**https://machinelearningmastery.com/calculate-feature-importance-with-python/**

**First, deleted columns** 'tm','player','player.id','x.min','adjusted.production','Year','Player','Pos','Team','Selection Type','Nationality'

**Note:** The positive scores indicate a feature that predicts class 1, whereas the negative scores indicate a feature that predicts class 0.

**Linear regression on KFold(n\_splits=3, shuffle=True, random\_state=42) cross validation**

Score = [0.47886780008333907, 0.4589724781545994, 0.44309810063557775]

Feature: year, Score: 0.00263

Feature: age, Score: -0.00642

Feature: g, Score: 0.00066

Feature: mp, Score: -0.00013

Feature: per, Score: 0.00865

Feature: ts., Score: -0.13959

Feature: x3par, Score: 0.11640

Feature: ftr, Score: -0.00179

Feature: orb., Score: 0.00343

Feature: drb., Score: -0.00113

Feature: trb., Score: -0.00405

Feature: ast., Score: 0.00813

Feature: stl., Score: -0.00698

Feature: blk., Score: -0.01834

Feature: tov., Score: 0.00334

Feature: usg., Score: -0.01080

Feature: ows, Score: 0.03461

Feature: dws, Score: 0.05149

Feature: ws, Score: 0.00124

Feature: ws.48, Score: -2.34496

Feature: obpm, Score: 0.02270

Feature: dbpm, Score: 0.01260

Feature: bpm, Score: -0.02329

Feature: ows.48, Score: 2.72639

Feature: dws.48, Score: 2.68638

Feature: shot., Score: 0.02903

Feature: team.mar, Score: 0.09696

Feature: team.mp, Score: -0.00004

Feature: team.gm, Score: 0.00821

Feature: year.3par, Score: 0.01935

Feature: team.ts., Score: -6.52096

Feature: tm.usg, Score: 0.00000

Feature: tm.ts.w.o.plyr, Score: 6.77176

Feature: reb.vers, Score: 0.09651

Feature: defense, Score: 0.10133

Feature: val.shot, Score: 0.02309

Feature: offense, Score: 0.14601

Feature: raw.spm, Score: -0.13539

Feature: raw.contrib, Score: -0.02523

Feature: tm.sum, Score: -0.07011

Feature: tm.adj, Score: -0.40363

Feature: stderr, Score: 0.01494

Feature: contrib, Score: 0.00561

Feature: reb.vers.1, Score: -0.02006

Feature: val.shot.1, Score: -0.00182

Feature: offense.1, Score: -0.06921

Feature: defense.1, Score: -0.07380

Feature: raw.obpm, Score: 0.06808

Feature: contrib.1, Score: -0.02540

Feature: tm.ortg, Score: 0.04847

Feature: tm.sum.1, Score: -0.04005

Feature: tm.adj.1, Score: -0.13944

Feature: tm.drtg, Score: -0.00482

Feature: obpm.1, Score: 0.00167

Feature: ostderr, Score: -0.03208

Feature: ocontrib, Score: 0.00231

Feature: dbpm.1, Score: 0.00794

Feature: dstderr, Score: 0.01494

Feature: dcontrib, Score: -0.03314

Feature: sum.spm, Score: -0.04388

Feature: x.min.1, Score: 0.00328

Feature: mpg.1, Score: 0.00165

Feature: rempg, Score: 0.03303

Feature: contrib.2, Score: 0.00561

Feature: vorp.gm, Score: -0.00881

Feature: o.bpm, Score: 0.00167

Feature: ocontrib.1, Score: 0.00231

Feature: ovorp.gm, Score: 0.08355

Feature: d.bpm, Score: 0.00794

Feature: dcontrib.1, Score: -0.03314

Feature: dvorp.gm, Score: 0.07098

Feature: prod.gm, Score: 0.00000

Feature: exp.bpm, Score: -0.06566

Feature: truetalentbpm, Score: -0.00557

Feature: exp.min, Score: -0.54754

Feature: truetalentvorp, Score: 0.02899

Feature: truesalary, Score: -0.00000

Feature: truetimevorp, Score: -0.07513

Feature: worp, Score: 0.07967

Feature: o.worp, Score: -0.06188

Feature: d.worp, Score: -0.04927

Feature: adjusted.worp, Score: 0.01160

Feature: bbref.pos, Score: -0.00223

Feature: age.on.feb.1, Score: 0.00662

Feature: yrs.experience, Score: 0.00267

Feature: height, Score: 0.00647

Feature: weight, Score: 0.00037

Feature: rounded.position, Score: -0.01668Chart, box and whisker chart

Description automatically generated

**Logistic regression**

Score [0.9626004893393918, 0.9660957707095421, 0.9604895104895105]

