- Took test size as 0.15

- TFIDF Vectorizer => Max features = 300
  Catboost Classifier. Iterations = 100, depth = 6, learning rate = 0.1

	precision	recall	f1-score	support
0	0.75	0.55	0.64	38
1	0.67	0.10	0.17	21
2	0.50	0.12	0.19	17
3	1.00	0.14	0.25	21
4	0.76	0.61	0.67	61
5	0.50	0.10	0.16	21
6	1.00	0.20	0.33	15
7	0.40	0.10	0.15	21
8	1.00	0.06	0.11	17
9	0.61	0.34	0.44	32
10	0.62	0.14	0.23	35
micro avg	0.71	0.30	0.42	299
macro avg	0.71	0.22	0.30	299
weighted avg	0.70	0.30	0.38	299
samples avg	0.58	0.36	0.42	299

Hamming Loss = `0.20985556499575192`

LinearSVC

	precision	recall	f1-score	support
0	0.60	0.39	0.48	38
1	0.33	0.19	0.24	21
2	0.29	0.12	0.17	17
3	0.75	0.29	0.41	21
4	0.72	0.67	0.69	61
5	0.50	0.29	0.36	21
6	0.50	0.20	0.29	15
7	0.45	0.43	0.44	21
8	0.29	0.12	0.17	17
9	0.50	0.31	0.38	32
10	0.62	0.29	0.39	35
micro avg	0.57	0.36	0.44	299
macro avg	0.50	0.30	0.37	299
weighted avg	0.55	0.36	0.43	299
samples avg	0.59	0.43	0.46	299

Hamming Loss = 0.23194562446898895

LogisticRegression

	precision	recall	f1-score	support
0	0.52	0.44	0.48	36
1	0.75	0.30	0.43	30
2	0.36	0.17	0.23	24
3	0.56	0.23	0.32	22
4	0.70	0.62	0.66	53
5	0.70	0.33	0.45	21
6	0.67	0.07	0.13	28
7	0.60	0.38	0.46	24
8	0.80	0.19	0.31	21
9	0.57	0.54	0.56	37
10	0.50	0.30	0.37	27
micro avg	0.60	0.36	0.45	323
macro avg	0.61	0.32	0.40	323
weighted avg	0.61	0.36	0.43	323
samples avg	0.56	0.38	0.43	323

Hamming Loss = 0.24384027187765506

DecisionTreeClassifier

	precision	recall	f1-score	support
0	0.62	0.50	0.55	36
1	0.58	0.37	0.45	30
2	0.38	0.21	0.27	24
3	0.34	0.50	0.41	22
4	0.59	0.60	0.60	53
5	0.33	0.33	0.33	21
6	0.44	0.25	0.32	28
7	0.32	0.25	0.28	24
8	0.32	0.29	0.30	21
9	0.62	0.57	0.59	37
10	0.45	0.37	0.41	27
micro avg	0.48	0.41	0.45	323
macro avg	0.45	0.39	0.41	323
weighted avg	0.48	0.41	0.44	323
samples avg	0.49	0.43	0.42	323

Hamming loss = 0.2829226847918437

RandomForest

	precision	recall	f1-score	support
0	0.88	0.39	0.54	36
1	1.00	0.17	0.29	30
2	1.00	0.08	0.15	24
3	0.67	0.09	0.16	22
4	0.71	0.47	0.57	53
5	0.00	0.00	0.00	21
6	0.00	0.00	0.00	28
7	0.00	0.00	0.00	24
8	0.00	0.00	0.00	21
9	0.67	0.16	0.26	37
10	1.00	0.11	0.20	27
micro avg	0.77	0.18	0.29	323
macro avg	0.54	0.13	0.20	323
weighted avg	0.59	0.18	0.25	323
samples avg	0.44	0.22	0.27	323

Hamming Loss = 0.24044180118946473

- TFIDF Vectorizer => Max Features = 500
    1. Catboost Classifier. Iterations = 100, depth = 6, learning rate = 0.1

	precision	recall	f1-score	support
0	0.73	0.50	0.59	38
1	0.67	0.10	0.17	21
2	0.40	0.12	0.18	17
3	1.00	0.14	0.25	21
4	0.75	0.59	0.66	61
5	1.00	0.10	0.17	21
6	1.00	0.07	0.12	15
7	0.40	0.10	0.15	21
8	0.00	0.00	0.00	17
9	0.53	0.25	0.34	32
10	0.86	0.17	0.29	35
micro avg	0.70	0.27	0.39	299
macro avg	0.67	0.19	0.27	299
weighted avg	0.69	0.27	0.35	299
samples avg	0.55	0.34	0.39	299

Hamming loss = 0.2141036533559898

LinearSVC

	precision	recall	f1-score	support
0	0.67	0.47	0.55	38
1	0.50	0.29	0.36	21
2	0.33	0.18	0.23	17
3	0.86	0.29	0.43	21
4	0.68	0.67	0.68	61
5	0.40	0.19	0.26	21
6	0.71	0.33	0.45	15
7	0.69	0.52	0.59	21
8	0.25	0.12	0.16	17
9	0.45	0.28	0.35	32
10	0.60	0.34	0.44	35
micro avg	0.60	0.39	0.47	299
macro avg	0.56	0.33	0.41	299
weighted avg	0.58	0.39	0.46	299
samples avg	0.58	0.46	0.47	299

Hamming Loss = 0.221750212404418

Logistic Regression

	precision	recall	f1-score	support
0	0.49	0.50	0.49	36
1	0.79	0.37	0.50	30
2	0.45	0.21	0.29	24
3	0.57	0.18	0.28	22
4	0.69	0.62	0.65	53
5	0.64	0.33	0.44	21
6	1.00	0.18	0.30	28
7	0.52	0.46	0.49	24
8	0.83	0.24	0.37	21
9	0.47	0.41	0.43	37
10	0.53	0.37	0.43	27
micro avg	0.59	0.38	0.46	323
macro avg	0.63	0.35	0.43	323
weighted avg	0.63	0.38	0.45	323
samples avg	0.55	0.41	0.44	323

Hamming Loss = 0.24384027187765506

DecisionTreeClassifier

	precision	recall	f1-score	support

0	0.50	0.56	0.53	36
1	0.46	0.37	0.41	30
2	0.53	0.33	0.41	24
3	0.45	0.45	0.45	22
4	0.56	0.47	0.51	53
5	0.33	0.48	0.39	21
6	0.55	0.21	0.31	28
7	0.37	0.46	0.41	24
8	0.11	0.10	0.10	21
9	0.60	0.57	0.58	37
10	0.32	0.33	0.33	27
micro avg	0.45	0.41	0.43	323
macro avg	0.43	0.39	0.40	323
weighted avg	0.46	0.41	0.42	323
samples avg	0.45	0.44	0.40	323

