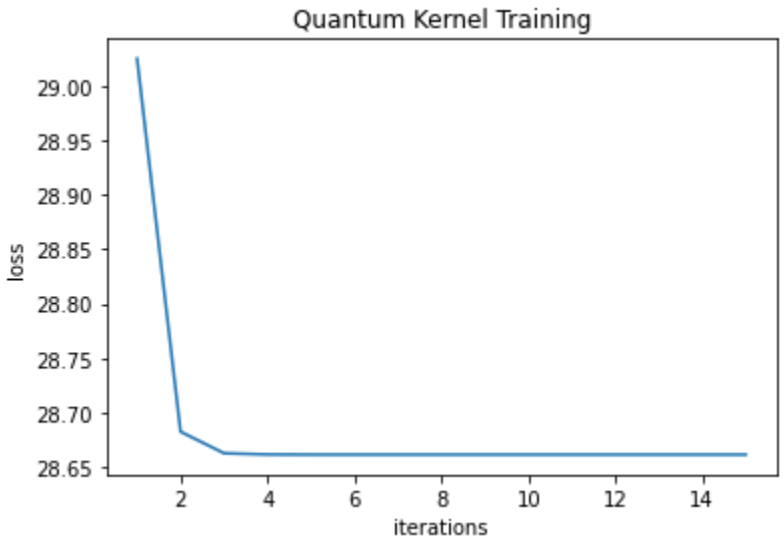
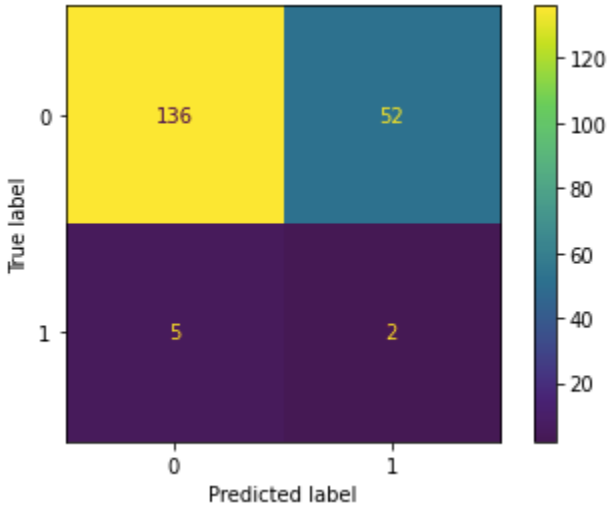
QSVM with Standard ZZFeatureMap and Customized QKT:

QKT Learning Graph:



1. 389 data points(Completely Balanced Data Set):

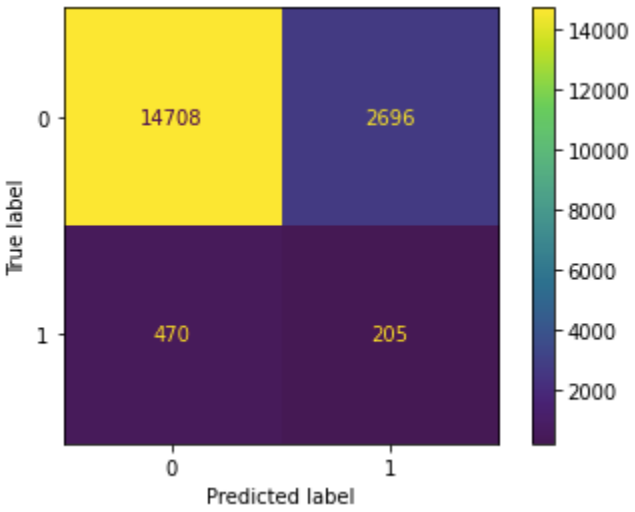
   QKT Data Confusion Matrix:



	Accuracy	Train data (%)	Label 1 in train (%)	TP	TN	FP	FN
ZZ Feature Map	0.96	50	70	188	0	7	0
QKT	0.71	50	70	136	52	5	2

