# Appendix : Neural Net tuning

This appendix contains the parameters and results of the tuning done for the nn and cnn models.

## Selected NN Model

### Selected NN Model architecture

nn\_model %>%

layer\_dense(units = 256, activation = 'relu', input\_shape = c(ncols-1)) %>%

layer\_dropout(rate = 0.4) %>%

layer\_dense(units = 128, activation = 'relu') %>%

layer\_dropout(rate = 0.3) %>%

layer\_dense(units = 6, activation = 'softmax')

Layer (type) Output Shape Param # ====================================================================================

dense\_25 (Dense) (None, 256) 2639360 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

dense\_26 (Dense) (None, 128) 32896 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

dense\_27 (Dense) (None, 6) 774 ====================================================================================

Total params: 2,673,030

Trainable params: 2,673,030

Non-trainable params: 0

### Selected NN Model tuning

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Plot ref | Loss function | Optimizer | Epochs | Batch Size | Validation split | Loss | Val\_acc |
| N1 | categorical\_crossentropy | rmsprop | 50 | 500 | 20% | 0.4548467 | 0.8474227 |
| N2 | categorical\_crossentropy | rmsprop | 50 | 400 | 20% | 0.4958594 | 0.8274914 |
| N3 | categorical\_crossentropy | rmsprop | 50 | 32 | 20% | 0.7263632 | 0.7079038 |
| N4 | categorical\_crossentropy | Adam | 50 | 400 | 20% | 0.872403 | 0.6054983 |
| N5 | categorical\_crossentropy | rmsprop | 50 | 200 | 20% | 0.9134078 | 0.5814433 |
| N6 | categorical\_crossentropy | rmsprop | 50 | 100 | 20% | 1.433739 | 0.4068729 |

### Selected NN Model performance

|  |  |
| --- | --- |
| Plot | Result |
| N1 |  |
| N2 |  |
| N3 |  |
| N4 |  |
| N5 |  |
| N6 |  |

# Convolutional Neural Net tuning

## Selected CNN Model

### Selected CNN Model architecture

cnn\_model %>%

# embedding layer maps vocab indices into embedding\_dims dimensions

layer\_embedding(max\_features, embedding\_dims, input\_length = maxlen) %>%

# add some dropout

layer\_dropout(0.5) %>%

# convolutional layer

layer\_conv\_1d(

filters = 100,

kernel\_size = 3,

padding = "valid", # "valid" means no padding, as we did it already

activation = "relu",

strides = 2 ) %>%

layer\_global\_max\_pooling\_1d() %>%

layer\_dense(128) %>%

layer\_activation("relu") %>%

layer\_dense(128) %>%

layer\_dropout(0.5) %>%

layer\_activation("relu") %>%

layer\_dense(6) %>% # single unit output layer

layer\_activation("softmax")

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

Layer (type) Output Shape Param # ====================================================================================

embedding\_2 (Embedding) (None, 300, 10) 20000 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_3 (Dropout) (None, 300, 10) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv1d\_2 (Conv1D) (None, 149, 100) 3100 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

global\_max\_pooling1d\_2 (GlobalMaxPoo (None, 100) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_4 (Dense) (None, 128) 12928 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

activation\_4 (Activation) (None, 128) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_5 (Dense) (None, 128) 16512 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_4 (Dropout) (None, 128) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

activation\_5 (Activation) (None, 128) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_6 (Dense) (None, 6) 774 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

activation\_6 (Activation) (None, 6) 0 ====================================================================================

Total params: 53,314

Trainable params: 53,314

Non-trainable params: 0

### Selected CNN Model tuning

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Plot ref | Loss function | Optimizer | Epochs | Batch Size | Validation split | Loss | Val\_acc |
| C1 | categorical\_crossentropy | Nadam | 10 | 400 | 20% | 1.138601 | 0.556694 |
| C2 | categorical\_crossentropy | Adam | 10 | 400 | 20% | 1.223028 | 0.5491803 |
| C3 | categorical\_crossentropy | Rmsprop | 10 | 400 | 20% | 1.15393 | 0.545765 |
| C4 | categorical\_crossentropy | Adamax | 10 | 400 | 20% | 1.318988 | 0.4911202 |
| C5 | categorical\_crossentropy | Adadelta | 10 | 400 | 20% | 1.389502 | 0.4487705 |

### Selected CNN Model performance

|  |  |
| --- | --- |
| Plot no | Result |
| C1 |  |
| C2 |  |
| C3 |  |
| C4 | Plot was not saved |
| C5 |  |

## Alternative CNN Models

### Alternative 1 Architecture

cnn\_model %>%

# embedding layer maps vocab indices into embedding\_dims dimensions

layer\_embedding(max\_features, embedding\_dims, input\_length = maxlen) %>%

# add some dropout

layer\_dropout(0.5) %>%

# convolutional layer

layer\_conv\_1d(

filters = 100,

kernel\_size = 3,

padding = "valid", # "valid" means no padding, as we did it already

activation = "relu",

strides = 2 ) %>%

layer\_global\_max\_pooling\_1d() %>%

layer\_dense(256) %>%

layer\_dropout(0.4) %>%

layer\_activation("relu") %>%

layer\_dense(128) %>%

layer\_dropout(0.3) %>%

layer\_activation("relu") %>%

layer\_dense(6) %>% # single unit output layer

layer\_activation("softmax")