Hamming Loss = `0.3016142735768904`

RandomForestClassifier

	precision	recall	f1-score	support
0	0.77	0.47	0.59	36
1	1.00	0.13	0.24	30
2	1.00	0.12	0.22	24
3	1.00	0.18	0.31	22
4	0.69	0.55	0.61	53
5	0.00	0.00	0.00	21
6	0.00	0.00	0.00	28
7	1.00	0.04	0.08	24
8	0.00	0.00	0.00	21
9	0.78	0.19	0.30	37
10	0.00	0.00	0.00	27
micro avg	0.76	0.20	0.32	323
macro avg	0.57	0.15	0.21	323
weighted avg	0.60	0.20	0.27	323
samples avg	0.54	0.25	0.32	323

Hamming Loss = `0.23619371282922685`

- TFIDF Vectorizer => Max Features = 700

` 1. LinearSVC

	precision	recall	f1-score	support
0	0.62	0.34	0.44	38
1	0.45	0.24	0.31	21
2	0.43	0.18	0.25	17

3	0.88	0.33	0.48	21
4	0.72	0.69	0.71	61
5	0.40	0.19	0.26	21
6	0.80	0.27	0.40	15
7	0.85	0.52	0.65	21
8	0.29	0.12	0.17	17
9	0.50	0.38	0.43	32
10	0.47	0.23	0.31	35
micro avg	0.61	0.37	0.46	299
macro avg	0.58	0.32	0.40	299
weighted avg	0.60	0.37	0.45	299
samples avg	0.56	0.43	0.46	299

Hamming Loss = 0.21920135938827529

2. Catboost Classifier. Iterations = 100, depth = 6, learning rate = 0.1

	precision	recall	f1-score	support
0	0.79	0.50	0.61	38
1	0.40	0.10	0.15	21
2	0.38	0.18	0.24	17
3	0.86	0.29	0.43	21
4	0.80	0.61	0.69	61
5	0.67	0.10	0.17	21
6	1.00	0.20	0.33	15
7	0.78	0.33	0.47	21
8	0.00	0.00	0.00	17
9	0.67	0.31	0.43	32
10	0.50	0.06	0.10	35
micro avg	0.73	0.30	0.43	299
macro avg	0.62	0.24	0.33	299
weighted avg	0.66	0.30	0.39	299
samples avg	0.60	0.36	0.43	299

Hamming Loss = 0.20475785896346643

Logistic Regression

	precision	recall	f1-score	support
0	0.51	0.53	0.52	36
1	0.75	0.30	0.43	30
2	0.56	0.21	0.30	24

3	0.67	0.27	0.39	22
4	0.80	0.66	0.72	53
5	0.78	0.33	0.47	21
6	1.00	0.18	0.30	28
7	0.65	0.46	0.54	24
8	0.57	0.19	0.29	21
9	0.55	0.49	0.51	37
10	0.53	0.33	0.41	27
micro avg	0.64	0.40	0.49	323
macro avg	0.67	0.36	0.44	323
weighted avg	0.67	0.40	0.47	323
samples avg	0.61	0.43	0.47	323

Hamming Loss = 0.24553950722175022

DecisionTreeClassifier

	precision	recall	f1-score	support
0	0.54	0.56	0.55	36
1	0.42	0.37	0.39	30
2	0.33	0.25	0.29	24
3	0.45	0.45	0.45	22
4	0.52	0.49	0.50	53
5	0.38	0.43	0.40	21
6	0.54	0.25	0.34	28
7	0.55	0.67	0.60	24
8	0.18	0.19	0.19	21
9	0.50	0.51	0.51	37
10	0.32	0.33	0.33	27
micro avg	0.45	0.42	0.43	323
macro avg	0.43	0.41	0.41	323
weighted avg	0.45	0.42	0.43	323
samples avg	0.45	0.45	0.42	323

Hamming Loss = 0.30246389124893797

RandomForestClassifier

	precision	recall	f1-score	support
0	0.87	0.36	0.51	36
1	1.00	0.07	0.12	30
2	0.75	0.12	0.21	24
3	1.00	0.27	0.43	22
4	0.69	0.51	0.59	53
5	1.00	0.05	0.09	21
6	0.00	0.00	0.00	28
7	1.00	0.08	0.15	24

8	0.00	0.00	0.00	21
9	0.78	0.19	0.30	37
10	1.00	0.04	0.07	27
micro avg	0.78	0.19	0.31	323
macro avg	0.74	0.15	0.23	323
weighted avg	0.74	0.19	0.27	323
samples avg	0.47	0.23	0.29	323

Hamming Loss = 0.23619371282922685

- Applying MLSMOTE => k = 600

1. TFIDF Vectorizer => Max features = 300
   Catboost Classifier. Iterations = 100, depth = 6, learning rate = 0.1

	precision	recall	f1-score	support
0	0.39	0.29	0.33	38
1	0.29	0.26	0.27	31
2	0.71	0.28	0.40	18
3	0.58	0.30	0.40	23
4	0.58	0.31	0.41	48
5	0.75	0.11	0.19	28
6	0.67	0.38	0.48	16
7	0.33	0.05	0.08	21
8	0.50	0.09	0.15	22
9	0.46	0.24	0.32	25
10	0.00	0.00	0.00	25
micro avg	0.48	0.22	0.30	295
macro avg	0.48	0.21	0.28	295
weighted avg	0.47	0.22	0.28	295
samples avg	0.36	0.25	0.28	295

Hamming Loss = 0.25573491928632114

LinearSVC

	precision	recall	f1-score	support
0	0.39	0.37	0.38	38
1	0.37	0.35	0.36	31
2	0.10	0.06	0.07	18
3	0.45	0.43	0.44	23
4	0.64	0.44	0.52	48
5	0.55	0.21	0.31	28
6	0.23	0.19	0.21	16
7	0.12	0.05	0.07	21
8	0.11	0.05	0.06	22

9	0.32	0.36	0.34	25
10	0.00	0.00	0.00	25
micro avg	0.38	0.26	0.31	295
macro avg	0.30	0.23	0.25	295
weighted avg	0.34	0.26	0.29	295
samples avg	0.37	0.28	0.28	295

