classification\_mlp\_gy\_si-high\_1

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 32) 28960

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batch\_normalization (BatchNo (None, 32) 128

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re\_lu (ReLU) (None, 32) 0

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dense\_1 (Dense) (None, 1) 33

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 29,121

Trainable params: 29,057

Non-trainable params: 64

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classification\_mlp\_gy\_si-high\_2

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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normalization (Normalization (None, 904) 1809

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dense (Dense) (None, 512) 463360

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batch\_normalization (BatchNo (None, 512) 2048

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re\_lu (ReLU) (None, 512) 0

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dropout (Dropout) (None, 512) 0

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dense\_1 (Dense) (None, 128) 65664

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batch\_normalization\_1 (Batch (None, 128) 512

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re\_lu\_1 (ReLU) (None, 128) 0

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dropout\_1 (Dropout) (None, 128) 0

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dropout\_2 (Dropout) (None, 128) 0

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dense\_2 (Dense) (None, 1) 129

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 533,522

Trainable params: 530,433

Non-trainable params: 3,089

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classification\_mlp\_gy\_si-high\_3

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 512) 463360

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batch\_normalization (BatchNo (None, 512) 2048

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re\_lu (ReLU) (None, 512) 0

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dense\_1 (Dense) (None, 32) 16416

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batch\_normalization\_1 (Batch (None, 32) 128

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re\_lu\_1 (ReLU) (None, 32) 0

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dropout (Dropout) (None, 32) 0

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dense\_2 (Dense) (None, 1) 33

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 481,985

Trainable params: 480,897

Non-trainable params: 1,088

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classification\_mlp\_gy\_si-high\_4

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 32) 28960

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re\_lu (ReLU) (None, 32) 0

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dense\_1 (Dense) (None, 256) 8448

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re\_lu\_1 (ReLU) (None, 256) 0

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dense\_2 (Dense) (None, 32) 8224

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re\_lu\_2 (ReLU) (None, 32) 0

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dense\_3 (Dense) (None, 1) 33

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 45,665

Trainable params: 45,665

Non-trainable params: 0

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classification\_mlp\_gy\_si-high\_5

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 32) 28960

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re\_lu (ReLU) (None, 32) 0

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dropout (Dropout) (None, 32) 0

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dense\_1 (Dense) (None, 256) 8448

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re\_lu\_1 (ReLU) (None, 256) 0

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dropout\_1 (Dropout) (None, 256) 0

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dense\_2 (Dense) (None, 32) 8224

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re\_lu\_2 (ReLU) (None, 32) 0

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dropout\_2 (Dropout) (None, 32) 0

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dropout\_3 (Dropout) (None, 32) 0

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dense\_3 (Dense) (None, 1) 33

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 45,665

Trainable params: 45,665

Non-trainable params: 0

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classification\_mlp\_gy\_si-low\_1

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 32) 28960

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re\_lu (ReLU) (None, 32) 0

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dropout (Dropout) (None, 32) 0

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dense\_1 (Dense) (None, 1) 33

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 28,993

Trainable params: 28,993

Non-trainable params: 0

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classification\_mlp\_gy\_si-low\_2

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 256) 231680

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re\_lu (ReLU) (None, 256) 0

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dense\_1 (Dense) (None, 1) 257

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 231,937

Trainable params: 231,937

Non-trainable params: 0

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classification\_mlp\_gy\_si-low\_3

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 16) 14480

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re\_lu (ReLU) (None, 16) 0

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dropout (Dropout) (None, 16) 0

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dense\_1 (Dense) (None, 256) 4352

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re\_lu\_1 (ReLU) (None, 256) 0

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dropout\_1 (Dropout) (None, 256) 0

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dense\_2 (Dense) (None, 32) 8224

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re\_lu\_2 (ReLU) (None, 32) 0

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dropout\_2 (Dropout) (None, 32) 0

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dense\_3 (Dense) (None, 1) 33

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 27,089

Trainable params: 27,089

Non-trainable params: 0

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classification\_mlp\_gy\_si-low\_4

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 32) 28960

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re\_lu (ReLU) (None, 32) 0

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dense\_1 (Dense) (None, 256) 8448

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re\_lu\_1 (ReLU) (None, 256) 0

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dense\_2 (Dense) (None, 256) 65792

