

## Results of performance metrics,accuracy, recall, precision, and F1 scores

Epoch = 10/SGD /window = 3				Epoch = 10/SGD /window = 5				Epoch = 10/SGD /window = 7				Epoch = 10/Adam /window = 3				Epoch = 10/Adam /window = 5				Epoch = 10/Adam /window = 7			
	Precision	recall	F1-score		Precision	recall	F1-score		Precision	recall	F1-score		Precision	recall	F1-score		Precision	recall	F1-score		Precision	recall	F1-score
Negative	0.5900	0.5800	0.5800	Negative	0.5800	0.5900	0.5900	Negative	0.5800	0.5700	0.5700	Negative	0.8500	0.8400	0.8400	Negative	0.8400	0.8200	0.8300	Negative	0.8300	0.8500	0.8400
	0.5900	0.6200	0.6000		0.5900	0.5900	0.6000		0.5800	0.5700	0.5700		0.8300	0.8500	0.8400		0.8600	0.8000	0.8300		0.8100	0.8600	0.8400
	0.6000	0.6500	0.6200		0.5900	0.5600	0.5700		0.5900	0.5900	0.5900		0.8500	0.8100	0.8300		0.8200	0.8700	0.8400		0.8300	0.8600	0.8400
	0.5900	0.5700	0.5800		0.6000	0.5800	0.5900		0.5700	0.6300	0.6000		0.8400	0.8200	0.8300		0.8100	0.8700	0.8400		0.8200	0.8500	0.8400
	0.5800	0.6000	0.5900		0.5900	0.5400	0.5700		0.5800	0.6200	0.6000		0.8400	0.8300	0.8300		0.8200	0.8200	0.8300		0.8300	0.8600	0.8500
Negative Avg	59.00%	60.40%	59.40%	Avg	59.25%	57.20%	58.40%	Avg	58.00%	59.60%	58.60%	Negative Avg	84.20%	83.00%	83.40%	Avg	83.00%	83.60%	83.40%	Avg	82.40%	85.60%	84.20%
Positive	0.5900	0.6000	0.5900	Positive	0.5900	0.5900	0.5900	Positive	0.5800	0.5900	0.5900	Positive	0.8400	0.8500	0.8400	Positive	0.8300	0.8400	0.8400	Positive	0.8400	0.8200	0.8300
	0.6000	0.5800	0.5900		0.5900	0.5800	0.5800		0.5800	0.5900	0.5800		0.8500	0.8200	0.8400		0.8100	0.8700	0.8400		0.8500	0.8000	0.8300
	0.6200	0.5600	0.5900		0.5800	0.6000	0.5900		0.5900	0.5900	0.5900		0.8200	0.8600	0.8400		0.8600	0.8100	0.8300		0.8500	0.8300	0.8400
	0.5900	0.6100	0.6000		0.5900	0.6100	0.6000		0.5800	0.5200	0.5500		0.8300	0.8500	0.8400		0.8600	0.8000	0.8300		0.8500	0.8200	0.8400
	0.5900	0.5700	0.5800		0.5700	0.6200	0.6000		0.5900	0.5500	0.5700		0.8400	0.8400	0.8400		0.8400	0.8100	0.8300		0.8600	0.8300	0.8400