2. Whole Dataset (Balanced with Classical KNN):

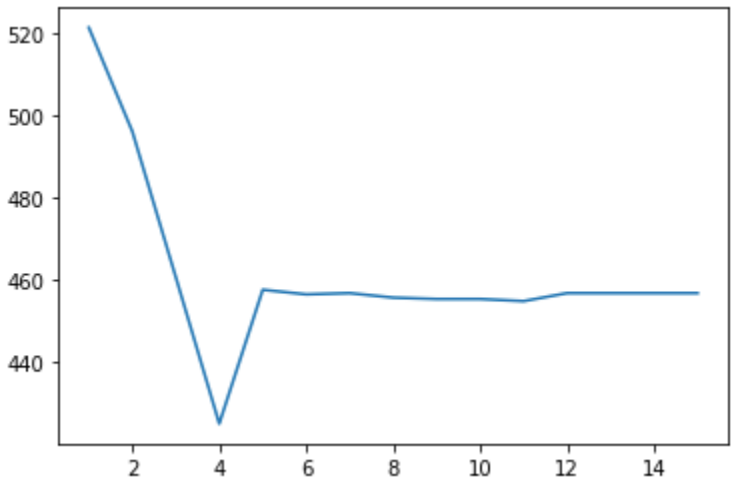
QSVM Data Confusion Matrix:



Circuit	Accuracy	Train data (%)	Label 1 in train (%)	TP	TN	FP	FN
ZZ Feature Map (no balance)	0.95	50	70	14169	1	673	2
QKT (no balance)	0.95	50	70	14170	0	672	3
ZZ Feature Map (balance: replication of label 1 after split)	0.82	55	70	14708	2696	470	205

QuClassi results using 389 data points:

Sample Model Training Image:

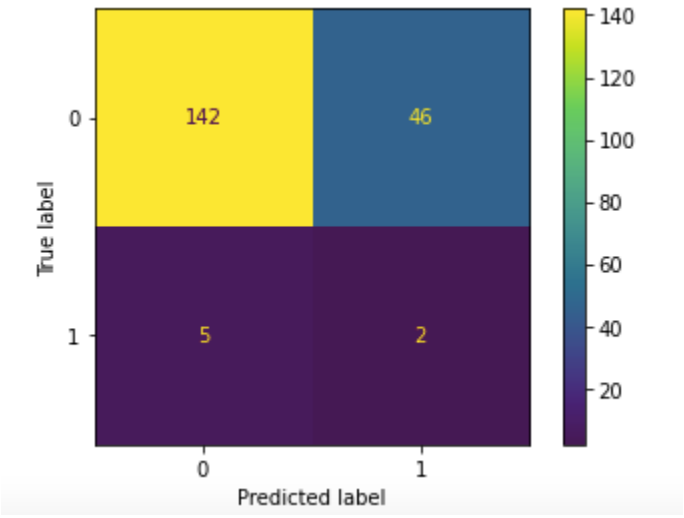


Features: X[0] : Mean
X[1] : Standard deviation
X[2] : Variance
X[3] : Skew
X[4] : Kurtosis
X[5] : 75%

1. Data encoding:

q4 - Ry(x[0]) Rz(x[1])
q5 - Ry(x[2]) Rz(x[3])
q6 - Ry(x[4]) Rz(x[5])

Learning rate	Iteration	Accuracy	Train data (%)	Label 1 in train (%)	TP	TN	FP	FN
0.05	30	0.84	70	100	98	19	0	0
0.05	15	0.79	70	100	92	25	0	0
0.01	15	0.81	50	100	95	22	0	0
0.03	15	0.75	70	70	86	25	5	2
0.01	15	0.72	70	70	83	28	5	2
0.01	15	0.66	70	50	75	31	9	2
0.01	15	0.67	70	80	78	35	4	1
0.01	15	0.74	50	70	142	46	5	2



2. Data encoding

   q4 - Ry(x[0]) Rz(x[5])
   q5 - Ry(x[1]) Rz(x[2])
   q6 - Ry(x[3]) Rz(x[4])

Learning rate	Iteration	Accuracy	Train data (%)	Label 1 in train (%)
0.05	15	0.67	50	100
0.05	15	0.43	70	70

3. Data encoding

   q4 - Ry(x[0]) Rz(x[3])
   q5 - Ry(x[1]) Rz(x[4])
   q6 - Ry(x[2]) Rz(x[5])

Learning rate	Iteration	Accuracy	Train data (%)	Label 1 in train (%)	TP	TN	FP	FN
0.05	15	0.97	50	100	189	6	0	0
0.05	15	0.57	70	70	65	46	5	2
0.01	15	0.69	70	70	81	30	7	0
0.03	15	0.65	70	70	75	36	5	2