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re\_lu\_2 (ReLU) (None, 256) 0

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dense\_3 (Dense) (None, 1) 257

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 103,457

Trainable params: 103,457

Non-trainable params: 0

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classification\_mlp\_gy\_si-low\_5

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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normalization (Normalization (None, 904) 1809

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dense (Dense) (None, 16) 14480

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batch\_normalization (BatchNo (None, 16) 64

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re\_lu (ReLU) (None, 16) 0

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dropout (Dropout) (None, 16) 0

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dense\_1 (Dense) (None, 256) 4352

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batch\_normalization\_1 (Batch (None, 256) 1024

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re\_lu\_1 (ReLU) (None, 256) 0

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dropout\_1 (Dropout) (None, 256) 0

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dense\_2 (Dense) (None, 64) 16448

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batch\_normalization\_2 (Batch (None, 64) 256

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re\_lu\_2 (ReLU) (None, 64) 0

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dropout\_2 (Dropout) (None, 64) 0

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dropout\_3 (Dropout) (None, 64) 0

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dense\_3 (Dense) (None, 1) 65

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 38,498

Trainable params: 36,017

Non-trainable params: 2,481

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classification\_mlp\_ph\_si-high\_1

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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normalization (Normalization (None, 904) 1809

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dense (Dense) (None, 32) 28960

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batch\_normalization (BatchNo (None, 32) 128

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re\_lu (ReLU) (None, 32) 0

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dense\_1 (Dense) (None, 32) 1056

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batch\_normalization\_1 (Batch (None, 32) 128

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re\_lu\_1 (ReLU) (None, 32) 0

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dense\_2 (Dense) (None, 1) 33

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 32,114

Trainable params: 30,177

Non-trainable params: 1,937

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classification\_mlp\_ph\_si-high\_2

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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normalization (Normalization (None, 904) 1809

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dense (Dense) (None, 512) 463360

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batch\_normalization (BatchNo (None, 512) 2048

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re\_lu (ReLU) (None, 512) 0

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dropout (Dropout) (None, 512) 0

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dense\_1 (Dense) (None, 1) 513

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 467,730

Trainable params: 464,897

Non-trainable params: 2,833

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classification\_mlp\_ph\_si-high\_3

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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normalization (Normalization (None, 904) 1809

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dense (Dense) (None, 32) 28960

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batch\_normalization (BatchNo (None, 32) 128

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re\_lu (ReLU) (None, 32) 0

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dense\_1 (Dense) (None, 32) 1056

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batch\_normalization\_1 (Batch (None, 32) 128

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re\_lu\_1 (ReLU) (None, 32) 0

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dense\_2 (Dense) (None, 1) 33

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 32,114

Trainable params: 30,177

Non-trainable params: 1,937

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classification\_mlp\_ph\_si-high\_4

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 256) 231680

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re\_lu (ReLU) (None, 256) 0

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dense\_1 (Dense) (None, 128) 32896

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re\_lu\_1 (ReLU) (None, 128) 0

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dense\_2 (Dense) (None, 32) 4128

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re\_lu\_2 (ReLU) (None, 32) 0

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dense\_3 (Dense) (None, 1) 33

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 268,737

Trainable params: 268,737

Non-trainable params: 0

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classification\_mlp\_ph\_si-high\_5

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 512) 463360

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batch\_normalization (BatchNo (None, 512) 2048

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re\_lu (ReLU) (None, 512) 0

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dense\_1 (Dense) (None, 1) 513

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 465,921

Trainable params: 464,897

Non-trainable params: 1,024

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classification\_mlp\_ph\_si-low\_1

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Layer (type) Output Shape Param #

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input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 1024) 926720

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re\_lu (ReLU) (None, 1024) 0

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dropout (Dropout) (None, 1024) 0

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dense\_1 (Dense) (None, 32) 32800

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re\_lu\_1 (ReLU) (None, 32) 0

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dropout\_1 (Dropout) (None, 32) 0

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dense\_2 (Dense) (None, 32) 1056

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re\_lu\_2 (ReLU) (None, 32) 0

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dropout\_2 (Dropout) (None, 32) 0

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dense\_3 (Dense) (None, 1) 33

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 960,609

Trainable params: 960,609

Non-trainable params: 0

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classification\_mlp\_ph\_si-low\_2