Hamming Loss = 0.29226847918436705

Logistic Regression

	precision	recall	f1-score	support
0	0.41	0.50	0.45	36
1	0.27	0.27	0.27	30
2	0.46	0.25	0.32	24
3	0.41	0.41	0.41	22
4	0.65	0.38	0.48	53
5	0.64	0.43	0.51	21
6	0.62	0.18	0.28	28
7	0.60	0.25	0.35	24
8	0.11	0.05	0.07	21
9	0.52	0.38	0.44	37
10	1.00	0.04	0.07	27
micro avg	0.46	0.30	0.36	323
macro avg	0.52	0.28	0.33	323
weighted avg	0.53	0.30	0.35	323
samples avg	0.41	0.32	0.32	323

Hamming Loss = 0.2531860662701784

DecisionTreeClassifier

	precision	recall	f1-score	support
0	0.54	0.61	0.57	36
1	0.23	0.30	0.26	30
2	0.30	0.29	0.30	24
3	0.44	0.36	0.40	22
4	0.62	0.38	0.47	53
5	0.25	0.38	0.30	21
6	0.53	0.32	0.40	28
7	0.30	0.25	0.27	24
8	0.31	0.19	0.24	21
9	0.55	0.49	0.51	37
10	0.21	0.11	0.15	27
micro avg	0.40	0.35	0.38	323
macro avg	0.39	0.33	0.35	323

weighted avg	0.42	0.35	0.38	323
samples avg	0.39	0.40	0.35	323

Hamming Loss = 0.32030586236193714

RandomForestClassifier

	precision	recall	f1-score	support
0	0.67	0.33	0.44	36
1	0.39	0.23	0.29	30
2	0.60	0.12	0.21	24
3	0.57	0.18	0.28	22
4	0.80	0.23	0.35	53
5	1.00	0.14	0.25	21
6	1.00	0.04	0.07	28
7	0.00	0.00	0.00	24
8	0.00	0.00	0.00	21
9	0.73	0.22	0.33	37
10	0.00	0.00	0.00	27
micro avg	0.64	0.15	0.25	323
macro avg	0.52	0.14	0.20	323
weighted avg	0.56	0.15	0.23	323
samples avg	0.36	0.17	0.21	323

Hamming Loss = 0.25573491928632114

2. TFIDF Vectorizer => Max features = 500
   Catboost Classifier. Iterations = 100, depth = 6, learning rate = 0.1

	precision	recall	f1-score	support
0	0.61	0.37	0.46	38
1	0.42	0.35	0.39	31
2	0.50	0.28	0.36	18
3	0.56	0.39	0.46	23
4	0.59	0.33	0.43	48
5	0.83	0.18	0.29	28
6	0.46	0.38	0.41	16
7	1.00	0.05	0.09	21
8	1.00	0.05	0.09	22
9	0.52	0.44	0.48	25
10	1.00	0.04	0.08	25
micro avg	0.55	0.27	0.36	295
macro avg	0.68	0.26	0.32	295
weighted avg	0.67	0.27	0.34	295
samples avg	0.48	0.29	0.34	295

Hamming Loss = 0.23789294817332202

LinearSVC

	precision	recall	f1-score	support
0	0.37	0.34	0.36	38
1	0.38	0.39	0.38	31
2	0.18	0.11	0.14	18
3	0.44	0.30	0.36	23
4	0.50	0.42	0.45	48
5	0.50	0.21	0.30	28
6	0.44	0.44	0.44	16
7	0.00	0.00	0.00	21
8	0.30	0.14	0.19	22
9	0.24	0.24	0.24	25
10	0.00	0.00	0.00	25
micro avg	0.37	0.26	0.30	295
macro avg	0.30	0.24	0.26	295
weighted avg	0.33	0.26	0.28	295
samples avg	0.38	0.28	0.29	295

Hamming Loss = 0.29481733220050976

Logistic Regression

	precision	recall	f1-score	support
0	0.56	0.61	0.59	36
1	0.37	0.33	0.35	30
2	0.47	0.29	0.36	24
3	0.43	0.27	0.33	22
4	0.66	0.36	0.46	53
5	0.37	0.33	0.35	21
6	0.88	0.25	0.39	28
7	0.38	0.21	0.27	24
8	0.43	0.14	0.21	21
9	0.55	0.32	0.41	37
10	0.50	0.07	0.13	27
micro avg	0.51	0.31	0.38	323
macro avg	0.51	0.29	0.35	323
weighted avg	0.53	0.31	0.37	323
samples avg	0.43	0.31	0.34	323

Hamming Loss = 0.2574341546304163

DecisionTreeClassifier

	precision	recall	f1-score	support
0	0.45	0.50	0.47	36
1	0.37	0.53	0.44	30
2	0.41	0.38	0.39	24
3	0.44	0.36	0.40	22
4	0.63	0.36	0.46	53
5	0.27	0.33	0.30	21
6	0.50	0.29	0.36	28
7	0.26	0.21	0.23	24
8	0.32	0.48	0.38	21
9	0.47	0.62	0.53	37
10	0.31	0.15	0.20	27
micro avg	0.41	0.39	0.40	323
macro avg	0.40	0.38	0.38	323
weighted avg	0.43	0.39	0.40	323
samples avg	0.43	0.39	0.37	323

Hamming Loss = 0.31945624468988953

RandomForestClassifier

	precision	recall	f1-score	support
0	0.71	0.56	0.62	36
1	0.48	0.37	0.42	30
2	0.67	0.17	0.27	24
3	0.80	0.18	0.30	22
4	0.75	0.17	0.28	53
5	0.33	0.05	0.08	21
6	1.00	0.04	0.07	28
7	0.00	0.00	0.00	24
8	0.00	0.00	0.00	21
9	0.89	0.22	0.35	37
10	0.00	0.00	0.00	27
micro avg	0.67	0.18	0.28	323
macro avg	0.51	0.16	0.22	323
weighted avg	0.56	0.18	0.24	323
samples avg	0.40	0.19	0.24	323

Hamming Loss = 0.2497875955819881

3. TFIDF Vectorizer => Max features = 700
   Catboost Classifier. Iterations = 100, depth = 6, learning rate = 0.1

	precision	recall	f1-score	support

0	0.54	0.37	0.44	38
1	0.44	0.35	0.39	31
2	0.62	0.28	0.38	18
3	0.64	0.39	0.49	23
4	0.75	0.25	0.38	48
5	0.80	0.29	0.42	28
6	0.44	0.25	0.32	16
7	0.57	0.19	0.29	21
8	0.67	0.09	0.16	22
9	0.50	0.24	0.32	25
10	0.00	0.00	0.00	25
micro avg	0.58	0.25	0.35	295
macro avg	0.54	0.25	0.33	295
weighted avg	0.56	0.25	0.34	295
samples avg	0.45	0.27	0.32	295

