A. Supplementary materials for "AutoAugment: Learning Augmentation policies from Data"

Operation Name	Description	Range of magnitudes
ShearX(Y)	Shear the image along the horizontal (vertical) axis with rate *magnitude*.	[-0.3,0.3]
TranslateX(Y)	Translate the image in the horizontal (vertical) direction by *magnitude* number of pixels.	[-150,150]
Rotate	Rotate the image *magnitude* degrees.	[-30,30]
AutoContrast	Maximize the the image contrast, by making the darkest pixel black and lightest pixel white.	
Invert	Invert the pixels of the image.	
Equalize	Equalize the image histogram.	
Solarize	Invert all pixels above a threshold value of *magnitude*.	[0,256]
Posterize	Reduce the number of bits for each pixel to *magnitude* bits.	[4,8]
Contrast	Control the contrast of the image. A *magnitude*=0 gives a gray image, whereas *magnitude*=1 gives the original image.	[0.1,1.9]
Color	Adjust the color balance of the image, in a manner similar to the controls on a colour TV set. A *magnitude*=0 gives a black & white image, whereas *magnitude*=1 gives the original image.	[0.1,1.9]
Brightness	Adjust the brightness of the image. A *magnitude*=0 gives a black image, whereas *magnitude*=1 gives the original image.	[0.1,1.9]
Sharpness	Adjust the sharpness of the image. A *magnitude*=0 gives a blurred image, whereas *magnitude*=1 gives the original image.	[0.1,1.9]
Cutout [12, 69]	Set a random square patch of side-length *magnitude* pixels to gray.	[0,60]
Sample Pairing [24, 68]	Linearly add the image with another image (selected at random from the same mini-batch) with weight *magnitude*, without changing the label.	[0, 0.4]

Table 6. List of all image transformations that the controller could choose from during the search. Additionally, the values of magnitude that can be predicted by the controller during the search for each operation at shown in the third column (for image size 331x331). Some transformations do not use the magnitude information (e.g. Invert and Equalize).

	Operation 1	Operation 2
Sub-policy 0	(Invert,0.1,7)	(Contrast,0.2,6)
Sub-policy 1	(Rotate,0.7,2)	(TranslateX,0.3,9)
Sub-policy 2	(Sharpness,0.8,1)	(Sharpness,0.9,3)
Sub-policy 3	(ShearY,0.5,8)	(TranslateY,0.7,9)
Sub-policy 4	(AutoContrast,0.5,8)	(Equalize,0.9,2)
Sub-policy 5	(ShearY,0.2,7)	(Posterize,0.3,7)
Sub-policy 6	(Color,0.4,3)	(Brightness,0.6,7)
Sub-policy 7	(Sharpness,0.3,9)	(Brightness,0.7,9)
Sub-policy 8	(Equalize,0.6,5)	(Equalize,0.5,1)
Sub-policy 9	(Contrast,0.6,7)	(Sharpness,0.6,5)
Sub-policy 10	(Color,0.7,7)	(TranslateX,0.5,8)
Sub-policy 11	(Equalize,0.3,7)	(AutoContrast,0.4,8)
Sub-policy 12	(TranslateY,0.4,3)	(Sharpness,0.2,6)
Sub-policy 13	(Brightness,0.9,6)	(Color,0.2,8)
Sub-policy 14	(Solarize,0.5,2)	(Invert,0.0,3)
Sub-policy 15	(Equalize,0.2,0)	(AutoContrast,0.6,0)
Sub-policy 16	(Equalize,0.2,8)	(Equalize,0.6,4)
Sub-policy 17	(Color,0.9,9)	(Equalize,0.6,6)
Sub-policy 18	(AutoContrast,0.8,4)	(Solarize,0.2,8)
Sub-policy 19	(Brightness,0.1,3)	(Color,0.7,0)
Sub-policy 20	(Solarize,0.4,5)	(AutoContrast,0.9,3)
Sub-policy 21	(TranslateY,0.9,9)	(TranslateY,0.7,9)
Sub-policy 22	(AutoContrast,0.9,2)	(Solarize,0.8,3)
Sub-policy 23	(Equalize,0.8,8)	(Invert,0.1,3)
Sub-policy 24	(TranslateY,0.7,9)	(AutoContrast,0.9,1)

Table 7. AutoAugment policy found on reduced CIFAR-10.