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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normalization (Normalization (None, 904) 1809

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dense (Dense) (None, 64) 57920

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re\_lu (ReLU) (None, 64) 0

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dropout (Dropout) (None, 64) 0

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dense\_1 (Dense) (None, 1) 65

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 59,794

Trainable params: 57,985

Non-trainable params: 1,809

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classification\_mlp\_ph\_si-low\_3

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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normalization (Normalization (None, 904) 1809

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dense (Dense) (None, 64) 57920

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re\_lu (ReLU) (None, 64) 0

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dropout (Dropout) (None, 64) 0

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dense\_1 (Dense) (None, 16) 1040

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re\_lu\_1 (ReLU) (None, 16) 0

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dropout\_1 (Dropout) (None, 16) 0

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dense\_2 (Dense) (None, 1) 17

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 60,786

Trainable params: 58,977

Non-trainable params: 1,809

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classification\_mlp\_ph\_si-low\_4

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 32) 28960

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re\_lu (ReLU) (None, 32) 0

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dropout (Dropout) (None, 32) 0

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dense\_1 (Dense) (None, 1) 33

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 28,993

Trainable params: 28,993

Non-trainable params: 0

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classification\_mlp\_ph\_si-low\_5

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 32) 28960

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re\_lu (ReLU) (None, 32) 0

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dense\_1 (Dense) (None, 32) 1056

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re\_lu\_1 (ReLU) (None, 32) 0

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dense\_2 (Dense) (None, 256) 8448

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re\_lu\_2 (ReLU) (None, 256) 0

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dropout (Dropout) (None, 256) 0

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dense\_3 (Dense) (None, 1) 257

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 38,721

Trainable params: 38,721

Non-trainable params: 0

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classification\_cnn\_gy\_si-high\_1

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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separable\_conv2d (SeparableC (None, 118, 118, 32) 73

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separable\_conv2d\_1 (Separabl (None, 116, 116, 64) 2400

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max\_pooling2d (MaxPooling2D) (None, 58, 58, 64) 0

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dropout (Dropout) (None, 58, 58, 64) 0

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flatten (Flatten) (None, 215296) 0

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dropout\_1 (Dropout) (None, 215296) 0

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dense (Dense) (None, 1) 215297

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 217,773

Trainable params: 217,770

Non-trainable params: 3

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classification\_cnn\_gy\_si-high\_2

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1) 0

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random\_flip (RandomFlip) (None, 120, 120, 1) 0

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concatenate (Concatenate) (None, 120, 120, 3) 0

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xception (Functional) (None, 4, 4, 2048) 20861480

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global\_average\_pooling2d (Globa (None, 2048) 0

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dense (Dense) (None, 1) 2049

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classification\_head\_1 (Activati (None, 1) 0

=================================================================

Total params: 20,863,529

Trainable params: 20,809,001

Non-trainable params: 54,528

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classification\_cnn\_gy\_si-high\_3

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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conv2d (Conv2D) (None, 118, 118, 32) 320

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conv2d\_1 (Conv2D) (None, 116, 116, 64) 18496

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max\_pooling2d (MaxPooling2D) (None, 58, 58, 64) 0

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dropout (Dropout) (None, 58, 58, 64) 0

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flatten (Flatten) (None, 215296) 0

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dropout\_1 (Dropout) (None, 215296) 0

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dense (Dense) (None, 1) 215297

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 234,116

Trainable params: 234,113

Non-trainable params: 3

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classification\_cnn\_gy\_si-high\_4

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1) 0

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random\_flip (RandomFlip) (None, 120, 120, 1) 0

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random\_contrast (RandomContrast (None, 120, 120, 1) 0

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resizing (Resizing) (None, 224, 224, 1) 0

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concatenate (Concatenate) (None, 224, 224, 3) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

xception (Functional) (None, None, None, 2 20861480

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global\_max\_pooling2d (GlobalMax (None, 2048) 0

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dense (Dense) (None, 1) 2049

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classification\_head\_1 (Activati (None, 1) 0 dense[0][0]

=================================================================

Total params: 20,863,529

Trainable params: 20,809,001

Non-trainable params: 54,528

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classification\_cnn\_gy\_si-high\_5

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1) 0

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normalization (Normalization) (None, 120, 120, 1) 3

