Machine Learning

BITS:F464

Detailed report

Of logistic Regression

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Formulas Used :

Sigmoid:

For z<0:

A picture containing diagram

Description automatically generated

For z>0:

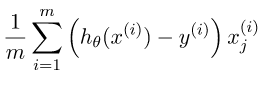


Cost Function:

Text

Description automatically generated

Gradient:



For Normalised Data (Feature Engineering):

Batch gradient:

Learning rate:

0.01:

Average acucuracy for 0.3 threshold is = 0.9626315789473685

Average precision for 0.3 threshold is = 0.9224480825557303

Average recall for 0.3 threshold is = 0.9814298537275821

Average acucuracy for 0.4 threshold is = 0.9726315789473685

Average precision for 0.4 threshold is = 0.9522598593825435

Average recall for 0.4 threshold is = 0.9743082498412724

Average acucuracy for 0.5 threshold is = 0.9747368421052632

Average precision for 0.5 threshold is = 0.9642869604717514

Average recall for 0.5 threshold is = 0.9670880083626354

Average acucuracy for 0.6 threshold is = 0.9778947368421054

Average precision for 0.6 threshold is = 0.9837835099960652

Average recall for 0.6 threshold is = 0.9558647562453304

Average acucuracy for 0.7 threshold is = 0.9684210526315788

Average precision for 0.7 threshold is = 0.9968245967741934

Average recall for 0.7 threshold is = 0.9172885384848134

0.001:

Average acucuracy for 0.3 threshold is = 0.9236842105263159

Average precision for 0.3 threshold is = 0.8374539969143403

Average recall for 0.3 threshold is = 0.9860735719408465

Average acucuracy for 0.4 threshold is = 0.9563157894736842

Average precision for 0.4 threshold is = 0.9118661021440793

Average recall for 0.4 threshold is = 0.976147162355396

Average acucuracy for 0.5 threshold is = 0.9668421052631578

Average precision for 0.5 threshold is = 0.9463194165901849

Average recall for 0.5 threshold is = 0.9651962066593716

Average acucuracy for 0.6 threshold is = 0.9647368421052632

Average precision for 0.6 threshold is = 0.9708255965472392

Average recall for 0.6 threshold is = 0.9333152429832725

Average acucuracy for 0.7 threshold is = 0.9500000000000001

Average precision for 0.7 threshold is = 0.9916831140350876

Average recall for 0.7 threshold is = 0.8732590289298792

0.0001:

Average acucuracy for 0.3 threshold is = 0.8478947368421054

Average precision for 0.3 threshold is = 0.7117759802043597

Average recall for 0.3 threshold is = 0.9899302488697981

Average acucuracy for 0.4 threshold is = 0.9110526315789473

Average precision for 0.4 threshold is = 0.819051893833803

Average recall for 0.4 threshold is = 0.9784731386122845

Average acucuracy for 0.5 threshold is = 0.9536842105263157

Average precision for 0.5 threshold is = 0.9261751614381443

Average recall for 0.5 threshold is = 0.9498224880020226

Average acucuracy for 0.6 threshold is = 0.9389473684210526

Average precision for 0.6 threshold is = 0.9630454099333837

Average recall for 0.6 threshold is = 0.8686538560613124

Average acucuracy for 0.7 threshold is = 0.9310526315789475

Average precision for 0.7 threshold is = 0.9917578499931441

Average recall for 0.7 threshold is = 0.8210702094979594

Mini-Batch:

Learning rate:

0.01:

Average acucuracy for 0.3 threshold is = 0.9063157894736843

Average precision for 0.3 threshold is = 0.8105998827336244

Average recall for 0.3 threshold is = 0.9857604832977966

Average acucuracy for 0.4 threshold is = 0.9421052631578947

Average precision for 0.4 threshold is = 0.8828972962196646

Average recall for 0.4 threshold is = 0.9771806443970622

Average acucuracy for 0.5 threshold is = 0.9594736842105263

Average precision for 0.5 threshold is = 0.9344460017791101

Average recall for 0.5 threshold is = 0.9589590147975751

Average acucuracy for 0.6 threshold is = 0.9578947368421054

Average precision for 0.6 threshold is = 0.9686220266348068

Average recall for 0.6 threshold is = 0.9174703418734215

Average acucuracy for 0.7 threshold is = 0.9457894736842105

Average precision for 0.7 threshold is = 0.9936250219806969

Average recall for 0.7 threshold is = 0.8609251652896089

For Un-normalised data(LR1):