	Operation 1	Operation 2
Sub-policy 0	(ShearX,0.9,4)	(Invert,0.2,3)
Sub-policy 1	(ShearY,0.9,8)	(Invert,0.7,5)
Sub-policy 2	(Equalize,0.6,5)	(Solarize,0.6,6)
Sub-policy 3	(Invert,0.9,3)	(Equalize,0.6,3)
Sub-policy 4	(Equalize,0.6,1)	(Rotate,0.9,3)
Sub-policy 5	(ShearX,0.9,4)	(AutoContrast,0.8,3)
Sub-policy 6	(ShearY,0.9,8)	(Invert,0.4,5)
Sub-policy 7	(ShearY,0.9,5)	(Solarize,0.2,6)
Sub-policy 8	(Invert,0.9,6)	(AutoContrast,0.8,1)
Sub-policy 9	(Equalize,0.6,3)	(Rotate,0.9,3)
Sub-policy 10	(ShearX,0.9,4)	(Solarize,0.3,3)
Sub-policy 11	(ShearY,0.8,8)	(Invert,0.7,4)
Sub-policy 12	(Equalize,0.9,5)	(TranslateY,0.6,6)
Sub-policy 13	(Invert,0.9,4)	(Equalize,0.6,7)
Sub-policy 14	(Contrast,0.3,3)	(Rotate,0.8,4)
Sub-policy 15	(Invert,0.8,5)	(TranslateY,0.0,2)
Sub-policy 16	(ShearY,0.7,6)	(Solarize,0.4,8)
Sub-policy 17	(Invert,0.6,4)	(Rotate,0.8,4)
Sub-policy 18	(ShearY,0.3,7)	(TranslateX,0.9,3)
Sub-policy 19	(ShearX,0.1,6)	(Invert,0.6,5)
Sub-policy 20	(Solarize,0.7,2)	(TranslateY,0.6,7)
Sub-policy 21	(ShearY,0.8,4)	(Invert,0.8,8)
Sub-policy 22	(ShearX,0.7,9)	(TranslateY,0.8,3)
Sub-policy 23	(ShearY,0.8,5)	(AutoContrast,0.7,3)
Sub-policy 24	(ShearX,0.7,2)	(Invert,0.1,5)

Table 8. AutoAugment policy found on reduced SVHN.

	Operation 1	Operation 2
Sub-policy 0	(Posterize,0.4,8)	(Rotate,0.6,9)
Sub-policy 1	(Solarize,0.6,5)	(AutoContrast,0.6,5)
Sub-policy 2	(Equalize,0.8,8)	(Equalize,0.6,3)
Sub-policy 3	(Posterize,0.6,7)	(Posterize,0.6,6)
Sub-policy 4	(Equalize,0.4,7)	(Solarize,0.2,4)
Sub-policy 5	(Equalize,0.4,4)	(Rotate,0.8,8)
Sub-policy 6	(Solarize,0.6,3)	(Equalize,0.6,7)
Sub-policy 7	(Posterize,0.8,5)	(Equalize,1.0,2)
Sub-policy 8	(Rotate,0.2,3)	(Solarize,0.6,8)
Sub-policy 9	(Equalize,0.6,8)	(Posterize,0.4,6)
Sub-policy 10	(Rotate,0.8,8)	(Color,0.4,0)
Sub-policy 11	(Rotate,0.4,9)	(Equalize,0.6,2)
Sub-policy 12	(Equalize,0.0,7)	(Equalize,0.8,8)
Sub-policy 13	(Invert,0.6,4)	(Equalize,1.0,8)
Sub-policy 14	(Color,0.6,4)	(Contrast,1.0,8)
Sub-policy 15	(Rotate,0.8,8)	(Color,1.0,2)
Sub-policy 16	(Color,0.8,8)	(Solarize,0.8,7)
Sub-policy 17	(Sharpness,0.4,7)	(Invert,0.6,8)
Sub-policy 18	(ShearX,0.6,5)	(Equalize,1.0,9)
Sub-policy 19	(Color,0.4,0)	(Equalize,0.6,3)
Sub-policy 20	(Equalize,0.4,7)	(Solarize,0.2,4)
Sub-policy 21	(Solarize,0.6,5)	(AutoContrast,0.6,5)
Sub-policy 22	(Invert,0.6,4)	(Equalize,1.0,8)
Sub-policy 23	(Color,0.6,4)	(Contrast,1.0,8)
Sub-policy 24	(Equalize,0.8,8)	(Equalize,0.6,3)

Table 9. AutoAugment policy found on reduced ImageNet.