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random\_translation (RandomTrans (None, 120, 120, 1) 0 normalization[0][0]

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concatenate (Concatenate) (None, 120, 120, 3) 0

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resnet50 (Functional) (None, 4, 4, 2048) 23587712

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global\_average\_pooling2d (Globa (None, 2048) 0

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dense (Dense) (None, 1) 2049

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classification\_head\_1 (Activati (None, 1) 0

=================================================================

Total params: 23,589,764

Trainable params: 23,536,641

Non-trainable params: 53,123

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classification\_cnn\_gy\_si-low\_1

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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conv2d (Conv2D) (None, 118, 118, 32) 320

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conv2d\_1 (Conv2D) (None, 116, 116, 64) 18496

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max\_pooling2d (MaxPooling2D) (None, 58, 58, 64) 0

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dropout (Dropout) (None, 58, 58, 64) 0

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flatten (Flatten) (None, 215296) 0

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dropout\_1 (Dropout) (None, 215296) 0

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dense (Dense) (None, 1) 215297

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 234,116

Trainable params: 234,113

Non-trainable params: 3

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classification\_cnn\_gy\_si-low\_2

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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random\_flip (RandomFlip) (None, 120, 120, 1) 0

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separable\_conv2d (SeparableC (None, 118, 118, 32) 73

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separable\_conv2d\_1 (Separabl (None, 116, 116, 64) 2400

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flatten (Flatten) (None, 861184) 0

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dropout (Dropout) (None, 861184) 0

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dense (Dense) (None, 1) 861185

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 863,661

Trainable params: 863,658

Non-trainable params: 3

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classification\_cnn\_gy\_si-low\_3

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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conv2d (Conv2D) (None, 118, 118, 32) 320

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max\_pooling2d (MaxPooling2D) (None, 59, 59, 32) 0

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dropout (Dropout) (None, 59, 59, 32) 0

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flatten (Flatten) (None, 111392) 0

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dropout\_1 (Dropout) (None, 111392) 0

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dense (Dense) (None, 1) 111393

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classification\_head\_1 (Activ (None, 1) 0

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Total params: 111,716

Trainable params: 111,713

Non-trainable params: 3

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classification\_cnn\_gy\_si-low\_4

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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conv2d (Conv2D) (None, 114, 114, 32) 1600

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conv2d\_1 (Conv2D) (None, 108, 108, 128) 200832

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max\_pooling2d (MaxPooling2D) (None, 18, 18, 128) 0

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dropout (Dropout) (None, 18, 18, 128) 0

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flatten (Flatten) (None, 41472) 0

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dropout\_1 (Dropout) (None, 41472) 0

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dense (Dense) (None, 1) 41473

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classification\_head\_1 (Activ (None, 1) 0

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Total params: 243,908

Trainable params: 243,905

Non-trainable params: 3

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classification\_cnn\_gy\_si-low\_5

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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conv2d (Conv2D) (None, 114, 114, 32) 1600

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conv2d\_1 (Conv2D) (None, 108, 108, 64) 100416

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max\_pooling2d (MaxPooling2D) (None, 18, 18, 64) 0

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flatten (Flatten) (None, 20736) 0

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dropout (Dropout) (None, 20736) 0

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dense (Dense) (None, 1) 20737

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classification\_head\_1 (Activ (None, 1) 0

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Total params: 122,756

Trainable params: 122,753

Non-trainable params: 3

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classification\_cnn\_ph\_si-high\_1

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Layer (type) Output Shape Param #

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input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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conv2d (Conv2D) (None, 118, 118, 32) 320

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conv2d\_1 (Conv2D) (None, 116, 116, 64) 18496

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max\_pooling2d (MaxPooling2D) (None, 58, 58, 64) 0

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dropout (Dropout) (None, 58, 58, 64) 0

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flatten (Flatten) (None, 215296) 0

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dropout\_1 (Dropout) (None, 215296) 0

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dense (Dense) (None, 1) 215297

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 234,116

Trainable params: 234,113

Non-trainable params: 3

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classification\_cnn\_ph\_si-high\_2

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1) 0

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normalization (Normalization) (None, 120, 120, 1) 3

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random\_flip (RandomFlip) (None, 120, 120, 1) 0

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concatenate (Concatenate) (None, 120, 120, 3) 0

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resnet50 (Functional) (None, 4, 4, 2048) 23587712