Learning rate:

0.01:

Batch:

Average acucuracy for 0.3 threshold is = 0.8941489361702127

Average precision for 0.3 threshold is = 0.869120716773324

Average recall for 0.3 threshold is = 0.8714062390418343

Average acucuracy for 0.4 threshold is = 0.8941489361702127

Average precision for 0.4 threshold is = 0.869120716773324

Average recall for 0.4 threshold is = 0.8714062390418343

Average acucuracy for 0.5 threshold is = 0.8941489361702127

Average precision for 0.5 threshold is = 0.869120716773324

Average recall for 0.5 threshold is = 0.8714062390418343

Average acucuracy for 0.6 threshold is = 0.8941489361702127

Average precision for 0.6 threshold is = 0.869120716773324

Average recall for 0.6 threshold is = 0.8714062390418343

Average acucuracy for 0.7 threshold is = 0.8941489361702127

Average precision for 0.7 threshold is = 0.869120716773324

Average recall for 0.7 threshold is = 0.8714062390418343

Mini-Batch:

Average acucuracy for 0.3 threshold is = 0.8941489361702127

Average precision for 0.3 threshold is = 0.8861317472786603

Average recall for 0.3 threshold is = 0.8481973215502806

Average acucuracy for 0.4 threshold is = 0.8941489361702127

Average precision for 0.4 threshold is = 0.8861317472786603

Average recall for 0.4 threshold is = 0.8481973215502806

Average acucuracy for 0.5 threshold is = 0.8941489361702127

Average precision for 0.5 threshold is = 0.8861317472786603

Average recall for 0.5 threshold is = 0.8481973215502806

Average acucuracy for 0.6 threshold is = 0.8941489361702127

Average precision for 0.6 threshold is = 0.8861317472786603

Average recall for 0.6 threshold is = 0.8481973215502806

Average acucuracy for 0.7 threshold is = 0.8941489361702127

Average precision for 0.7 threshold is = 0.8861317472786603

Average recall for 0.7 threshold is = 0.8481973215502806

Stochastic:

Average acucuracy for 0.3 threshold is = 0.7159574468085107

Average precision for 0.3 threshold is = 0.6826751181104155

Average recall for 0.3 threshold is = 0.9163002144051124

Average acucuracy for 0.4 threshold is = 0.7159574468085107

Average precision for 0.4 threshold is = 0.6826751181104155

Average recall for 0.4 threshold is = 0.9163002144051124

Average acucuracy for 0.5 threshold is = 0.7159574468085107

Average precision for 0.5 threshold is = 0.6826751181104155

Average recall for 0.5 threshold is = 0.9163002144051124

Average acucuracy for 0.6 threshold is = 0.7159574468085107

Average precision for 0.6 threshold is = 0.6826751181104155

Average recall for 0.6 threshold is = 0.9163002144051124

Average acucuracy for 0.7 threshold is = 0.7159574468085107

Average precision for 0.7 threshold is = 0.6826751181104155

Average recall for 0.7 threshold is = 0.9163002144051124

0.001:

Batch:

Average acucuracy for 0.3 threshold is = 0.9117021276595744

Average precision for 0.3 threshold is = 0.894055957342404

Average recall for 0.3 threshold is = 0.8601741786063988

Average acucuracy for 0.4 threshold is = 0.9117021276595744

Average precision for 0.4 threshold is = 0.897216248476826

Average recall for 0.4 threshold is = 0.8557837267734917

Average acucuracy for 0.5 threshold is = 0.9117021276595744

Average precision for 0.5 threshold is = 0.897216248476826

Average recall for 0.5 threshold is = 0.8557837267734917

Average acucuracy for 0.6 threshold is = 0.9122340425531915

Average precision for 0.6 threshold is = 0.8998118380952651

Average recall for 0.6 threshold is = 0.8543131385381976

Average acucuracy for 0.7 threshold is = 0.9132978723404255

Average precision for 0.7 threshold is = 0.9052840655397185

Average recall for 0.7 threshold is = 0.8514926257176847

Mini-Batch:

