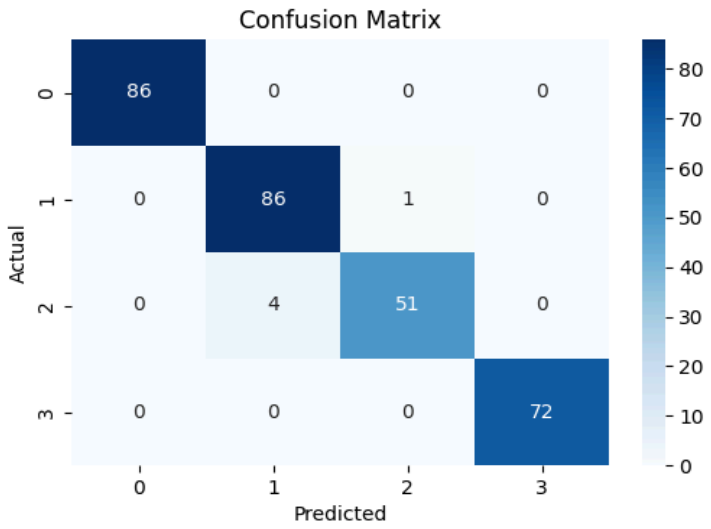
📊 XGBoost — Performance on 20% Unseen Text Data

Accuracy: 98.33%
Precision: 98.36%
Recall: 98.33%
F1 Score: 98.32%

Confusion Matrix (Class Mapping):

- `0 → Backend`
- `1 → Frontend`
- `2 → Fullstack`
- `3 → QA`



Major Failure Modes

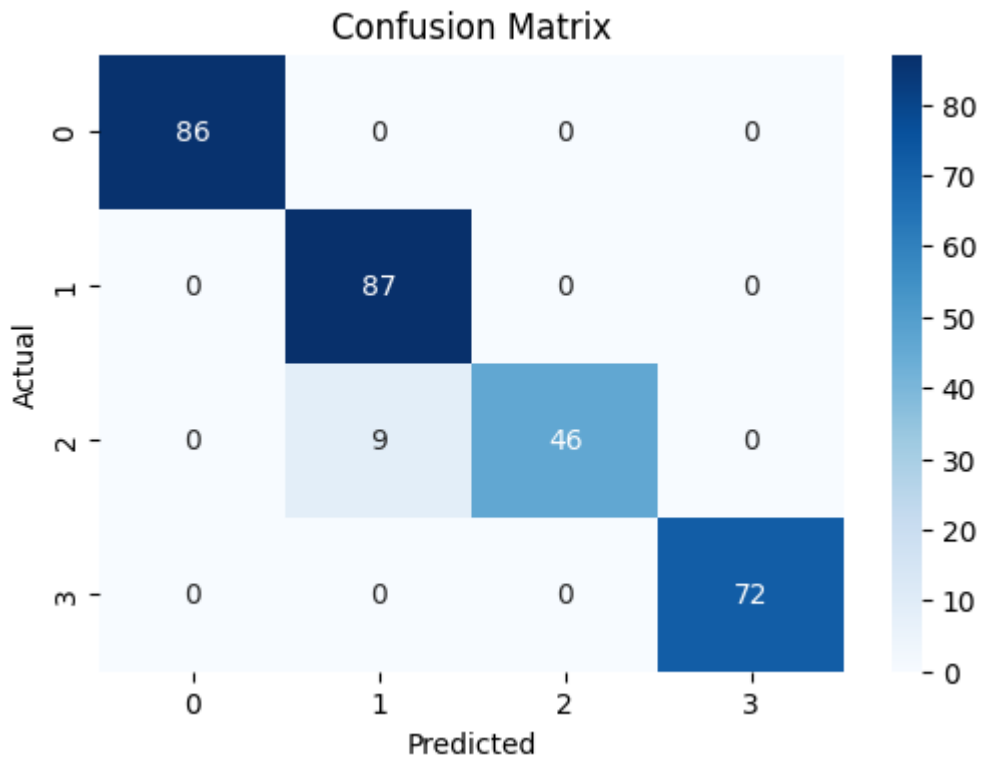
1. Misclassifies **Frontend vs Fullstack** due to overlapping skillsets
2. Model might be overfitting as the data is little low for some classes

Random Forest

- **Accuracy:** 0.97

- **Precision:** 0.972
- **Recall:** 0.97
- **F1 Score:** 0.96

Confusion Matrix (labels: 0=Backend, 1=Frontend, 2=Fullstack, 3=QA):