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global\_average\_pooling2d (Globa (None, 2048) 0

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dense (Dense) (None, 1) 2049

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classification\_head\_1 (Activati (None, 1) 0

=================================================================

Total params: 23,589,764

Trainable params: 23,536,641

Non-trainable params: 53,123

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classification\_cnn\_ph\_si-high\_3

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1) 0

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normalization (Normalization) (None, 120, 120, 1) 3

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resizing (Resizing) (None, 224, 224, 1) 0

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concatenate (Concatenate) (None, 224, 224, 3) 0

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resnet50 (Functional) (None, None, None, 2 23587712

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global\_average\_pooling2d (Globa (None, 2048) 0

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dropout (Dropout) (None, 2048) 0

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dense (Dense) (None, 1) 2049

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classification\_head\_1 (Activati (None, 1) 0

=================================================================

Total params: 23,589,764

Trainable params: 23,536,641

Non-trainable params: 53,123

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classification\_cnn\_ph\_si-high\_4

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1) 0

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normalization (Normalization) (None, 120, 120, 1) 3

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random\_translation (RandomTrans (None, 120, 120, 1) 0

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random\_flip (RandomFlip) (None, 120, 120, 1) 0

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concatenate (Concatenate) (None, 120, 120, 3) 0

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resnet50 (Functional) (None, 4, 4, 2048) 23587712

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global\_max\_pooling2d (GlobalMax (None, 2048) 0

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dense (Dense) (None, 1) 2049

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classification\_head\_1 (Activati (None, 1) 0

=================================================================

Total params: 23,589,764

Trainable params: 23,536,641

Non-trainable params: 53,123

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classification\_cnn\_ph\_si-high\_5

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1) 0

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normalization (Normalization) (None, 120, 120, 1) 3

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random\_translation (RandomTrans (None, 120, 120, 1) 0

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concatenate (Concatenate) (None, 120, 120, 3) 0

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xception (Functional) (None, 4, 4, 2048) 20861480

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flatten (Flatten) (None, 32768) 0

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dropout (Dropout) (None, 32768) 0

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dense (Dense) (None, 1) 32769

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classification\_head\_1 (Activati (None, 1) 0

=================================================================

Total params: 20,894,252

Trainable params: 20,839,721

Non-trainable params: 54,531

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classification\_cnn\_ph\_si-low\_1

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1) 0

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normalization (Normalization) (None, 120, 120, 1) 3

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random\_translation (RandomTrans (None, 120, 120, 1) 0

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random\_flip (RandomFlip) (None, 120, 120, 1) 0

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concatenate (Concatenate) (None, 120, 120, 3) 0

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resnet50 (Functional) (None, 4, 4, 2048) 23587712

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global\_average\_pooling2d (Globa (None, 2048) 0

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dense (Dense) (None, 1) 2049

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classification\_head\_1 (Activati (None, 1) 0

=================================================================

Total params: 23,589,764

Trainable params: 23,536,641

Non-trainable params: 53,123

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classification\_cnn\_ph\_si-low\_2

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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separable\_conv2d (SeparableC (None, 114, 114, 32) 113

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separable\_conv2d\_1 (Separabl (None, 108, 108, 64) 3680

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max\_pooling2d (MaxPooling2D) (None, 18, 18, 64) 0

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dropout (Dropout) (None, 18, 18, 64) 0

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flatten (Flatten) (None, 20736) 0

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dropout\_1 (Dropout) (None, 20736) 0

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dense (Dense) (None, 1) 20737

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 24,533

Trainable params: 24,530

Non-trainable params: 3

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classification\_cnn\_ph\_si-low\_3

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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random\_translation (RandomTr (None, 120, 120, 1) 0

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conv2d (Conv2D) (None, 118, 118, 32) 320

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max\_pooling2d (MaxPooling2D) (None, 59, 59, 32) 0

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flatten (Flatten) (None, 111392) 0

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dropout (Dropout) (None, 111392) 0

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dense (Dense) (None, 1) 111393

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classification\_head\_1 (Activ (None, 1) 0

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Total params: 111,716

Trainable params: 111,713

Non-trainable params: 3

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classification\_cnn\_ph\_si-low\_4

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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random\_flip (RandomFlip) (None, 120, 120, 1) 0