Hamming Loss = 0.2336448598130841

LinearSVC

	precision	recall	f1-score	support
0	0.39	0.39	0.39	38
1	0.41	0.39	0.40	31
2	0.38	0.17	0.23	18
3	0.43	0.39	0.41	23
4	0.61	0.40	0.48	48
5	0.54	0.25	0.34	28
6	0.50	0.25	0.33	16
7	0.22	0.10	0.13	21
8	0.42	0.23	0.29	22
9	0.40	0.40	0.40	25
10	1.00	0.04	0.08	25
micro avg	0.45	0.29	0.36	295
macro avg	0.48	0.27	0.32	295
weighted avg	0.49	0.29	0.34	295
samples avg	0.41	0.30	0.32	295

Hamming Loss = 0.26847918436703483

Logistic Regression

	precision	recall	f1-score	support
0	0.54	0.53	0.54	36
1	0.36	0.33	0.34	30

2	0.54	0.29	0.38	24
3	0.47	0.32	0.38	22
4	0.76	0.42	0.54	53
5	0.54	0.33	0.41	21
6	0.86	0.21	0.34	28
7	0.33	0.08	0.13	24
8	0.40	0.19	0.26	21
9	0.61	0.30	0.40	37
10	1.00	0.11	0.20	27
micro avg	0.55	0.30	0.39	323
macro avg	0.58	0.28	0.36	323
weighted avg	0.60	0.30	0.38	323
samples avg	0.50	0.32	0.36	323

Hamming Loss = 0.25573491928632114

DecisionTreeClassifier

	precision	recall	f1-score	support
0	0.51	0.50	0.51	36
1	0.42	0.37	0.39	30
2	0.43	0.38	0.40	24
3	0.42	0.45	0.43	22
4	0.63	0.49	0.55	53
5	0.26	0.38	0.31	21
6	0.43	0.36	0.39	28
7	0.42	0.46	0.44	24
8	0.33	0.38	0.36	21
9	0.43	0.41	0.42	37
10	0.33	0.19	0.24	27
micro avg	0.44	0.41	0.42	323
macro avg	0.42	0.40	0.40	323
weighted avg	0.45	0.41	0.42	323
samples avg	0.42	0.40	0.38	323

Hamming Loss = 0.30756159728122345

RandomForestClassifier

	precision	recall	f1-score	support
0	0.67	0.33	0.44	36
1	0.54	0.23	0.33	30
2	0.71	0.21	0.32	24
3	1.00	0.27	0.43	22
4	0.77	0.19	0.30	53
5	0.40	0.10	0.15	21
6	1.00	0.07	0.13	28
7	0.00	0.00	0.00	24

8	0.00	0.00	0.00	21
9	0.56	0.14	0.22	37
10	0.00	0.00	0.00	27
micro avg	0.66	0.15	0.25	323
macro avg	0.51	0.14	0.21	323
weighted avg	0.55	0.15	0.23	323
samples avg	0.36	0.17	0.22	323

Hamming Loss = 0.254035683942226

- Applying MLSMOTE => k = 500
    1. TFIDF Vectorizer => Max features = 300
       Catboost Classifier. Iterations = 100, depth = 6, learning rate = 0.1

	precision	recall	f1-score	support
0	0.83	0.39	0.54	38
1	0.50	0.24	0.32	21
2	0.38	0.18	0.24	17
3	0.78	0.33	0.47	21
4	0.79	0.31	0.45	61
5	0.25	0.10	0.14	21
6	0.75	0.20	0.32	15
7	0.50	0.10	0.16	21
8	0.00	0.00	0.00	17
9	0.57	0.25	0.35	32
10	0.00	0.00	0.00	35
micro avg	0.62	0.21	0.32	299
macro avg	0.49	0.19	0.27	299
weighted avg	0.53	0.21	0.30	299
samples avg	0.40	0.21	0.26	299

Hamming Loss = 0.2336448598130841

LinearSVC

	precision	recall	f1-score	support
0	0.50	0.37	0.42	38
1	0.42	0.24	0.30	21
2	0.38	0.18	0.24	17
3	0.56	0.43	0.49	21
4	0.81	0.43	0.56	61
5	0.53	0.43	0.47	21
6	0.36	0.27	0.31	15
7	0.36	0.19	0.25	21
8	0.10	0.12	0.11	17
9	0.50	0.31	0.38	32

10	0.00	0.00	0.00	35
micro avg	0.49	0.29	0.36	299
macro avg	0.41	0.27	0.32	299
weighted avg	0.46	0.29	0.35	299
samples avg	0.44	0.32	0.34	299

Hamming Loss = 0.2574341546304163

Logistic Regression

	precision	recall	f1-score	support
0	0.52	0.61	0.56	36
1	0.38	0.27	0.31	30
2	0.50	0.29	0.37	24
3	0.45	0.45	0.45	22
4	0.69	0.42	0.52	53
5	0.60	0.43	0.50	21
6	0.75	0.21	0.33	28
7	0.64	0.29	0.40	24
8	0.30	0.14	0.19	21
9	0.53	0.49	0.51	37
10	0.67	0.07	0.13	27
micro avg	0.54	0.35	0.43	323
macro avg	0.55	0.33	0.39	323
weighted avg	0.56	0.35	0.41	323
samples avg	0.49	0.37	0.39	323

Hamming Loss = 0.24808836023789294

DecisionTreeClassifier

	precision	recall	f1-score	support
0	0.46	0.64	0.53	36
1	0.34	0.40	0.37	30
2	0.30	0.25	0.27	24
3	0.35	0.41	0.38	22
4	0.56	0.34	0.42	53
5	0.33	0.57	0.42	21
6	0.50	0.29	0.36	28
7	0.17	0.17	0.17	24
8	0.21	0.29	0.24	21
9	0.53	0.46	0.49	37
10	0.26	0.19	0.22	27
micro avg	0.38	0.37	0.37	323

macro avg	0.36	0.36	0.35	323
weighted avg	0.39	0.37	0.37	323
samples avg	0.35	0.35	0.33	323