Major Failure Modes

1. Misclassifies **Frontend vs Fullstack** due to overlapping skillsets

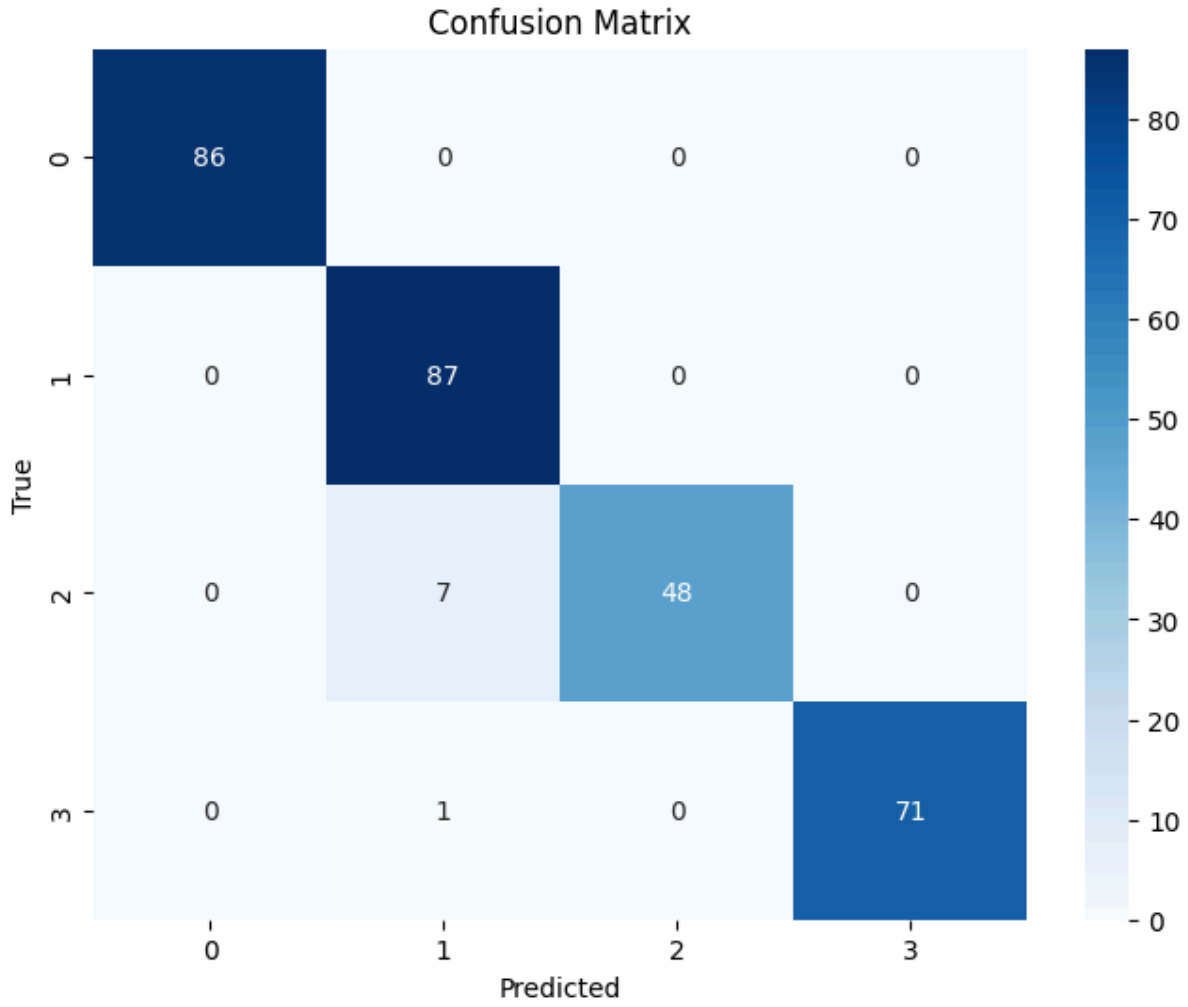
BiLSTM — Performance on 20% Unseen Text Data

- **Accuracy:** 0.9733

- **Precision:** 0.9755
- **Recall:** 0.9733
- **F1 Score:** 0.973

Confusion Matrix (labels: 0=Backend, 1=Frontend, 2=Fullstack, 3=QA):

This is also showing similar behaviour, confusing frontend with the full stack.



LESSONS:

1. **TF-IDF is a great preprocessing technique and helped us reach very high accuracy, but it is still making mistake on capturing context**
2. **As the data is low, the model is highly likely to overfit**
3. **The fact that BILSTMS do not improve accuracy, shows that the context was not important here.**

4. **Xgboast performed much better that both as others might be overfitting due to complex architect and large number of estimators in random forest**