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random\_contrast (RandomContr (None, 120, 120, 1) 0

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conv2d (Conv2D) (None, 118, 118, 16) 160

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conv2d\_1 (Conv2D) (None, 116, 116, 64) 9280

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max\_pooling2d (MaxPooling2D) (None, 58, 58, 64) 0

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dropout (Dropout) (None, 58, 58, 64) 0

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flatten (Flatten) (None, 215296) 0

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dense (Dense) (None, 1) 215297

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classification\_head\_1 (Activ (None, 1) 0

=================================================================

Total params: 224,740

Trainable params: 224,737

Non-trainable params: 3

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classification\_cnn\_ph\_si-low\_5

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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random\_flip (RandomFlip) (None, 120, 120, 1) 0

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random\_contrast (RandomContr (None, 120, 120, 1) 0

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conv2d (Conv2D) (None, 118, 118, 32) 320

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conv2d\_1 (Conv2D) (None, 116, 116, 64) 18496

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dropout (Dropout) (None, 116, 116, 64) 0

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conv2d\_2 (Conv2D) (None, 114, 114, 32) 18464

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conv2d\_3 (Conv2D) (None, 112, 112, 32) 9248

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dropout\_1 (Dropout) (None, 112, 112, 32) 0

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flatten (Flatten) (None, 401408) 0

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dropout\_2 (Dropout) (None, 401408) 0

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dense (Dense) (None, 1) 401409

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classification\_head\_1 (Activ (None, 1) 0

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Total params: 447,940

Trainable params: 447,937

Non-trainable params: 3

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regression\_mlp\_gy\_1

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 32) 28960

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re\_lu (ReLU) (None, 32) 0

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dropout (Dropout) (None, 32) 0

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dense\_1 (Dense) (None, 32) 1056

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re\_lu\_1 (ReLU) (None, 32) 0

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dropout\_1 (Dropout) (None, 32) 0

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dropout\_2 (Dropout) (None, 32) 0

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regression\_head\_1 (Dense) (None, 1) 33

=================================================================

Total params: 30,049

Trainable params: 30,049

Non-trainable params: 0

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regression\_mlp\_gy\_2

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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normalization (Normalization (None, 904) 1809

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dense (Dense) (None, 64) 57920

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re\_lu (ReLU) (None, 64) 0

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dropout (Dropout) (None, 64) 0

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regression\_head\_1 (Dense) (None, 1) 65

=================================================================

Total params: 59,794

Trainable params: 57,985

Non-trainable params: 1,809

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regression\_mlp\_gy\_3

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 1024) 926720

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re\_lu (ReLU) (None, 1024) 0

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dropout (Dropout) (None, 1024) 0

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dense\_1 (Dense) (None, 32) 32800

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re\_lu\_1 (ReLU) (None, 32) 0

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dropout\_1 (Dropout) (None, 32) 0

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dense\_2 (Dense) (None, 128) 4224

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re\_lu\_2 (ReLU) (None, 128) 0

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dropout\_2 (Dropout) (None, 128) 0

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regression\_head\_1 (Dense) (None, 1) 129

=================================================================

Total params: 963,873

Trainable params: 963,873

Non-trainable params: 0

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regression\_mlp\_gy\_4

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 256) 231680

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batch\_normalization (BatchNo (None, 256) 1024

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re\_lu (ReLU) (None, 256) 0

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dropout (Dropout) (None, 256) 0

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regression\_head\_1 (Dense) (None, 1) 257

=================================================================

Total params: 232,961

Trainable params: 232,449

Non-trainable params: 512

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regression\_mlp\_gy\_5

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Layer (type) Output Shape Param #

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input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 32) 28960

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re\_lu (ReLU) (None, 32) 0

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dense\_1 (Dense) (None, 32) 1056

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re\_lu\_1 (ReLU) (None, 32) 0

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dense\_2 (Dense) (None, 32) 1056

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re\_lu\_2 (ReLU) (None, 32) 0

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regression\_head\_1 (Dense) (None, 1) 33

=================================================================

Total params: 31,105

Trainable params: 31,105

Non-trainable params: 0

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regression\_mlp\_ph\_1

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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normalization (Normalization (None, 904) 1809

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dense (Dense) (None, 1024) 926720

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batch\_normalization (BatchNo (None, 1024) 4096