Hamming Loss = 0.3415463041631266

RandomForestClassifier

	precision	recall	f1-score	support
0	0.76	0.36	0.49	36
1	0.56	0.30	0.39	30
2	0.57	0.17	0.26	24
3	1.00	0.18	0.31	22
4	0.73	0.15	0.25	53
5	0.00	0.00	0.00	21
6	1.00	0.04	0.07	28
7	0.00	0.00	0.00	24
8	0.00	0.00	0.00	21
9	0.73	0.22	0.33	37
10	0.00	0.00	0.00	27
micro avg	0.70	0.15	0.24	323
macro avg	0.49	0.13	0.19	323
weighted avg	0.54	0.15	0.22	323
samples avg	0.36	0.16	0.20	323

Hamming Loss = 0.25148683092608326

2. TFIDF Vectorizer => Max features = 500
   Catboost Classifier. Iterations = 100, depth = 6, learning rate = 0.1

	precision	recall	f1-score	support
0	0.72	0.34	0.46	38
1	0.29	0.10	0.14	21
2	0.38	0.18	0.24	17
3	0.82	0.43	0.56	21
4	0.80	0.33	0.47	61
5	0.42	0.24	0.30	21
6	1.00	0.20	0.33	15
7	0.00	0.00	0.00	21
8	0.00	0.00	0.00	17
9	0.56	0.28	0.38	32
10	0.00	0.00	0.00	35
micro avg	0.60	0.21	0.32	299
macro avg	0.45	0.19	0.26	299
weighted avg	0.49	0.21	0.30	299
samples avg	0.41	0.24	0.28	299

Hamming Loss = 0.23619371282922685

LinearSVC

	precision	recall	f1-score	support
0	0.55	0.32	0.40	38
1	0.50	0.24	0.32	21
2	0.27	0.18	0.21	17
3	0.65	0.52	0.58	21
4	0.74	0.38	0.50	61
5	0.39	0.33	0.36	21
6	0.50	0.40	0.44	15
7	0.29	0.10	0.14	21
8	0.17	0.12	0.14	17
9	0.45	0.28	0.35	32
10	0.00	0.00	0.00	35
micro avg	0.50	0.27	0.35	299
macro avg	0.41	0.26	0.31	299
weighted avg	0.45	0.27	0.33	299
samples avg	0.41	0.28	0.30	299

Hamming Loss = 0.254035683942226

Logistic Regression

	precision	recall	f1-score	support
0	0.55	0.72	0.63	36
1	0.53	0.33	0.41	30
2	0.46	0.25	0.32	24
3	0.43	0.27	0.33	22
4	0.71	0.28	0.41	53
5	0.48	0.52	0.50	21
6	0.83	0.18	0.29	28
7	0.38	0.12	0.19	24
8	0.56	0.24	0.33	21
9	0.45	0.27	0.34	37
10	1.00	0.07	0.14	27
micro avg	0.54	0.31	0.39	323
macro avg	0.58	0.30	0.35	323
weighted avg	0.59	0.31	0.37	323
samples avg	0.46	0.29	0.33	323

Hamming Loss = 0.2531860662701784

DecisionTreeClassifier

	precision	recall	f1-score	support
0	0.45	0.42	0.43	36
1	0.43	0.40	0.41	30
2	0.24	0.25	0.24	24
3	0.42	0.36	0.39	22
4	0.65	0.38	0.48	53
5	0.13	0.19	0.16	21
6	0.38	0.29	0.33	28
7	0.36	0.17	0.23	24
8	0.08	0.10	0.09	21
9	0.50	0.46	0.48	37
10	0.56	0.19	0.28	27
micro avg	0.38	0.31	0.34	323
macro avg	0.38	0.29	0.32	323
weighted avg	0.42	0.31	0.35	323
samples avg	0.34	0.30	0.29	323

Hamming Loss = 0.3296516567544605

RandomForestClassifier

	precision	recall	f1-score	support
0	0.69	0.50	0.58	36
1	0.80	0.27	0.40	30
2	0.71	0.21	0.32	24
3	0.83	0.23	0.36	22
4	0.83	0.19	0.31	53
5	1.00	0.10	0.17	21
6	1.00	0.04	0.07	28
7	0.00	0.00	0.00	24
8	0.00	0.00	0.00	21
9	0.88	0.19	0.31	37
10	0.00	0.00	0.00	27
micro avg	0.77	0.17	0.28	323
macro avg	0.61	0.16	0.23	323
weighted avg	0.65	0.17	0.25	323
samples avg	0.41	0.20	0.25	323

Hamming Loss = 0.2412914188615123

3. TFIDF Vectorizer => Max features = 700

Catboost Classifier. Iterations = 100, depth = 6, learning rate = 0.1

	precision	recall	f1-score	support
0	0.80	0.42	0.55	38
1	0.67	0.19	0.30	21
2	0.71	0.29	0.42	17
3	0.70	0.33	0.45	21
4	0.87	0.33	0.48	61
5	0.50	0.19	0.28	21
6	1.00	0.27	0.42	15
7	1.00	0.10	0.17	21
8	0.07	0.06	0.06	17
9	0.80	0.25	0.38	32
10	0.00	0.00	0.00	35
micro avg	0.68	0.24	0.35	299
macro avg	0.65	0.22	0.32	299
weighted avg	0.66	0.24	0.34	299
samples avg	0.43	0.26	0.31	299

Hamming Loss = 0.221750212404418

LinearSVC

	precision	recall	f1-score	support
0	0.56	0.39	0.46	38
1	0.50	0.24	0.32	21
2	0.38	0.18	0.24	17
3	0.45	0.43	0.44	21
4	0.85	0.46	0.60	61
5	0.33	0.24	0.28	21
6	0.50	0.33	0.40	15
7	0.33	0.05	0.08	21
8	0.10	0.12	0.11	17
9	0.56	0.44	0.49	32
10	0.00	0.00	0.00	35
micro avg	0.51	0.29	0.37	299
macro avg	0.41	0.26	0.31	299
weighted avg	0.47	0.29	0.35	299
samples avg	0.42	0.31	0.33	299

Hamming Loss = 0.25148683092608326

Logistic Regression

	precision	recall	f1-score	support
0	0.56	0.50	0.53	36
1	0.42	0.33	0.37	30
2	0.50	0.29	0.37	24
3	0.50	0.32	0.39	22
4	0.74	0.38	0.50	53
5	0.56	0.48	0.51	21
6	0.80	0.14	0.24	28
7	0.50	0.08	0.14	24
8	0.50	0.14	0.22	21
9	0.53	0.27	0.36	37
10	1.00	0.11	0.20	27
micro avg	0.57	0.29	0.38	323
macro avg	0.60	0.28	0.35	323
weighted avg	0.61	0.29	0.37	323
samples avg	0.49	0.31	0.35	323