Positive Avg	59.80%	58.40%	59.00%	Avg	58.40%	60.00%	59.20%	Avg	58.40%	56.80%	57.60%	Positive Avg	83.60%	84.40%	84.00%	Avg	84.00%	82.60%	83.40%		85.00%	82.00%	83.60%
Macro Avg	0.5900	0.5900	0.5900	Macro Avg	0.5900	0.5900	0.5900	Macro Avg	0.5800	0.5800	0.5800	Macro Avg	0.8400	0.8400	0.8400	Macro Avg	0.8300	0.8300	0.8300	Macro Avg	0.8400	0.8400	0.8400
	0.6000	0.6000	0.6000		0.5900	0.5900	0.5900		0.5800	0.5800	0.5800		0.8400	0.8400	0.8400		0.8400	0.8300	0.8300		0.8300	0.8300	0.8300
	0.6100	0.6100	0.6100		0.5800	0.5800	0.5800		0.5900	0.5900	0.5900		0.8400	0.8400	0.8400		0.8400	0.8400	0.8400		0.8400	0.8400	0.8400
	0.5900	0.5900	0.5900		0.6000	0.6000	0.6000		0.5800	0.5700	0.5700		0.8400	0.8400	0.8400		0.8400	0.8400	0.8400		0.8400	0.8400	0.8400
	0.5900	0.5900	0.5900		0.5800	0.5800	0.5800		0.5800	0.5800	0.5800		0.8400	0.8400	0.8400		0.8300	0.8300	0.8300		0.8500	0.8500	0.8500
AVG Of Macro Avg	59.60%	59.60%	59.60%	Macro Avg	58.80%	58.80%	58.80%	Macro Avg	58.20%	58.00%	58.00%	AVG Of Macro Avg	84.00%	84.00%	84.00%	Macro Avg	83.60%	83.40%	83.40%		84.00%	84.00%	84.00%
Weighted Avg	0.5900	0.5900	0.5900	Weighted Avg	0.5900	0.5900	0.5900	Weighted Avg	0.5800	0.5800	0.5800	Weighted Avg	0.8400	0.8400	0.8400	Weighted Avg	0.8300	0.8300	0.8300	Weighted Avg	0.8400	0.8400	0.8400
	0.6000	0.6000	0.6000		0.5900	0.5900	0.5900		0.5800	0.5800	0.5800		0.8400	0.8400	0.8400		0.8400	0.8300	0.8300		0.8300	0.8300	0.8300
	0.6100	0.6100	0.6100		0.5800	0.5800	0.5800		0.5900	0.5900	0.5900		0.8400	0.8400	0.8400		0.8400	0.8400	0.8400		0.8400	0.8400	0.8400
	0.5900	0.5900	0.5900		0.6000	0.6000	0.6000		0.5800	0.5700	0.5700		0.8400	0.8400	0.8400		0.8400	0.8400	0.8400		0.8400	0.8400	0.8400
	0.5900	0.5900	0.5900		0.5800	0.5800	0.5800		0.5800	0.5800	0.5800		0.8400	0.8400	0.8400		0.8300	0.8300	0.8300		0.8500	0.8500	0.8500
AVG Of Weighted Avg	59.60%	59.60%	59.60%	Weighted Avg	58.80%	58.80%	58.80%	Weighted Avg	58.20%	58.00%	58.00%	AVG Of Weighted Avg	84.00%	84.00%	84.00%	Weighted Avg	83.60%	83.40%	83.40%	Weighted Avg	84.00%	84.00%	84.00%