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re\_lu (ReLU) (None, 1024) 0

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dropout (Dropout) (None, 1024) 0

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dropout\_1 (Dropout) (None, 1024) 0

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regression\_head\_1 (Dense) (None, 1) 1025

=================================================================

Total params: 933,650

Trainable params: 929,793

Non-trainable params: 3,857

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regression\_mlp\_ph\_2

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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normalization (Normalization (None, 904) 1809

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dense (Dense) (None, 64) 57920

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batch\_normalization (BatchNo (None, 64) 256

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re\_lu (ReLU) (None, 64) 0

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dropout (Dropout) (None, 64) 0

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regression\_head\_1 (Dense) (None, 1) 65

=================================================================

Total params: 60,050

Trainable params: 58,113

Non-trainable params: 1,937

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regression\_mlp\_ph\_3

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 32) 28960

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re\_lu (ReLU) (None, 32) 0

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dense\_1 (Dense) (None, 32) 1056

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re\_lu\_1 (ReLU) (None, 32) 0

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dropout (Dropout) (None, 32) 0

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regression\_head\_1 (Dense) (None, 1) 33

=================================================================

Total params: 30,049

Trainable params: 30,049

Non-trainable params: 0

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regression\_mlp\_ph\_4

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 32) 28960

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re\_lu (ReLU) (None, 32) 0

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dense\_1 (Dense) (None, 256) 8448

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re\_lu\_1 (ReLU) (None, 256) 0

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dropout (Dropout) (None, 256) 0

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regression\_head\_1 (Dense) (None, 1) 257

=================================================================

Total params: 37,665

Trainable params: 37,665

Non-trainable params: 0

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regression\_mlp\_ph\_5

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Layer (type) Output Shape Param #

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input\_1 (InputLayer) [(None, 904)] 0

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multi\_category\_encoding (Mul (None, 904) 0

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dense (Dense) (None, 32) 28960

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re\_lu (ReLU) (None, 32) 0

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dropout (Dropout) (None, 32) 0

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regression\_head\_1 (Dense) (None, 1) 33

=================================================================

Total params: 28,993

Trainable params: 28,993

Non-trainable params: 0

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regression\_cnn\_gy\_1

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Layer (type) Output Shape Param #

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input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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random\_flip (RandomFlip) (None, 120, 120, 1) 0

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conv2d (Conv2D) (None, 118, 118, 256) 2560

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conv2d\_1 (Conv2D) (None, 116, 116, 32) 73760

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max\_pooling2d (MaxPooling2D) (None, 58, 58, 32) 0

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dropout (Dropout) (None, 58, 58, 32) 0

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dropout\_1 (Dropout) (None, 58, 58, 32) 0

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flatten (Flatten) (None, 107648) 0

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regression\_head\_1 (Dense) (None, 1) 107649

=================================================================

Total params: 183,972

Trainable params: 183,969

Non-trainable params: 3

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regression\_cnn\_gy\_2

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Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

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normalization (Normalization (None, 120, 120, 1) 3

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random\_flip (RandomFlip) (None, 120, 120, 1) 0

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conv2d (Conv2D) (None, 118, 118, 16) 160

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conv2d\_1 (Conv2D) (None, 116, 116, 32) 4640

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d (MaxPooling2D) (None, 58, 58, 32) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout (Dropout) (None, 58, 58, 32) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

flatten (Flatten) (None, 107648) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_head\_1 (Dense) (None, 1) 107649

=================================================================

Total params: 112,452

Trainable params: 112,449

Non-trainable params: 3

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_cnn\_gy\_3

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d (Conv2D) (None, 118, 118, 32) 320

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_1 (Conv2D) (None, 116, 116, 256) 73984

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_2 (Conv2D) (None, 114, 114, 32) 73760

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_3 (Conv2D) (None, 112, 112, 32) 9248

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

flatten (Flatten) (None, 401408) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_head\_1 (Dense) (None, 1) 401409

=================================================================

Total params: 558,721

Trainable params: 558,721

Non-trainable params: 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_cnn\_gy\_4

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d (Conv2D) (None, 118, 118, 32) 320

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_1 (Conv2D) (None, 116, 116, 128) 36992

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d (MaxPooling2D) (None, 58, 58, 128) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout (Dropout) (None, 58, 58, 128) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

flatten (Flatten) (None, 430592) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_head\_1 (Dense) (None, 1) 430593