Hamming Loss = 0.2659303313508921

DecisionTreeClassifier

	precision	recall	f1-score	support
0	0.45	0.58	0.51	36
1	0.41	0.50	0.45	30
2	0.35	0.46	0.40	24
3	0.47	0.32	0.38	22
4	0.58	0.40	0.47	53
5	0.37	0.48	0.42	21
6	0.53	0.32	0.40	28
7	0.56	0.42	0.48	24
8	0.26	0.43	0.33	21
9	0.49	0.46	0.47	37
10	0.30	0.22	0.26	27
micro avg	0.43	0.42	0.42	323
macro avg	0.43	0.42	0.41	323
weighted avg	0.45	0.42	0.42	323
samples avg	0.42	0.43	0.40	323

Hamming Loss = 0.31265930331350894

RandomForestClassifier

	precision	recall	f1-score	support
0	0.64	0.44	0.52	36
1	0.60	0.30	0.40	30
2	0.62	0.21	0.31	24

3	1.00	0.18	0.31	22
4	0.93	0.25	0.39	53
5	1.00	0.14	0.25	21
6	1.00	0.04	0.07	28
7	0.00	0.00	0.00	24
8	0.67	0.10	0.17	21
9	0.67	0.16	0.26	37
10	0.00	0.00	0.00	27
micro avg	0.72	0.18	0.29	323
macro avg	0.65	0.17	0.24	323
weighted avg	0.67	0.18	0.27	323
samples avg	0.40	0.19	0.24	323

Hamming Loss = 0.24384027187765506

- Applying MLSMOTE => k = 400
    4. TFIDF Vectorizer => Max features = 300
       Catboost Classifier. Iterations = 100, depth = 6, learning rate = 0.1

	precision	recall	f1-score	support
0	0.68	0.39	0.50	38
1	0.40	0.10	0.15	21
2	0.50	0.18	0.26	17
3	0.75	0.43	0.55	21
4	0.72	0.34	0.47	61
5	0.40	0.19	0.26	21
6	1.00	0.20	0.33	15
7	0.33	0.05	0.08	21
8	0.33	0.06	0.10	17
9	0.69	0.28	0.40	32
10	0.00	0.00	0.00	35
micro avg	0.64	0.23	0.34	299
macro avg	0.53	0.20	0.28	299
weighted avg	0.54	0.23	0.31	299
samples avg	0.45	0.25	0.31	299

Hamming Loss = 0.22854715378079865

LinearSVC

	precision	recall	f1-score	support
0	0.50	0.37	0.42	38
1	0.40	0.29	0.33	21
2	0.27	0.18	0.21	17

3	0.48	0.57	0.52	21
4	0.77	0.54	0.63	61
5	0.50	0.43	0.46	21
6	0.33	0.27	0.30	15
7	0.17	0.10	0.12	21
8	0.18	0.18	0.18	17
9	0.55	0.34	0.42	32
10	0.50	0.03	0.05	35
micro avg	0.48	0.33	0.39	299
macro avg	0.42	0.30	0.33	299
weighted avg	0.49	0.33	0.37	299
samples avg	0.44	0.34	0.36	299

Hamming Loss = `0.2599830076465591`

Logistic Regression

	precision	recall	f1-score	support
0	0.44	0.50	0.47	36
1	0.33	0.23	0.27	30
2	0.43	0.25	0.32	24
3	0.50	0.45	0.48	22
4	0.74	0.47	0.57	53
5	0.50	0.38	0.43	21
6	0.67	0.14	0.24	28
7	0.44	0.33	0.38	24
8	0.25	0.14	0.18	21
9	0.47	0.41	0.43	37
10	0.33	0.07	0.12	27
micro avg	0.48	0.33	0.39	323
macro avg	0.46	0.31	0.35	323
weighted avg	0.49	0.33	0.38	323
samples avg	0.42	0.34	0.35	323

Hamming Loss = `0.2463891248937978`

DecisionTreeClassifier

	precision	recall	f1-score	support
0	0.50	0.56	0.53	36
1	0.31	0.37	0.34	30
2	0.29	0.25	0.27	24
3	0.31	0.41	0.35	22
4	0.49	0.43	0.46	53
5	0.35	0.33	0.34	21
6	0.60	0.21	0.32	28

7	0.40	0.25	0.31	24
8	0.23	0.24	0.23	21
9	0.56	0.54	0.55	37
10	0.33	0.22	0.27	27
micro avg	0.41	0.37	0.39	323
macro avg	0.40	0.35	0.36	323
weighted avg	0.42	0.37	0.38	323
samples avg	0.39	0.38	0.35	323

Hamming Loss = 0.3211554800339847

RandomForestClassifier

	precision	recall	f1-score	support
0	0.62	0.36	0.46	36
1	0.50	0.27	0.35	30
2	0.60	0.12	0.21	24
3	0.62	0.23	0.33	22
4	0.90	0.17	0.29	53
5	0.67	0.10	0.17	21
6	1.00	0.04	0.07	28
7	0.00	0.00	0.00	24
8	0.00	0.00	0.00	21
9	0.75	0.24	0.37	37
10	0.00	0.00	0.00	27
micro avg	0.66	0.15	0.25	323
macro avg	0.51	0.14	0.20	323
weighted avg	0.57	0.15	0.23	323
samples avg	0.39	0.18	0.22	323

Hamming Loss = 0.254035683942226

5. TFIDF Vectorizer => Max features = 500
   Catboost Classifier. Iterations = 100, depth = 6, learning rate = 0.1

	precision	recall	f1-score	support
0	0.74	0.45	0.56	38
1	0.57	0.19	0.29	21
2	0.44	0.24	0.31	17
3	0.73	0.38	0.50	21
4	0.89	0.28	0.42	61
5	0.44	0.19	0.27	21
6	1.00	0.33	0.50	15
7	1.00	0.10	0.17	21
8	0.00	0.00	0.00	17
9	0.79	0.34	0.48	32

10	0.00	0.00	0.00	35
micro avg	0.69	0.24	0.36	299
macro avg	0.60	0.23	0.32	299
weighted avg	0.63	0.24	0.34	299
samples avg	0.48	0.25	0.31	299

Hamming Loss = 0.22090059473237042

LinearSVC

	precision	recall	f1-score	support
0	0.57	0.45	0.50	38
1	0.50	0.33	0.40	21
2	0.33	0.24	0.28	17
3	0.69	0.52	0.59	21
4	0.79	0.36	0.49	61
5	0.47	0.38	0.42	21
6	0.50	0.53	0.52	15
7	0.83	0.24	0.37	21
8	0.17	0.24	0.20	17
9	0.43	0.31	0.36	32
10	0.00	0.00	0.00	35
micro avg	0.51	0.32	0.40	299
macro avg	0.48	0.33	0.38	299
weighted avg	0.51	0.32	0.38	299
samples avg	0.46	0.32	0.35	299

