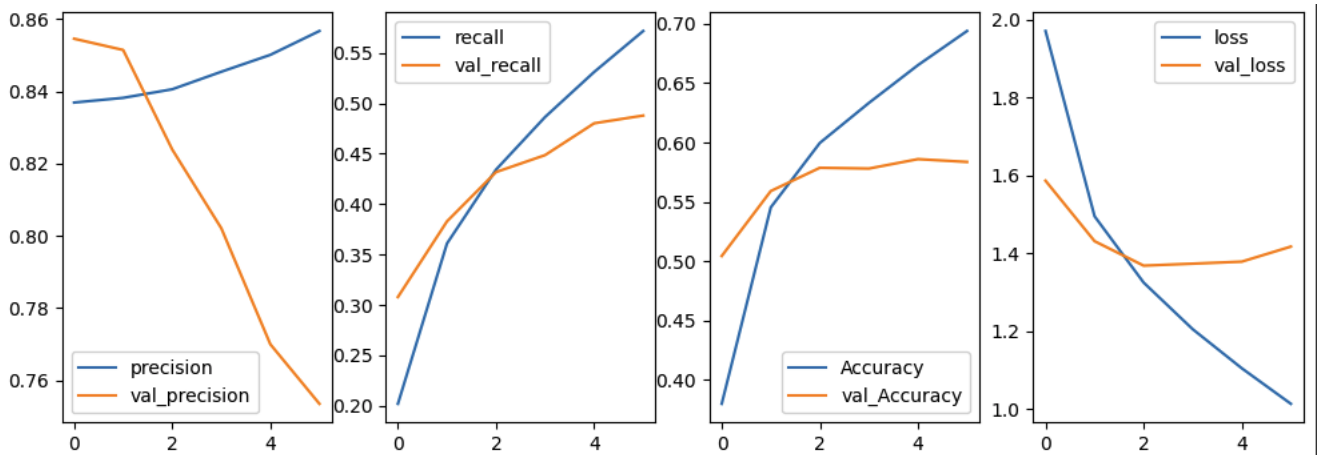


CLASSIFICATION REPORTS

- Gated Recurrent Unit – GRU

Epoch 1/6
1839/1839 [=====] - 759s 411ms/step - loss: 1.9709 - Accuracy: 0.3799 - precision: 0.8369 - recall: 0.2017 - val_loss: 1.5862 - val_Accuracy: 0.5043
Epoch 2/6
1839/1839 [=====] - 737s 401ms/step - loss: 1.4947 - Accuracy: 0.5452 - precision: 0.8382 - recall: 0.3608 - val_loss: 1.4308 - val_Accuracy: 0.5590
Epoch 3/6
1839/1839 [=====] - 743s 404ms/step - loss: 1.3244 - Accuracy: 0.5995 - precision: 0.8406 - recall: 0.4341 - val_loss: 1.3680 - val_Accuracy: 0.5786
Epoch 4/6
1839/1839 [=====] - 747s 406ms/step - loss: 1.2046 - Accuracy: 0.6332 - precision: 0.8454 - recall: 0.4864 - val_loss: 1.3731 - val_Accuracy: 0.5779
Epoch 5/6
1839/1839 [=====] - 744s 405ms/step - loss: 1.1043 - Accuracy: 0.6650 - precision: 0.8501 - recall: 0.5311 - val_loss: 1.3783 - val_Accuracy: 0.5858
Epoch 6/6
1839/1839 [=====] - 747s 406ms/step - loss: 1.0130 - Accuracy: 0.6937 - precision: 0.8567 - recall: 0.5717 - val_loss: 1.4169 - val_Accuracy: 0.5835
1149/1149 [=====] - 20s 17ms/step
Test set (GRU):