Average acucuracy for 0.3 threshold is = 0.8648936170212765

Average precision for 0.3 threshold is = 0.8331381089075954

Average recall for 0.3 threshold is = 0.8859533178978624

Average acucuracy for 0.4 threshold is = 0.8648936170212765

Average precision for 0.4 threshold is = 0.8331381089075954

Average recall for 0.4 threshold is = 0.8859533178978624

Average acucuracy for 0.5 threshold is = 0.8654255319148936

Average precision for 0.5 threshold is = 0.8349857710493752

Average recall for 0.5 threshold is = 0.8859533178978624

Average acucuracy for 0.6 threshold is = 0.8654255319148936

Average precision for 0.6 threshold is = 0.8349857710493752

Average recall for 0.6 threshold is = 0.8859533178978624

Average acucuracy for 0.7 threshold is = 0.8654255319148937

Average precision for 0.7 threshold is = 0.8362504795144262

Average recall for 0.7 threshold is = 0.884544867193637

Stochastic:

Average acucuracy for 0.3 threshold is = 0.7765957446808511

Average precision for 0.3 threshold is = 0.8100887359595752

Average recall for 0.3 threshold is = 0.7742549989734215

Average acucuracy for 0.4 threshold is = 0.7765957446808511

Average precision for 0.4 threshold is = 0.8100887359595752

Average recall for 0.4 threshold is = 0.7742549989734215

Average acucuracy for 0.5 threshold is = 0.7765957446808511

Average precision for 0.5 threshold is = 0.8100887359595752

Average recall for 0.5 threshold is = 0.7742549989734215

Average acucuracy for 0.6 threshold is = 0.7765957446808511

Average precision for 0.6 threshold is = 0.8100887359595752

Average recall for 0.6 threshold is = 0.7742549989734215

Average acucuracy for 0.7 threshold is = 0.777127659574468

Average precision for 0.7 threshold is = 0.8108356326563982

Average recall for 0.7 threshold is = 0.7742549989734215

0.0001:

Batch:

Average acucuracy for 0.3 threshold is = 0.9005319148936171

Average precision for 0.3 threshold is = 0.8707653015851569

Average recall for 0.3 threshold is = 0.871565874765571

Average acucuracy for 0.4 threshold is = 0.9047872340425532

Average precision for 0.4 threshold is = 0.8878580255096974

Average recall for 0.4 threshold is = 0.8615727222678258

Average acucuracy for 0.5 threshold is = 0.90531914893617

Average precision for 0.5 threshold is = 0.8931772295748627

Average recall for 0.5 threshold is = 0.8562273430094031

Average acucuracy for 0.6 threshold is = 0.9085106382978723

Average precision for 0.6 threshold is = 0.9031899137134586

Average recall for 0.6 threshold is = 0.8517967601349739

Average acucuracy for 0.7 threshold is = 0.9095744680851063

Average precision for 0.7 threshold is = 0.9118969980730252

Average recall for 0.7 threshold is = 0.8445800127952757

Mini-batch:

Average precision for 0.3 threshold is = 0.8347789249879061

Average recall for 0.3 threshold is = 0.8675840918148322

Average acucuracy for 0.4 threshold is = 0.8494680851063829

Average precision for 0.4 threshold is = 0.8447869396575329

Average recall for 0.4 threshold is = 0.8566311867329583

Average acucuracy for 0.5 threshold is = 0.850531914893617

Average precision for 0.5 threshold is = 0.8511211334987235

Average recall for 0.5 threshold is = 0.8473255870155938

Average acucuracy for 0.6 threshold is = 0.852659574468085

Average precision for 0.6 threshold is = 0.8587099160704607

Average recall for 0.6 threshold is = 0.8408386857921196

Average acucuracy for 0.7 threshold is = 0.8515957446808511

Average precision for 0.7 threshold is = 0.863579725793137

Average recall for 0.7 threshold is = 0.8275779137078182

Stochastic:

Average acucuracy for 0.3 threshold is = 0.6946808510638298

Average precision for 0.3 threshold is = 0.7328141715852242

Average recall for 0.3 threshold is = 0.7633925574960129

Average acucuracy for 0.4 threshold is = 0.6946808510638298

Average precision for 0.4 threshold is = 0.7339861429281154

Average recall for 0.4 threshold is = 0.7605301571688813

Average acucuracy for 0.5 threshold is = 0.6957446808510638

Average precision for 0.5 threshold is = 0.736489740120361

Average recall for 0.5 threshold is = 0.7605301571688813

Average acucuracy for 0.6 threshold is = 0.698404255319149

Average precision for 0.6 threshold is = 0.7378658664817248

Average recall for 0.6 threshold is = 0.7605301571688813

Average acucuracy for 0.7 threshold is = 0.7015957446808511

Average precision for 0.7 threshold is = 0.740311696119391

Average recall for 0.7 threshold is = 0.7605301571688813