Epoch = 8/SGD /window = 3				Epoch = 8/SGD /window = 5				Epoch = 8/SGD /window = 7				Epoch = 8/Adam /window = 3				Epoch = 8/Adam /window = 5				Epoch = 8/Adam /window = 7			
	Precision	recall	F1-score		Precision	recall	F1-score		Precision	recall	F1-score		Precision	recall	F1-score		Precision	recall	F1-score		Precision	recall	F1-score
Negative	0.6000	0.5700	0.5800	Negative	0.5700	0.5500	0.5600	Negative	0.5700	0.6000	0.5900	Negative	0.8300	0.8300	0.8300	Negative	0.8100	0.8500	0.8300	Negative	0.8400	0.8000	0.8200
	0.5800	0.5700	0.5800		0.5900	0.5900	0.5900		0.5900	0.6100	0.6000		0.8200	0.8500	0.8300		0.8100	0.8800	0.8400		0.8300	0.8300	0.8300
	0.5900	0.5900	0.5900		0.5900	0.6200	0.6100		0.5800	0.5400	0.5600		0.8400	0.8200	0.8300		0.8100	0.8400	0.8300		0.8400	0.8100	0.8200
	0.5800	0.5900	0.5900		0.5800	0.5800	0.5800		0.5700	0.6000	0.5900		0.8400	0.8000	0.8200		0.8300	0.8200	0.8300		0.8100	0.8600	0.8400
	0.5800	0.5900	0.5800		0.6000	0.5300	0.5600		0.5800	0.5400	0.5600		0.8300	0.8200	0.8200		0.8000	0.8700	0.8300		0.8200	0.8300	0.8300
Negative Avg	58.60%	58.20%	58.40%	Negative	58.60%	57.40%	58.00%	Negative	57.80%	57.80%	58.00%	Negative Avg	83.20%	82.40%	82.60%	Negative	81.20%	85.20%	83.20%	Negative	82.80%	82.60%	82.80%
Positive	0.5900	0.6200	0.6000	Positive	0.5700	0.5900	0.5800	Positive	0.5800	0.5500	0.5600	Positive	0.8300	0.8300	0.8300	Positive	0.8400	0.8000	0.8200	Positive	0.8100	0.8400	0.8200
	0.5800	0.6000	0.5900		0.5900	0.5800	0.5900		0.6000	0.5800	0.5900		0.8400	0.8100	0.8200		0.8700	0.8900	0.8300		0.8300	0.8300	0.8300
	0.5900	0.5900	0.5900		0.6100	0.5800	0.5900		0.5700	0.6100	0.5900		0.8200	0.8400	0.8300		0.8400	0.8100	0.8200		0.8200	0.8400	0.8300
	0.5900	0.5700	0.5800		0.5800	0.5800	0.5800		0.5900	0.5600	0.5700		0.8100	0.8500	0.8300		0.8300	0.8300	0.8300		0.8500	0.8000	0.8300
	0.5900	0.5900	0.5900		0.5800	0.6400	0.6100		0.5700	0.6000	0.5900		0.8200	0.8300	0.8300		0.8500	0.7800	0.8200		0.8300	0.8200	0.8300
Positive Avg	58.80%	59.40%	59.00%	Positive	58.60%	59.40%	59.00%	Positive	58.20%	58.00%	58.00%	Positive Avg	82.40%	83.20%	82.80%	Positive	84.60%	82.20%	82.40%	Positive	82.80%	82.60%	82.80%
Macro Avg	0.5900	0.5900	0.5900	Macro Avg	0.5700	0.5700	0.5700	Macro Avg	0.5800	0.5800	0.5800	Macro Avg	0.8300	0.8300	0.8300	Macro Avg	0.8300	0.8300	0.8300	Macro Avg	0.8200	0.8200	0.8200
	0.5800	0.5800	0.5800		0.5900	0.5900	0.5900		0.6000	0.6000	0.6000		0.8300	0.8300	0.8300		0.8400	0.8400	0.8300		0.8300	0.8300	0.8300
	0.5900	0.5900	0.5900		0.6000	0.6000	0.6000		0.5800	0.5800	0.5800		0.8300	0.8300	0.8300		0.8200	0.8200	0.8200		0.8300	0.8300	0.8300
	0.5800	0.5800	0.5800		0.5800	0.5800	0.5800		0.5800	0.5800	0.5800		0.8300	0.8300	0.8300		0.8300	0.8300	0.8300		0.8300	0.8300	0.8300
	0.5900	0.5900	0.5900		0.5900	0.5900	0.5900		0.5700	0.5700	0.5700		0.8200	0.8200	0.8200		0.8300	0.8300	0.8300		0.8300	0.8300	0.8300
AVG Of Macro Avg	58.60%	58.60%	58.60%	Macro Avg	58.60%	58.60%	58.60%	Macro Avg	58.20%	58.20%	58.20%	AVG Of Macro Avg	82.80%	82.80%	82.80%	Macro Avg	83.00%	83.00%	82.80%	Macro Avg	82.80%	82.80%	82.80%
Weighted Avg	0.5900	0.5900	0.5900	Weighted Avg	0.5700	0.5700	0.5700	Weighted Avg	0.5800	0.5800	0.5800	Weighted Avg	0.8300	0.8300	0.8300	Weighted Avg	0.8300	0.8300	0.8300	Weighted Avg	0.8200	0.8200	0.8200
	0.5800	0.5800	0.5800		0.5900	0.5900	0.5900		0.6000	0.6000	0.6000		0.8300	0.8300	0.8300		0.8400	0.8400	0.8300		0.8300	0.8300	0.8300
	0.5900	0.5900	0.5900		0.6000	0.6000	0.6000		0.5800	0.5800	0.5800		0.8300	0.8300	0.8300		0.8200	0.8200	0.8200		0.8300	0.8300	0.8300
	0.5800	0.5800	0.5800		0.5800	0.5800	0.5800		0.5800	0.5800	0.5800		0.8300	0.8300	0.8300		0.8300	0.8300	0.8300		0.8300	0.8300	0.8300
	0.5900	0.5900	0.5900		0.5900	0.5900	0.5900		0.5700	0.5700	0.5700		0.8200	0.8200	0.8200		0.8300	0.8300	0.8300		0.8300	0.8300	0.8300
AVG Of Weighted Avg	58.60%	58.60%	58.60%	Weighted Avg	58.60%	58.60%	58.60%	Weighted Avg	58.20%	58.20%	58.20%	AVG Of Weighted Avg	82.80%	82.80%	82.80%	Weighted Avg	83.00%	83.00%	82.80%	Weighted Avg	82.80%	82.80%	82.80%