	precision	recall	f1-score	support
Mainichi Shimbun	0.78	0.54	0.64	13
The Japan Times	1.00	1.00	1.00	2597
asahi.com	0.55	0.51	0.53	2594
chunichi.co.jp	0.00	0.00	0.00	17
hokkaido-np.co.jp	0.65	0.59	0.62	2175
isemp.co.jp	0.74	0.59	0.66	288
iwate-np.co.jp	0.90	0.07	0.14	259
kobe-np.co.jp	0.42	0.37	0.39	1611
kyoto-np.co.jp	0.52	0.32	0.40	662
mainichi.jp	0.69	0.70	0.70	2744
nikkansports.com	0.72	0.71	0.72	2698
nikkei.com	0.58	0.71	0.64	2555
nishinippon.co.jp	0.39	0.42	0.41	2648
nnn.co.jp	1.00	0.01	0.03	74
oita-press.co.jp	0.38	0.47	0.42	2665
sankei.jp.msn.com	0.35	0.33	0.34	2676
sanspo.com	0.54	0.53	0.54	2709
shimotsuke.co.jp	0.57	0.58	0.57	1915
tokachi.co.jp	0.00	0.00	0.00	39
tokyo-np.co.jp	0.00	0.00	0.00	15
tomamin.co.jp	0.74	0.75	0.74	2562
yamagata-np.jp	0.43	0.17	0.24	533
yomiuri.co.jp	0.53	0.60	0.56	2719
accuracy			0.58	36768
macro avg	0.54	0.43	0.45	36768
weighted avg	0.58	0.58	0.58	36768

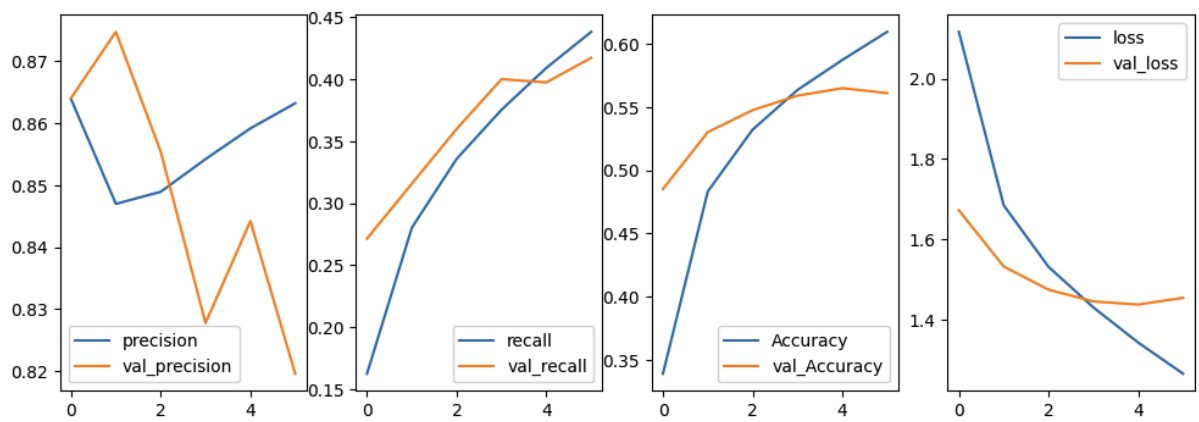


- Long Short Term Memory – LSTM

```
Epoch 1/6
1839/1839 [=====] - 902s 489ms/step - loss: 2.1161 - Accuracy: 0.3390 - precision: 0.8639 - recall: 0.1625 - val_loss: 1.6726 - val_Accuracy: 0.4851
Epoch 2/6
1839/1839 [=====] - 899s 489ms/step - loss: 1.6849 - Accuracy: 0.4832 - precision: 0.8470 - recall: 0.2802 - val_loss: 1.5329 - val_Accuracy: 0.5301
Epoch 3/6
1839/1839 [=====] - 892s 485ms/step - loss: 1.5320 - Accuracy: 0.5321 - precision: 0.8489 - recall: 0.3357 - val_loss: 1.4753 - val_Accuracy: 0.5475
Epoch 4/6
1839/1839 [=====] - 949s 516ms/step - loss: 1.4311 - Accuracy: 0.5635 - precision: 0.8542 - recall: 0.3753 - val_loss: 1.4461 - val_Accuracy: 0.5590
Epoch 5/6
1839/1839 [=====] - 902s 490ms/step - loss: 1.3438 - Accuracy: 0.5872 - precision: 0.8591 - recall: 0.4091 - val_loss: 1.4384 - val_Accuracy: 0.5649
Epoch 6/6
1839/1839 [=====] - 901s 490ms/step - loss: 1.2664 - Accuracy: 0.6095 - precision: 0.8632 - recall: 0.4381 - val_loss: 1.4551 - val_Accuracy: 0.5610
1149/1149 [=====] - 31s 23ms/step
Test set:
      precision    recall  f1-score   support

Mainichi Shimbun      1.00      0.31      0.47        13
The Japan Times       1.00      1.00      1.00       2597
asahi.com              0.48      0.52      0.50       2594
chunichi.co.jp        0.00      0.00      0.00         17
hokkaido-np.co.jp     0.66      0.58      0.62       2175
isenp.co.jp           0.54      0.55      0.54        288
iwate-np.co.jp        0.00      0.00      0.00        259
kobe-np.co.jp         0.36      0.34      0.35       1611
kyoto-np.co.jp        0.60      0.24      0.34        662
mainichi.jp           0.67      0.70      0.68       2744
nikkansports.com      0.70      0.74      0.72       2698
nikkei.com            0.66      0.62      0.64       2555
nishinippon.co.jp    0.35      0.40      0.38       2648
nnn.co.jp             0.00      0.00      0.00         74
oita-press.co.jp     0.34      0.46      0.39       2665
sankei.jp.msn.com     0.34      0.19      0.24       2676
sanspo.com            0.49      0.57      0.52       2709
shimotsuke.co.jp     0.55      0.57      0.56       1915
tokachi.co.jp         0.00      0.00      0.00         39
tokyo-np.co.jp        0.00      0.00      0.00         15
tomamir.co.jp         0.75      0.75      0.75       2562
yamagata-np.jp        0.52      0.05      0.09        533
yomiuri.co.jp         0.50      0.59      0.54       2719

accuracy              0.46
macro avg             0.46
weighted avg          0.56
```