=================================================================

Total params: 467,905

Trainable params: 467,905

Non-trainable params: 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_cnn\_gy\_5

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d (Conv2D) (None, 118, 118, 32) 320

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_1 (Conv2D) (None, 116, 116, 128) 36992

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout (Dropout) (None, 116, 116, 128) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

flatten (Flatten) (None, 1722368) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_head\_1 (Dense) (None, 1) 1722369

=================================================================

Total params: 1,759,681

Trainable params: 1,759,681

Non-trainable params: 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_cnn\_ph\_1

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d (Conv2D) (None, 118, 118, 128) 1280

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_1 (Conv2D) (None, 116, 116, 32) 36896

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d (MaxPooling2D) (None, 58, 58, 32) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout (Dropout) (None, 58, 58, 32) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

flatten (Flatten) (None, 107648) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_head\_1 (Dense) (None, 1) 107649

=================================================================

Total params: 145,825

Trainable params: 145,825

Non-trainable params: 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_cnn\_ph\_2

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

normalization (Normalization (None, 120, 120, 1) 3

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

random\_flip (RandomFlip) (None, 120, 120, 1) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

separable\_conv2d (SeparableC (None, 118, 118, 32) 73

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

separable\_conv2d\_1 (Separabl (None, 116, 116, 32) 1344

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

separable\_conv2d\_2 (Separabl (None, 114, 114, 32) 1344

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

separable\_conv2d\_3 (Separabl (None, 112, 112, 32) 1344

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

flatten (Flatten) (None, 401408) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_head\_1 (Dense) (None, 1) 401409

=================================================================

Total params: 405,517

Trainable params: 405,514

Non-trainable params: 3

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_cnn\_ph\_3

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d (Conv2D) (None, 118, 118, 32) 320

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_1 (Conv2D) (None, 116, 116, 32) 9248

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d (MaxPooling2D) (None, 58, 58, 32) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_2 (Conv2D) (None, 56, 56, 32) 9248

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_3 (Conv2D) (None, 54, 54, 256) 73984

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d\_1 (MaxPooling2 (None, 27, 27, 256) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_4 (Conv2D) (None, 25, 25, 32) 73760

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_5 (Conv2D) (None, 23, 23, 32) 9248

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d\_2 (MaxPooling2 (None, 11, 11, 32) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

flatten (Flatten) (None, 3872) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_head\_1 (Dense) (None, 1) 3873

=================================================================

Total params: 179,681

Trainable params: 179,681

Non-trainable params: 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_cnn\_ph\_4

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

random\_flip (RandomFlip) (None, 120, 120, 1) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d (Conv2D) (None, 118, 118, 32) 320

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_1 (Conv2D) (None, 116, 116, 256) 73984

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d (MaxPooling2D) (None, 58, 58, 256) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_2 (Conv2D) (None, 56, 56, 32) 73760

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv2d\_3 (Conv2D) (None, 54, 54, 32) 9248

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d\_1 (MaxPooling2 (None, 27, 27, 32) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

flatten (Flatten) (None, 23328) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_head\_1 (Dense) (None, 1) 23329

=================================================================

Total params: 180,641

Trainable params: 180,641

Non-trainable params: 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_cnn\_ph\_5

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Layer (type) Output Shape Param #

=================================================================

input\_1 (InputLayer) [(None, 120, 120, 1)] 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

separable\_conv2d (SeparableC (None, 118, 118, 32) 73

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

separable\_conv2d\_1 (Separabl (None, 116, 116, 32) 1344

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d (MaxPooling2D) (None, 58, 58, 32) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout (Dropout) (None, 58, 58, 32) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

separable\_conv2d\_2 (Separabl (None, 56, 56, 64) 2400

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

separable\_conv2d\_3 (Separabl (None, 54, 54, 512) 33856

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

max\_pooling2d\_1 (MaxPooling2 (None, 27, 27, 512) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_1 (Dropout) (None, 27, 27, 512) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_2 (Dropout) (None, 27, 27, 512) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

flatten (Flatten) (None, 373248) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

regression\_head\_1 (Dense) (None, 1) 373249

=================================================================

Total params: 410,922

Trainable params: 410,922

Non-trainable params: 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_