Feature: year, Score: -0.00229

Feature: age, Score: -0.00003

Feature: g, Score: 0.00001

Feature: mp, Score: 0.00082

Feature: per, Score: -0.00001

Feature: ts., Score: -0.00000

Feature: x3par, Score: -0.00000

Feature: ftr, Score: -0.00000

Feature: orb., Score: -0.00001

Feature: drb., Score: -0.00001

Feature: trb., Score: -0.00001

Feature: ast., Score: -0.00001

Feature: stl., Score: -0.00000

Feature: blk., Score: -0.00000

Feature: tov., Score: -0.00002

Feature: usg., Score: -0.00001

Feature: ows, Score: 0.00000

Feature: dws, Score: 0.00000

Feature: ws, Score: 0.00000

Feature: ws.48, Score: -0.00000

Feature: obpm, Score: 0.00001

Feature: dbpm, Score: 0.00000

Feature: bpm, Score: 0.00001

Feature: ows.48, Score: 0.00000

Feature: dws.48, Score: -0.00000

Feature: shot., Score: -0.00001

Feature: team.mar, Score: 0.00000

Feature: team.mp, Score: -0.00010

Feature: team.gm, Score: -0.00000

Feature: year.3par, Score: -0.00000

Feature: team.ts., Score: -0.00000

Feature: tm.usg, Score: -0.00000

Feature: tm.ts.w.o.plyr, Score: -0.00000

Feature: reb.vers, Score: 0.00000

Feature: defense, Score: -0.00000

Feature: val.shot, Score: 0.00000

Feature: offense, Score: -0.00000

Feature: raw.spm, Score: 0.00001

Feature: raw.contrib, Score: 0.00000

Feature: tm.sum, Score: 0.00000

Feature: tm.adj, Score: -0.00000

Feature: stderr, Score: -0.00001

Feature: contrib, Score: 0.00000

Feature: reb.vers.1, Score: 0.00000

Feature: val.shot.1, Score: -0.00000

Feature: offense.1, Score: 0.00000

Feature: defense.1, Score: -0.00000

Feature: raw.obpm, Score: 0.00000

Feature: contrib.1, Score: 0.00000

Feature: tm.ortg, Score: 0.00000

Feature: tm.sum.1, Score: -0.00000

Feature: tm.adj.1, Score: 0.00000

Feature: tm.drtg, Score: -0.00000

Feature: obpm.1, Score: 0.00001

Feature: ostderr, Score: -0.00000

Feature: ocontrib, Score: 0.00000

Feature: dbpm.1, Score: 0.00000

Feature: dstderr, Score: -0.00001

Feature: dcontrib, Score: -0.00000

Feature: sum.spm, Score: 0.00000

Feature: x.min.1, Score: -0.00000

Feature: mpg.1, Score: -0.00001

Feature: rempg, Score: -0.00000

Feature: contrib.2, Score: 0.00000

Feature: vorp.gm, Score: 0.00000

Feature: o.bpm, Score: 0.00001

Feature: ocontrib.1, Score: 0.00000

Feature: ovorp.gm, Score: 0.00000

Feature: d.bpm, Score: 0.00000

Feature: dcontrib.1, Score: -0.00000

Feature: dvorp.gm, Score: -0.00000

Feature: prod.gm, Score: 0.00000

Feature: exp.bpm, Score: 0.00001

Feature: truetalentbpm, Score: 0.00001

Feature: exp.min, Score: 0.00000

Feature: truetalentvorp, Score: 0.00000

Feature: truesalary, Score: 0.00000

Feature: truetimevorp, Score: 0.00000

Feature: worp, Score: 0.00000

Feature: o.worp, Score: 0.00000

Feature: d.worp, Score: -0.00000

Feature: adjusted.worp, Score: 0.00000

Feature: bbref.pos, Score: -0.00000

Feature: age.on.feb.1, Score: -0.00003

Feature: yrs.experience, Score: -0.00000

Feature: height, Score: -0.00009

Feature: weight, Score: -0.00025

Feature: rounded.position, Score: -0.00000Chart, box and whisker chart

Description automatically generated

**Decision Tree Classifier**

[0.9639986018874519, 0.9615519049283467, 0.9587412587412587]