### Final Results of performance metrics,accuracy, recall, precision, and F1 scores

Epoch = 10/SGD /window = 3				Epoch = 10/SGD /window = 5			Epoch = 10/SGD /window = 7				Epoch = 8/Adam/window = 3				Epoch = 8/Adam/window = 5			Epoch = 8/Adam/window = 7		
	Precision	recall	F1-score	Precision	recall	F1-score	Precision	recall	F1-score			Precision	recall	F1-score	Precision	recall	F1-score	Precision	recall	F1-score
Negative(%)	59	60.4	59.4	59.25	57.2	58.4	58	59.6	58.6		Negative(%)	83.2	82.4	82.6	81.2	85.2	83.2	82.8	82.6	82.8
Positive(%)	59.8	58.4	59	58.4	60	59.2	58.4	56.8	57.6		Positive(%)	82.4	83.2	82.8	84.6	82.2	82.4	82.8	82.6	82.8
Macro Avg(%)	59.6	59.6	59.6	58.8	58.8	58.8	58.2	58	58		Macro Avg(%)	82.8	82.8	82.8	83	83	82.8	82.8	82.8	82.8
Weighted Avg(%)	59.6	59.6	59.6	58.8	58.8	58.8	58.2	58	58		Weighted Avg(%)	82.8	82.8	82.8	83	83	82.8	82.8	82.8	82.8
Epoch = 10/Adam/window = 3				Epoch = 10/Adam/window = 5			Epoch = 10/Adam/window = 7				Epoch = 8/SGD /window = 3				Epoch = 8/SGD /window = 5			Epoch = 8/SGD /window = 7		
	Precision	recall	F1-score	Precision	recall	F1-score	Precision	recall	F1-score			Precision	recall	F1-score	Precision	recall	F1-score	Precision	recall	F1-score
Negative(%)	84.2	83	83.4	83	83.6	83.4	82.4	85.6	84.2		Negative(%)	58.6	58.2	58.4	58.6	57.4	58	57.8	57.8	58
Positive(%)	83.6	84.4	84	84	82.6	83.4	85	82	83.6		Positive(%)	58.8	59.4	59	58.6	59.4	59	58.2	58	58
Macro Avg(%)	84	84	84	83.6	83.4	83.4	84	84	84		Macro Avg(%)	58.6	58.6	58.6	58.6	58.6	58.6	58.2	58.2	58.2
Weighted Avg(%)	84	84	84	83.6	83.4	83.4	84	84	84		Weighted Avg(%)	58.6	58.6	58.6	58.6	58.6	58.6	58.2	58.2	58.2