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

Layer (type) Output Shape Param # ====================================================================================

embedding\_11 (Embedding) (None, 300, 10) 20000 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_23 (Dropout) (None, 300, 10) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv1d\_11 (Conv1D) (None, 149, 100) 3100 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

global\_max\_pooling1d\_11 (GlobalMaxPo (None, 100) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_31 (Dense) (None, 256) 25856 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_24 (Dropout) (None, 256) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

activation\_31 (Activation) (None, 256) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_32 (Dense) (None, 128) 32896 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_25 (Dropout) (None, 128) 0

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

activation\_32 (Activation) (None, 128) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_33 (Dense) (None, 6) 774 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

activation\_33 (Activation) (None, 6) 0 ====================================================================================

Total params: 82,626

Trainable params: 82,626

Non-trainable params: 0

### Alternative 2 architeture

cnn\_model %>%

# embedding layer maps vocab indices into embedding\_dims dimensions

layer\_embedding(max\_features, embedding\_dims, input\_length = maxlen) %>%

# add some dropout

layer\_dropout(0.3) %>%

# convolutional layer

layer\_conv\_1d(

filters = 100,

kernel\_size = 3,

padding = "valid", # "valid" means no padding, as we did it already

activation = "relu",

strides = 2 ) %>%

layer\_global\_max\_pooling\_1d() %>%

layer\_dense(256) %>%

layer\_activation("relu") %>%

layer\_dense(128) %>%

layer\_dropout(0.5) %>%

layer\_activation("relu") %>%

layer\_dense(6) %>% # single unit output layer

layer\_activation("softmax")

Layer (type) Output Shape Param # ====================================================================================

embedding\_14 (Embedding) (None, 300, 10) 20000 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_30 (Dropout) (None, 300, 10) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv1d\_14 (Conv1D) (None, 149, 100) 3100 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

global\_max\_pooling1d\_14 (GlobalMaxPo (None, 100) 0

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

dense\_40 (Dense) (None, 256) 25856 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

activation\_40 (Activation) (None, 256) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_41 (Dense) (None, 128) 32896 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_31 (Dropout) (None, 128) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

activation\_41 (Activation) (None, 128) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_42 (Dense) (None, 6) 774 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

activation\_42 (Activation) (None, 6) 0 ====================================================================================

Total params: 82,626

Trainable params: 82,626

Non-trainable params: 0

### Alternative 3 architecture

cnn\_model %>%

# embedding layer maps vocab indices into embedding\_dims dimensions

layer\_embedding(max\_features, embedding\_dims, input\_length = maxlen) %>%

# add some dropout

layer\_dropout(0.4) %>%

# convolutional layer

layer\_conv\_1d(

filters = 100,

kernel\_size = 3,

padding = "valid", # "valid" means no padding, as we did it already

activation = "relu",

strides = 2 ) %>%

layer\_global\_max\_pooling\_1d() %>%

layer\_dense(256) %>%

layer\_activation("relu") %>%

layer\_dense(128) %>%

layer\_dropout(0.3) %>%

layer\_activation("relu") %>%

layer\_dense(6) %>% # single unit output layer

layer\_activation("softmax")

Layer (type) Output Shape Param # ====================================================================================

embedding\_15 (Embedding) (None, 300, 10) 20000 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_32 (Dropout) (None, 300, 10) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

conv1d\_15 (Conv1D) (None, 149, 100) 3100 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

global\_max\_pooling1d\_15 (GlobalMaxPo (None, 100) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_43 (Dense) (None, 256) 25856 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

activation\_43 (Activation) (None, 256) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_44 (Dense) (None, 128) 32896 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_33 (Dropout) (None, 128) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

activation\_44 (Activation) (None, 128) 0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_45 (Dense) (None, 6) 774 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

activation\_45 (Activation) (None, 6) 0 ====================================================================================

Total params: 82,626

Trainable params: 82,626

Non-trainable params: 0

## Alternative model results

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Plot ref | Loss function | Optimizer | Epochs | Batch Size | Validation split | Loss | Val\_acc |
| Alt1 | categorical\_crossentropy | Adam | 10 | 400 | 20% | 1.247856 | 0.5184426 |
| Alt2 | categorical\_crossentropy | RMSProp | 10 | 400 | 20% | 1.177343 | 0.5484973 |
| Alt3 | categorical\_crossentropy | RMSProp | 10 | 400 | 20% | 1.247915 | 0.5293716 |

|  |  |
| --- | --- |
| Plot no | Result |
| Alt1 |  |
| Alt2 |  |

|  |  |
| --- | --- |
| Alt3 |  |