Hamming Loss = 0.2497875955819881

Logistic Regression

	precision	recall	f1-score	support
0	0.51	0.56	0.53	36
1	0.50	0.37	0.42	30
2	0.47	0.29	0.36	24
3	0.40	0.27	0.32	22
4	0.77	0.43	0.55	53
5	0.48	0.48	0.48	21
6	0.71	0.18	0.29	28
7	0.38	0.12	0.19	24
8	0.50	0.19	0.28	21
9	0.50	0.32	0.39	37
10	0.40	0.07	0.12	27
micro avg	0.53	0.32	0.40	323
macro avg	0.51	0.30	0.36	323

weighted avg	0.54	0.32	0.38	323
samples avg	0.50	0.34	0.37	323

Hamming Loss = 0.2506372132540357

DecisionTreeClassifier

	precision	recall	f1-score	support
0	0.45	0.47	0.46	36
1	0.36	0.40	0.38	30
2	0.33	0.33	0.33	24
3	0.43	0.41	0.42	22
4	0.65	0.45	0.53	53
5	0.33	0.38	0.36	21
6	0.42	0.29	0.34	28
7	0.29	0.25	0.27	24
8	0.30	0.38	0.33	21
9	0.44	0.41	0.42	37
10	0.33	0.19	0.24	27
micro avg	0.41	0.37	0.39	323
macro avg	0.39	0.36	0.37	323
weighted avg	0.42	0.37	0.39	323
samples avg	0.41	0.40	0.37	323

Hamming Loss = 0.31945624468988953

RandomForestClassifier

	precision	recall	f1-score	support
0	0.67	0.50	0.57	36
1	0.59	0.33	0.43	30
2	0.83	0.21	0.33	24
3	0.71	0.23	0.34	22
4	0.89	0.15	0.26	53
5	0.50	0.05	0.09	21
6	1.00	0.04	0.07	28
7	0.00	0.00	0.00	24
8	0.00	0.00	0.00	21
9	0.83	0.27	0.41	37
10	0.00	0.00	0.00	27
micro avg	0.72	0.18	0.29	323
macro avg	0.55	0.16	0.23	323
weighted avg	0.60	0.18	0.25	323
samples avg	0.42	0.20	0.25	323

Hamming Loss = 0.24468988954970264

6. TFIDF Vectorizer => Max features = 700
   Catboost Classifier. Iterations = 100, depth = 6, learning rate = 0.1

	precision	recall	f1-score	support
0	0.68	0.39	0.50	38
1	0.56	0.24	0.33	21
2	0.44	0.24	0.31	17
3	0.70	0.33	0.45	21
4	0.92	0.36	0.52	61
5	0.29	0.10	0.14	21
6	1.00	0.33	0.50	15
7	1.00	0.14	0.25	21
8	0.10	0.06	0.07	17
9	0.65	0.34	0.45	32
10	0.00	0.00	0.00	35
micro avg	0.65	0.25	0.36	299
macro avg	0.58	0.23	0.32	299
weighted avg	0.60	0.25	0.35	299
samples avg	0.46	0.27	0.32	299

Hamming Loss = 0.22514868309260833

LinearSVC

	precision	recall	f1-score	support
0	0.44	0.29	0.35	38
1	0.62	0.24	0.34	21
2	0.30	0.18	0.22	17
3	0.60	0.57	0.59	21
4	0.85	0.46	0.60	61
5	0.36	0.24	0.29	21
6	0.75	0.60	0.67	15
7	0.50	0.10	0.16	21
8	0.21	0.18	0.19	17
9	0.62	0.41	0.49	32
10	0.00	0.00	0.00	35
micro avg	0.56	0.30	0.39	299
macro avg	0.48	0.30	0.35	299
weighted avg	0.51	0.30	0.37	299
samples avg	0.47	0.33	0.36	299

Hamming Loss = 0.23704333050127444

Logistic Regression

	precision	recall	f1-score	support
0	0.58	0.50	0.54	36
1	0.45	0.30	0.36	30
2	0.38	0.21	0.27	24
3	0.38	0.27	0.32	22
4	0.70	0.43	0.53	53
5	0.52	0.52	0.52	21
6	0.75	0.21	0.33	28
7	0.62	0.21	0.31	24
8	0.33	0.14	0.20	21
9	0.61	0.38	0.47	37
10	0.75	0.11	0.19	27
micro avg	0.55	0.32	0.40	323
macro avg	0.55	0.30	0.37	323
weighted avg	0.57	0.32	0.39	323
samples avg	0.48	0.32	0.36	323

Hamming Loss = 0.2582837723024639

DecisionTreeClassifier

	precision	recall	f1-score	support
0	0.44	0.42	0.43	36
1	0.35	0.47	0.40	30
2	0.38	0.42	0.40	24
3	0.41	0.41	0.41	22
4	0.53	0.38	0.44	53
5	0.44	0.57	0.50	21
6	0.26	0.18	0.21	28
7	0.47	0.38	0.42	24
8	0.21	0.29	0.24	21
9	0.56	0.51	0.54	37
10	0.27	0.26	0.26	27
micro avg	0.40	0.39	0.40	323
macro avg	0.39	0.39	0.39	323
weighted avg	0.41	0.39	0.40	323
samples avg	0.41	0.37	0.37	323

Hamming Loss = 0.32710280373831774

RandomForestClassifier

	precision	recall	f1-score	support
0	0.78	0.39	0.52	36
1	0.43	0.30	0.35	30
2	0.62	0.21	0.31	24
3	0.86	0.27	0.41	22
4	0.67	0.19	0.29	53
5	0.75	0.29	0.41	21
6	1.00	0.04	0.07	28
7	0.00	0.00	0.00	24
8	0.25	0.05	0.08	21
9	0.75	0.16	0.27	37
10	0.00	0.00	0.00	27
micro avg	0.64	0.18	0.28	323
macro avg	0.56	0.17	0.25	323
weighted avg	0.58	0.18	0.26	323
samples avg	0.40	0.19	0.24	323