## Experimental Results of Confusion Matrix

Epoch = 10/ Adam/ Window = 3					Epoch = 10/ Adam/ Window = 5					Epoch = 10/ Adam/ Window = 7			
False Positive	True Negative	Ture Positive	False Negative		False	True Negative	Ture	False Negative		False Positive	True Negative	Ture Positive	False Negative
0.15	0.85	0.84	0.16		0.16	0.84	0.82	0.18		0.18	0.82	0.85	0.15
0.18	0.82	0.85	0.15		0.13	0.87	0.80	0.20		0.20	0.80	0.86	0.14
0.14	0.86	0.81	0.19		0.19	0.81	0.87	0.13		0.15	0.85	0.75	0.25
0.15	0.85	0.82	0.18		0.20	0.80	0.87	0.13		0.17	0.83	0.86	0.14
0.16	0.84	0.83	0.17		0.19	0.81	0.84	0.16		0.18	0.82	0.85	0.15
0.16	0.84	0.84	0.16		0.16	0.84	0.84	0.16		0.17	0.83	0.86	0.14
<b>0.16</b>	<b>0.84</b>	<b>0.83</b>	<b>0.17</b>	<b>AVG</b>	<b>0.17</b>	<b>0.83</b>	<b>0.84</b>	<b>0.16</b>	<b>AVG</b>	<b>0.18</b>	<b>0.83</b>	<b>0.84</b>	<b>0.16</b>
Epoch = 10/ SGD/ Window = 3					Epoch = 10/ SGD/ Window = 5					Epoch = 10/ SGD/ Window = 7			
False Negative	Ture Positive	True Negative	False Positive		False	Ture Positive	True	False Positive		False Negative	Ture Positive	True Negative	False Positive
0.44	0.56	0.61	0.39		0.41	0.59	0.59	0.41		0.41	0.59	0.57	0.43
0.40	0.60	0.58	0.42		0.42	0.58	0.60	0.40		0.41	0.59	0.57	0.43
0.42	0.58	0.62	0.38		0.40	0.60	0.60	0.40		0.41	0.59	0.59	0.41
0.44	0.56	0.65	0.35		0.40	0.60	0.56	0.44		0.48	0.52	0.63	0.37
0.39	0.61	0.57	0.43		0.39	0.61	0.58	0.42		0.45	0.55	0.62	0.38
0.43	0.57	0.60	0.40		0.38	0.62	0.54	0.46		0.40	0.60	0.59	0.41
<b>0.42</b>	<b>0.58</b>	<b>0.61</b>	<b>0.40</b>	<b>AVG</b>	<b>0.40</b>	<b>0.60</b>	<b>0.58</b>	<b>0.42</b>	<b>AVG</b>	<b>0.43</b>	<b>0.57</b>	<b>0.60</b>	<b>0.41</b>
Epoch = 8/ Adam/ Window = 3					Epoch = 8/ Adam/ Window = 5					Epoch = 8/ Adam/ Window = 7			
False Positive	True Negative	Ture Positive	False Negative		False	True Negative	Ture	False Negative		False Positive	True Negative	Ture Positive	False Negative
0.17	0.83	0.83	0.17		0.20	0.80	0.85	0.15		0.18	0.82	0.85	0.15
0.18	0.82	0.85	0.15		0.21	0.79	0.88	0.12		0.17	0.83	0.83	0.17
0.19	0.81	0.85	0.15		0.19	0.81	0.84	0.16		0.16	0.84	0.81	0.19
0.19	0.81	0.85	0.15		0.16	0.84	0.80	0.20		0.20	0.80	0.86	0.14
0.16	0.84	0.82	0.18		0.17	0.83	0.82	0.18		0.18	0.82	0.83	0.17
0.15	0.85	0.80	0.20		0.23	0.77	0.86	0.14		0.17	0.83	0.84	0.16
<b>0.17</b>	<b>0.83</b>	<b>0.83</b>	<b>0.17</b>	<b>AVG</b>	<b>0.19</b>	<b>0.81</b>	<b>0.84</b>	<b>0.16</b>	<b>AVG</b>	<b>0.18</b>	<b>0.82</b>	<b>0.84</b>	<b>0.16</b>
Epoch = 8/ SGD/ Window = 3					Epoch = 8/ SGD/ Window = 5					Epoch = 8/ SGD/ Window = 7			
False Negative	Ture Positive	True Negative	False Positive		False	Ture Positive	True	False Positive		False Negative	Ture Positive	True Negative	False Positive
0.38	0.62	0.57	0.43		0.41	0.59	0.55	0.45		0.45	0.55	0.60	0.40
0.40	0.60	0.57	0.43		0.42	0.58	0.59	0.41		0.42	0.58	0.61	0.49
0.41	0.59	0.59	0.41		0.42	0.58	0.62	0.38		0.39	0.61	0.54	0.46
0.43	0.57	0.59	0.41		0.42	0.58	0.58	0.42		0.44	0.56	0.60	0.40
0.41	0.59	0.59	0.41		0.36	0.64	0.53	0.47		0.40	0.60	0.55	0.45
0.42	0.58	0.57	0.43		0.39	0.61	0.58	0.42		0.42	0.58	0.59	0.41
<b>0.41</b>	<b>0.59</b>	<b>0.58</b>	<b>0.42</b>	<b>AVG</b>	<b>0.40</b>	<b>0.60</b>	<b>0.58</b>	<b>0.43</b>	<b>AVG</b>	<b>0.42</b>	<b>0.58</b>	<b>0.58</b>	<b>0.44</b>

