**Model Training**
We trained our model with the preprocessed dataset that we introduced last week that had roughly 60,000 sentence to emotion pairing entries. We utilized KoELECTRA for their state-of-the-art performance for NLP classification and prediction tasks. We used a percentage based approach that utilizes the percentage of the emotions for predicting what emotion a certain word depicts. An example of this will be shown later in the presentation when going over the results that our model produced.

**Cross Validation**
Our team decided to utilize k-fold cross validation to estimate the performance of our proposed model. We split our dataset into K number of folds and used it to evaluate the model's performance when given new data. For this presentation, we chose a k-value of 5, but will try to see our results with a k-value of 10 in the future.

**Cross Validation Results**
Shown on this slide is the result of our five-fold cross validation using an epoch value of 5. As you can see with the accuracy and loss metrics, at the end of the fifth fold, the validation accuracy sits at 0.98 while the training loss is 0.03 and validation loss is 0.05. We can see the our model exhibits good performance

**Cross Validation Results *cont*.**
Using an epoch value of 10, we can see that the training loss and validation loss values have lowered with a slight improvement to our validation accuracy.

**Training Results**
This slide features the training results of our current model. With 10 epochs, the training loss was 0.017, validation loss was 2.89 and the accuracy was 0.57 or 57% accurate based on the dataset that we trained on.

**Prediction Results**
The prediction system we use takes in any input word and tries to predict or classify the emotions that accompany the given input. For this example, we have our input as "고마워." Using softmax, we are able to see both the prediction and the probability value that each classifier, or emotion holds. Looking at the results below the code image, we can see that there are seven values that correspond to the emotion dictionary that we have created. With the seven probability values, we can see that our model deduced that "고마워" probably belongs to the "행복" emotion since it has the highest probability value.

**Overfitting**
We can try to see if overfitting might be a problem for our current model by using a high epoch count during training and seeing our cross validation results. Over 50 epochs, the training loss, validation loss and accuracy showed fluctuations but stayed near to the results of our training done with 5 and 10 epochs. In conjunction with these results and the results shown in our kfold cross validation results, we can see that overfitting would not be a problem for this model

**Future Directions**

The model we have shown today is primarily based on a pre-trained model of KoELECTRA. Due to difficulties in producing a baseline model last week, we have chosen to produce the model presented today before moving onto producing our planned model. We hope to produce a new model that utilizes Named Entity Recognition on a dataset and utilize named entities as training data for sentiment analysis. We will use the model highlighted today as a baseline to compare to the new planned model.

Additional thoughts:

Simply training a base model to conduct sentiment analysis

- How Electra Works
    - For a given input sequence, randomly replace some tokens with a [MASK] token.
    - The generator predicts the original tokens for all masked tokens.
    - The input sequence to the discriminator is built by replacing [MASK] tokens with the generator predictions.
    - For each token in the sequence, the discriminator predicts whether it is an original or whether it has been replaced by the generator.