Feature: year, Score: 0.01617

Feature: age, Score: 0.01382

Feature: g, Score: 0.00000

Feature: mp, Score: 0.00509

Feature: per, Score: 0.07737

Feature: ts., Score: 0.00278

Feature: x3par, Score: 0.00347

Feature: ftr, Score: 0.00170

Feature: orb., Score: 0.01252

Feature: drb., Score: 0.00340

Feature: trb., Score: 0.00402

Feature: ast., Score: 0.00437

Feature: stl., Score: 0.00732

Feature: blk., Score: 0.01353

Feature: tov., Score: 0.00354

Feature: usg., Score: 0.05738

Feature: ows, Score: 0.00000

Feature: dws, Score: 0.00209

Feature: ws, Score: 0.00278

Feature: ws.48, Score: 0.00296

Feature: obpm, Score: 0.00000

Feature: dbpm, Score: 0.00000

Feature: bpm, Score: 0.00185

Feature: ows.48, Score: 0.00598

Feature: dws.48, Score: 0.00000

Feature: shot., Score: 0.01857

Feature: team.mar, Score: 0.02979

Feature: team.mp, Score: 0.00000

Feature: team.gm, Score: 0.00000

Feature: year.3par, Score: 0.00247

Feature: team.ts., Score: 0.00000

Feature: tm.usg, Score: 0.00386

Feature: tm.ts.w.o.plyr, Score: 0.00354

Feature: reb.vers, Score: 0.02538

Feature: defense, Score: 0.00000

Feature: val.shot, Score: 0.02287

Feature: offense, Score: 0.00000

Feature: raw.spm, Score: 0.00278

Feature: raw.contrib, Score: 0.00896

Feature: tm.sum, Score: 0.01316

Feature: tm.adj, Score: 0.02409

Feature: stderr, Score: 0.00000

Feature: contrib, Score: 0.00000

Feature: reb.vers.1, Score: 0.00444

Feature: val.shot.1, Score: 0.00000

Feature: offense.1, Score: 0.00000

Feature: defense.1, Score: 0.00627

Feature: raw.obpm, Score: 0.00000

Feature: contrib.1, Score: 0.00887

Feature: tm.ortg, Score: 0.00328

Feature: tm.sum.1, Score: 0.01387

Feature: tm.adj.1, Score: 0.00278

Feature: tm.drtg, Score: 0.00016

Feature: obpm.1, Score: 0.00185

Feature: ostderr, Score: 0.00000

Feature: ocontrib, Score: 0.00000

Feature: dbpm.1, Score: 0.00000

Feature: dstderr, Score: 0.00000

Feature: dcontrib, Score: 0.00000

Feature: sum.spm, Score: 0.00494

Feature: x.min.1, Score: 0.00182

Feature: mpg.1, Score: 0.06857

Feature: rempg, Score: 0.01180

Feature: contrib.2, Score: 0.00000

Feature: vorp.gm, Score: 0.00000

Feature: o.bpm, Score: 0.00185

Feature: ocontrib.1, Score: 0.00734

Feature: ovorp.gm, Score: 0.00000

Feature: d.bpm, Score: 0.00000

Feature: dcontrib.1, Score: 0.00000

Feature: dvorp.gm, Score: 0.00000

Feature: prod.gm, Score: 0.01642

Feature: exp.bpm, Score: 0.03000

Feature: truetalentbpm, Score: 0.00000

Feature: exp.min, Score: 0.00000

Feature: truetalentvorp, Score: 0.00309

Feature: truesalary, Score: 0.36537

Feature: truetimevorp, Score: 0.01162

Feature: worp, Score: 0.00713

Feature: o.worp, Score: 0.00889