## Final Results of Confusion Matrix

Adam							SGD						
True Positive			False Negative				True Positive			False Negative			
Window Size	3	5	7	3	5	7	Window Size	3	5	7	3	5	7
Epoch = 8	0.83	0.84	0.84	0.17	0.16	0.16	Epoch = 8	0.59	0.60	0.58	0.41	0.40	0.42
Epoch = 10	0.83	0.84	0.84	0.17	0.16	0.16	Epoch = 10	0.58	0.60	0.57	0.42	0.40	0.43
True Negative			False Positive				True Negative			False Positive			
Window Size	3	5	7	3	5	7	Window Size	3	5	7	3	5	7
Epoch = 8	0.83	0.81	0.82	0.17	0.19	0.18	Epoch = 8	0.58	0.58	0.58	0.42	0.43	0.44
Epoch = 10	0.84	0.83	0.83	0.16	0.17	0.18	Epoch = 10	0.61	0.58	0.60	0.40	0.42	0.41

## Experimental Results of different Optimizer

Optimizer and Window Values (epoch = 8/ sg = 0)					Optimizer and Window Values (epoch = 8/ sg = 0)			
	BenchMark	First Comparing One	Second Comparing One			BenchMark	First Comparing One	Second Comparing One
Optimizer/ Window Value	Adam + Window 3	Adam + Window5	Adam + Window 7		Optimizer/ Window Value	SGD + Window 3	SGD + Window5	SGD + Window 7
Adam	82.56	82.90	79.58		SGD	58.59	56.19	56.34
	82.58	82.60	83.28			59.13	58.40	57.95
	83.24	82.57	82.08			59.33	57.30	57.54
	83.19	83.50	83.11			58.39	58.87	59.60
	82.71	83.38	82.61			59.17	59.85	57.76
	83.11	82.22	83.12			58.32	58.04	57.94
	83.14	82.85	82.59			58.58	58.79	57.45
	82.73	81.54	83.79			57.66	59.34	58.49
	AVG	82.96	82.67	82.94			AVG	58.65
Stdev	0.29	0.63	1.30		Stdev	0.55	1.17	0.93
Optimizer and Window Values (epoch = 10/ sg = 0)					Optimizer and Window Values (epoch = 10/ sg = 0)			
	BenchMark	First Comparing One	Second Comparing One			BenchMark	First Comparing One	Second Comparing One
Optimizer/ Window Value	Adam + Window 3	Adam + Window5	Adam + Window 7		Optimizer/ Window Value	SGD + Window 3	SGD + Window5	SGD + Window 7
Adam	83.31	83.53	83.21		SGD	58.73	59.91	59.62
	83.49	83.74	84.07			58.90	58.64	58.08
	84.08	83.29	83.51			58.75	59.08	57.89
	83.89	83.48	83.10			59.66	60.07	58.72
	83.66	83.55	80.03			60.58	58.20	57.45
	83.57	83.60	84.10			59.06	59.69	58.23
	83.61	82.91	83.58			59.48	59.24	58.18
	83.95	84.07	84.51			58.54	58.21	59.56
	AVG	83.75	83.52	83.27			AVG	59.21
Stdev	0.26	0.33	1.39		Stdev	0.67	0.73	0.78