E	Normal	Sep3 C(k-2) Sep3 C(k-1)	Skip C(k-2) Sep3 N1	Avg3 C(k-1) Sep3 N1	Skip N2 Skip N3
	Reduce	Skip C(k-2) Dil3 C(k-1)	Avg3 C(k-2) Skip N1	Sep3 N1 Max3 C(k-2)	Avg3 C(k-2) Sep3 N3
CARS-F	Normal	Skip C(k-2) Sep5 C(k-1)	Sep5 C(k-2) Skip N1	Sep5 N2 Max3 C(k-2)	Skip C(k-2) Sep3 C(k-1)
	Reduce	Avg3 C(k-2) Sep5 C(k-1)	Dil3 C(k-2) Dil5 C(k-1)	Sep5 C(k-1) Skip N1	Max3 C(k-2) Max3 C(k-1)
CARS-G	Normal	Max3 C(k-2) Dil5 C(k-1)	Sep3 C(k-2) Skip C(k-1)	Dil5 C(k-2) Sep4 C(k-1)	Avg3 C(k-2) Sep3 C(k-1)
	Reduce	Max3 C(k-2) Sep3 C(k-1)	Sep3 C(k-2) Sep5 C(k-1)	Sep3 C(k-2) Skip C(k-1)	Avg3 C(k-2) Dil3 C(k-1)
CARS-H	Normal	Sep5 C(k-2) Sep3 C(k-1)	Sep3 C(k-2) Dil5 N1	Avg3 C(k-2) Skip C(k-1)	Sep5 N1 Max3 C(k-2)
	Reduce	Sep5 C(k-2) Max3 C(k-1)	Sep3 C(k-2) Skip C(k-1)	Dil3 N1 Max3 C(k-2)	Sep5 C(k-2) Avg3 N2
CARS-I	Normal	Sep3 C(k-2) Sep3 C(k-1)	Skip C(k-2) Sep5 C(k-1)	Skip N1 Sep3 N2	Sep3 C(n-2) Dil5 N3
	Reduce	Dil3 C(k-2) Skip C(k-1)	Max3 C(k-2) Max3 N1	Skip C(k-1) Sep5 N2	Dil3 C(k-1) Max3 N3