Homework #5

library(keras)

mnist <- dataset\_fashion\_mnist()

c(c(train\_images, train\_labels), c(test\_images, test\_labels)) %<-% mnist

train\_images <- array\_reshape(train\_images, c(60000, 28, 28, 1))

test\_images <- array\_reshape(test\_images, c(10000, 28, 28, 1))

train\_images <- train\_images / 255

test\_images <- test\_images / 255

train\_labels <- to\_categorical(train\_labels, num\_classes = 11)

test\_labels <- to\_categorical(test\_labels, num\_classes = 11)

model <- keras\_model\_sequential() %>%

layer\_conv\_2d(filters = 32, kernel\_size = c(3, 3), activation = "selu",input\_shape = c(28, 28, 1)) %>%

#layer\_max\_pooling\_2d(pool\_size = c(2, 2)) %>%

#layer\_dropout(rate = 0.4) %>%

layer\_conv\_2d(filters = 64, kernel\_size = c(3, 3), activation = "selu") %>%

layer\_max\_pooling\_2d(pool\_size = c(2, 2)) %>%

layer\_dropout(rate = 0.4) %>%

layer\_conv\_2d(filters = 96, kernel\_size = c(3, 3), activation = "selu")

layer\_max\_pooling\_2d(pool\_size = c(2, 2)) %>%

layer\_dropout(rate = 0.4) %>%

layer\_conv\_2d(filters = 128, kernel\_size = c(3, 3), activation = "selu") %>%

layer\_max\_pooling\_2d(pool\_size = c(2, 2))

#model

model <- model %>%

layer\_flatten() %>%

layer\_dense(units = 256, activation = "selu") %>%

layer\_dropout(rate = 0.4) %>%

#layer\_dense(units = 64, activation = "selu") %>%

layer\_dense(units = 11, activation = "softmax")

#model

model %>% compile(

optimizer = "Adadelta",

loss = "categorical\_crossentropy",

metrics = c("accuracy")

)

model %>% fit(

train\_images, train\_labels,

epochs = 10, batch\_size=64, validation\_split = 0.2

)

model %>% save\_model\_hdf5("~/github/DeepLearningR/MNist\_Fashion\_91.h5")

results <- model %>% evaluate(test\_images, test\_labels)

results

To achieve an accuracy of 91% we modified the top levels of the convnet to not do pooling between the first two layers as to not remove the rough detail to be excluded and to be able to break it down further. We also added the MIT addition of creating an extra class that does not represent a true label. Finally we added a dropout layer before the final layer and changed the optimizer to Adadelta.