Hamming Loss = 0.2523364485981308

Deep Learning

Need to build as minimal a network as possible. Also need higher batch size

ANN

Only 1 hidden layer - 32 neurons
Epochs = 1
Batch size = 512
Sequence Max Length = 1000
Hamming Loss = 0.4851316907391674

	precision	recall	f1-score	support
0	0.29	0.50	0.37	36
1	0.32	0.30	0.31	30
2	0.00	0.00	0.00	24
3	0.21	0.59	0.31	22
4	0.50	0.96	0.65	53
5	0.22	0.95	0.35	21
6	0.28	0.71	0.40	28
7	0.14	0.33	0.19	24
8	0.23	0.29	0.26	21
9	0.46	0.30	0.36	37

10	0.26	0.63	0.37	27
micro avg	0.29	0.54	0.38	323
macro avg	0.26	0.51	0.33	323
weighted avg	0.30	0.54	0.36	323
samples avg	0.28	0.53	0.35	323

Only 1 hidden layer - 32 neurons
Epochs = 2
Batch size = 512
Sequence Max Length = 1000
Hamming Loss = 0.4392523364485981

	precision	recall	f1-score	support
0	0.38	0.47	0.42	36
1	0.26	0.60	0.37	30
2	0.21	0.17	0.19	24
3	0.19	0.23	0.21	22
4	0.48	0.40	0.43	53
5	0.24	0.48	0.32	21
6	0.28	0.29	0.28	28
7	0.08	0.08	0.08	24
8	0.26	0.62	0.37	21
9	0.34	0.57	0.43	37
10	0.25	0.41	0.31	27
micro avg	0.29	0.40	0.33	323
macro avg	0.27	0.39	0.31	323
weighted avg	0.30	0.40	0.33	323
samples avg	0.23	0.39	0.27	323

Only 1 hidden layer - 16 neurons
Epochs = 2
Batch size = 512
Sequence Max Length = 1000
Hamming Loss = 0.3016142735768904

	precision	recall	f1-score	support
0	0.47	0.19	0.27	36
1	0.33	0.07	0.11	30
2	0.25	0.17	0.20	24
3	0.00	0.00	0.00	22

4	0.55	0.94	0.69	53
5	0.50	0.14	0.22	21
6	0.25	0.04	0.06	28
7	0.14	0.08	0.11	24
8	0.20	0.05	0.08	21
9	0.38	0.16	0.23	37
10	0.19	0.11	0.14	27
micro avg	0.42	0.24	0.31	323
macro avg	0.30	0.18	0.19	323
weighted avg	0.33	0.24	0.24	323
samples avg	0.50	0.28	0.31	323

Only 1 hidden layer - 16 neurons
Epochs = 1
Batch size = 512
Sequence Max Length = 1000
Hamming Loss = 0.37383177570093457

	precision	recall	f1-score	support
0	0.25	0.03	0.05	36
1	0.40	0.07	0.11	30
2	0.11	0.04	0.06	24
3	0.11	0.14	0.12	22
4	0.48	0.83	0.61	53
5	0.00	0.00	0.00	21
6	0.27	0.89	0.41	28
7	0.17	0.08	0.11	24
8	0.00	0.00	0.00	21
9	0.33	0.81	0.47	37
10	1.00	0.04	0.07	27
micro avg	0.33	0.34	0.33	323
macro avg	0.28	0.27	0.18	323
weighted avg	0.32	0.34	0.23	323
samples avg	0.33	0.36	0.31	323

Only 1 hidden layer - 16 neurons
Epochs = 1
Batch size = 256

Sequence Max Length = 1000
Hamming Loss = 0.3619371282922685

	precision	recall	f1-score	support
0	1.00	0.11	0.20	36
1	0.29	0.13	0.18	30
2	0.24	0.62	0.35	24
3	0.33	0.18	0.24	22
4	0.50	0.43	0.46	53
5	0.26	0.48	0.33	21
6	0.26	0.64	0.37	28
7	0.27	0.12	0.17	24
8	0.38	0.29	0.32	21
9	0.25	0.05	0.09	37
10	0.00	0.00	0.00	27
micro avg	0.32	0.28	0.29	323
macro avg	0.34	0.28	0.25	323
weighted avg	0.37	0.28	0.26	323
samples avg	0.29	0.26	0.25	323

Only 1 hidden layer - 16 neurons
Epochs = 2
Batch size = 256
Sequence Max Length = 1000
Hamming Loss = 0.27952421410365336

	precision	recall	f1-score	support
0	0.50	0.03	0.05	36
1	0.50	0.03	0.06	30
2	0.50	0.04	0.08	24
3	0.00	0.00	0.00	22
4	0.00	0.00	0.00	53
5	0.00	0.00	0.00	21
6	0.50	0.04	0.07	28
7	0.50	0.04	0.08	24
8	0.50	0.05	0.09	21
9	0.50	0.03	0.05	37
10	0.00	0.00	0.00	27
micro avg	0.35	0.02	0.04	323
macro avg	0.32	0.02	0.04	323
weighted avg	0.31	0.02	0.04	323

samples avg	0.01	0.01	0.01	323

Only 1 hidden layer - 32 neurons
Epochs = 2
Batch size = 256
Sequence Max Length = 1000
Hamming Loss = 0.34749362786745963

	precision	recall	f1-score	support
0	0.06	0.03	0.04	36
1	0.25	0.13	0.17	30
2	0.24	0.17	0.20	24
3	0.11	0.09	0.10	22
4	0.58	0.28	0.38	53
5	0.27	0.29	0.28	21
6	0.33	0.18	0.23	28
7	0.08	0.04	0.06	24
8	0.10	0.10	0.10	21
9	0.53	0.22	0.31	37
10	0.41	0.26	0.32	27
micro avg	0.28	0.17	0.21	323
macro avg	0.27	0.16	0.20	323
weighted avg	0.30	0.17	0.21	323
samples avg	0.11	0.17	0.12	323

Only 1 hidden layer - 32 neurons
Epochs = 2
Batch size = 256
Sequence Max Length = 1000
Hamming Loss = 0.3933729821580289

	precision	recall	f1-score	support
0	0.33	0.72	0.46	36
1	0.25	0.37	0.30	30
2	0.17	0.08	0.11	24
3	0.07	0.09	0.08	22
4	0.49	0.40	0.44	53
5	0.46	0.29	0.35	21
6	0.26	0.36	0.30	28
7	0.14	0.04	0.06	24
8	0.33	0.10	0.15	21

9	0.38	0.08	0.13	37
10	0.28	0.70	0.40	27
micro avg	0.30	0.32	0.31	323
macro avg	0.29	0.29	0.25	323
weighted avg	0.31	0.32	0.28	323
samples avg	0.28	0.34	0.28	323