MATH 686: HW 8
Text Classification with TF Hub (nnlm-en-dim128)

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Classify movie reviews as positive or negative using the text of the review. Based on the course handout, retrain the model and evaluate accuracy for the testing data.

- adding an early stopping condition to the training process
- use a pre-trained text embedding model from TensorFlow Hub called google/nnlm-en-dim128/2

```
if (dir.exists("aclImdb/"))
  unlink("aclImdb/", recursive = TRUE)
url <- "https://ai.stanford.edu/~amaas/data/sentiment/aclImdb_v1.tar.gz"
dataset <- get_file(
  "aclImdb_v1",
  url,
  untar = TRUE,
  cache_dir = '.',
  cache_subdir = ''
)
```

```
## Loaded Tensorflow version 2.9.2
```

```
unlink("aclImdb/train/unsup/", recursive = TRUE)
```

```
batch_size <- 512
seed <- 42

train_data <- text_dataset_from_directory(
  'aclImdb/train',
  batch_size = batch_size,
  validation_split = 0.2,
  subset = 'training',
  seed = seed
)
validation_data <- text_dataset_from_directory(
  'aclImdb/train',
  batch_size = batch_size,
  validation_split = 0.2,
  subset = 'validation',
  seed = seed
)
test_data <- text_dataset_from_directory(
  'aclImdb/test',
  batch_size = batch_size
)
```

```
embedding <- 'https://tfhub.dev/google/nnlm-en-dim128/2'
hub_layer <- tfhub::layer_hub(handle = embedding, trainable = TRUE)
```

```
model <- keras_model_sequential() %>%
  hub_layer() %>%
  layer_dense(16, activation = 'relu') %>%
  layer_dense(1)

summary(model)
```

```
## Model: <no summary available, model was not built>
```

```
model %>% compile(
  optimizer = 'adam',
  loss = loss_binary_crossentropy(from_logits = TRUE),
  metrics = 'accuracy'
)


history <- model %>% fit(
  train_data,
  epochs = 10,
  validation_data = validation_data,
  callbacks = callback_early_stopping(patience = 2, monitor = 'val_loss'),
  verbose <- 1
)

plot(history)
```

```
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : Chernobyl! trL>n 6

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
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## Warning in sqrt(sum.squares/one.delta): NaNs produced

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```

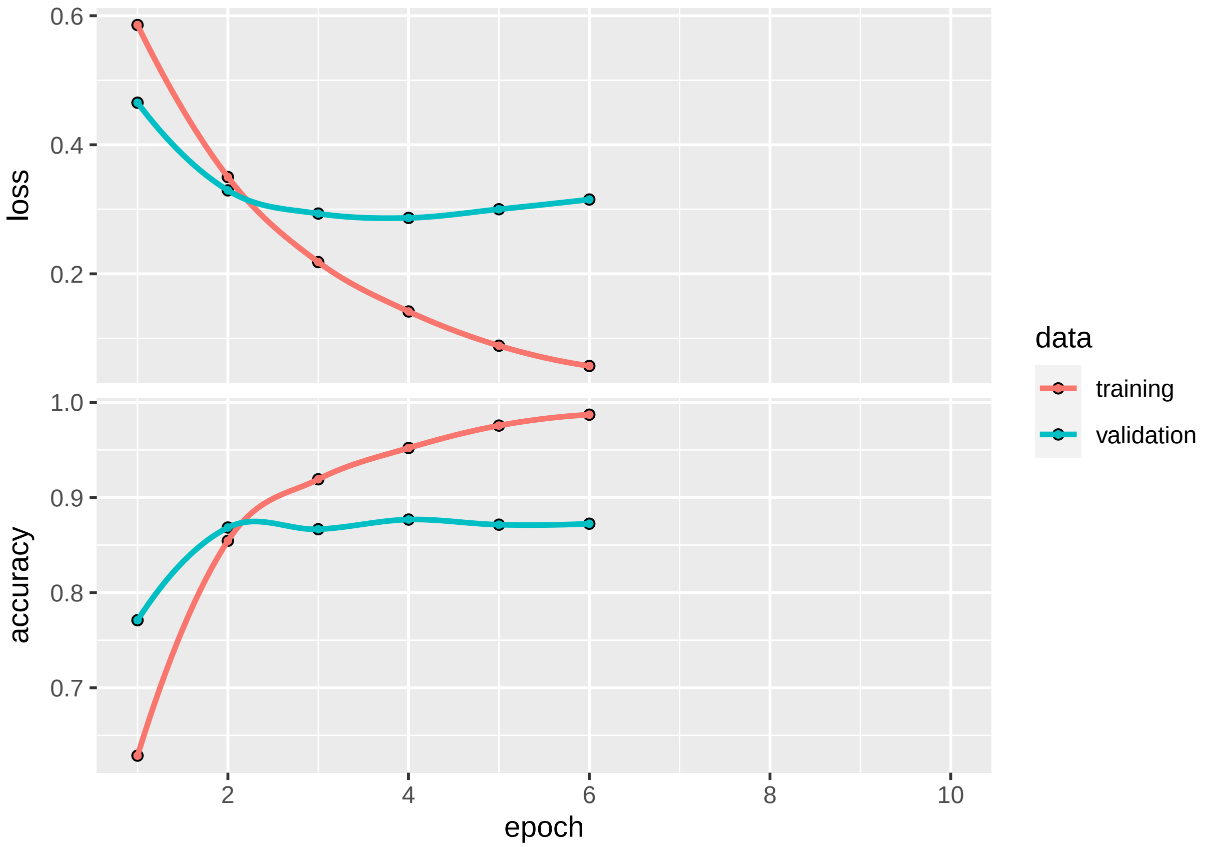

```
results <- model %>% evaluate(test_data, verbose = 2)
results
```

```
##      loss  accuracy
## 0.3469216 0.8579600
```