- BiDirectional Long Short Term Memory – BILSTM

```
Epoch 1/6
1839/1839 [=====] - 1068s 578ms/step - loss: 1.7086 - Accuracy: 0.4679 - precision: 0.8171 - recall: 0.2855 - val_loss: 1.4368 - val_Accuracy: 0.5569
Epoch 2/6
1839/1839 [=====] - 1083s 589ms/step - loss: 1.3148 - Accuracy: 0.5927 - precision: 0.8229 - recall: 0.4411 - val_loss: 1.3526 - val_Accuracy: 0.5855
Epoch 3/6
1839/1839 [=====] - 1142s 621ms/step - loss: 1.1633 - Accuracy: 0.6362 - precision: 0.8259 - recall: 0.5003 - val_loss: 1.3468 - val_Accuracy: 0.5887
Epoch 4/6
1839/1839 [=====] - 1069s 581ms/step - loss: 1.0526 - Accuracy: 0.6656 - precision: 0.8309 - recall: 0.5450 - val_loss: 1.3664 - val_Accuracy: 0.5926
Epoch 5/6
1839/1839 [=====] - 1074s 584ms/step - loss: 0.9624 - Accuracy: 0.6926 - precision: 0.8377 - recall: 0.5827 - val_loss: 1.3725 - val_Accuracy: 0.5942
Epoch 6/6
1839/1839 [=====] - 1181s 642ms/step - loss: 0.8949 - Accuracy: 0.7113 - precision: 0.8399 - recall: 0.6118 - val_loss: 1.4183 - val_Accuracy: 0.5932
1149/1149 [=====] - 46s 39ms/step
Test set:
```

	precision	recall	f1-score	support
Mainichi Shimbu	0.86	0.92	0.89	13
The Japan Times	1.00	1.00	1.00	2597
asahi.com	0.57	0.50	0.53	2594
chunichi.co.jp	0.00	0.00	0.00	17
hokkaido-np.co.jp	0.66	0.60	0.63	2175
isepn.co.jp	0.85	0.58	0.69	288
iwate-np.co.jp	0.51	0.15	0.23	259
kobe-np.co.jp	0.35	0.45	0.39	1611
kyoto-np.co.jp	0.64	0.32	0.43	662
mainichi.jp	0.69	0.71	0.70	2744
nikkansports.com	0.68	0.76	0.72	2698
nikkei.com	0.62	0.73	0.67	2555
nishinippon.co.jp	0.43	0.42	0.43	2648
nnn.co.jp	0.86	0.16	0.27	74
oita-press.co.jp	0.35	0.50	0.41	2665
sankei.jp.msn.com	0.43	0.31	0.36	2676
sanspo.com	0.54	0.51	0.53	2709
shimotsuke.co.jp	0.62	0.57	0.59	1915
tokachi.co.jp	0.00	0.00	0.00	39
tokyo-np.co.jp	0.00	0.00	0.00	15
tomamin.co.jp	0.71	0.82	0.76	2562
yamagata-np.jp	0.44	0.22	0.29	533
yomiuri.co.jp	0.61	0.56	0.58	2719
accuracy			0.59	36768
macro avg	0.54	0.47	0.48	36768
weighted avg	0.59	0.59	0.59	36768