Feature: d.worp, Score: 0.00000

Feature: adjusted.worp, Score: 0.00283

Feature: bbref.pos, Score: 0.00000

Feature: age.on.feb.1, Score: 0.00000

Feature: yrs.experience, Score: 0.00847

Feature: height, Score: 0.00333

Feature: weight, Score: 0.00736

Feature: rounded.position, Score: 0.00000

Chart, histogram

Description automatically generated

**Random forest classifier**

[0.9744844459979028, 0.9723872771758126, 0.9660839160839161]

Feature: year, Score: 0.00755

Feature: age, Score: 0.00446

Feature: g, Score: 0.00557

Feature: mp, Score: 0.00552

Feature: per, Score: 0.06633

Feature: ts., Score: 0.00629

Feature: x3par, Score: 0.00791

Feature: ftr, Score: 0.00542

Feature: orb., Score: 0.00610

Feature: drb., Score: 0.00764

Feature: trb., Score: 0.00624

Feature: ast., Score: 0.00747

Feature: stl., Score: 0.00619

Feature: blk., Score: 0.00589

Feature: tov., Score: 0.00612

Feature: usg., Score: 0.03186

Feature: ows, Score: 0.01512

Feature: dws, Score: 0.00717

Feature: ws, Score: 0.04555

Feature: ws.48, Score: 0.01059

Feature: obpm, Score: 0.00486

Feature: dbpm, Score: 0.00382

Feature: bpm, Score: 0.00549

Feature: ows.48, Score: 0.00616

Feature: dws.48, Score: 0.00623

Feature: shot., Score: 0.02898

Feature: team.mar, Score: 0.00720

Feature: team.mp, Score: 0.00521

Feature: team.gm, Score: 0.00073

Feature: year.3par, Score: 0.00681

Feature: team.ts., Score: 0.00690

Feature: tm.usg, Score: 0.00688

Feature: tm.ts.w.o.plyr, Score: 0.00769

Feature: reb.vers, Score: 0.00702

Feature: defense, Score: 0.00597

Feature: val.shot, Score: 0.00455

Feature: offense, Score: 0.00895

Feature: raw.spm, Score: 0.01461

Feature: raw.contrib, Score: 0.01621

Feature: tm.sum, Score: 0.00671

Feature: tm.adj, Score: 0.00630

Feature: stderr, Score: 0.00229

Feature: contrib, Score: 0.02084

Feature: reb.vers.1, Score: 0.00554

Feature: val.shot.1, Score: 0.00273

Feature: offense.1, Score: 0.00448

Feature: defense.1, Score: 0.00448

Feature: raw.obpm, Score: 0.00519

Feature: contrib.1, Score: 0.00725

Feature: tm.ortg, Score: 0.00520

Feature: tm.sum.1, Score: 0.00752

Feature: tm.adj.1, Score: 0.00379

Feature: tm.drtg, Score: 0.00431

Feature: obpm.1, Score: 0.00596

Feature: ostderr, Score: 0.00206

Feature: ocontrib, Score: 0.00718

Feature: dbpm.1, Score: 0.00342

Feature: dstderr, Score: 0.00099

Feature: dcontrib, Score: 0.00480

Feature: sum.spm, Score: 0.00443

Feature: x.min.1, Score: 0.00485

Feature: mpg.1, Score: 0.02328

Feature: rempg, Score: 0.01499

Feature: contrib.2, Score: 0.01716

Feature: vorp.gm, Score: 0.03260

Feature: o.bpm, Score: 0.00391

Feature: ocontrib.1, Score: 0.01110

Feature: ovorp.gm, Score: 0.00542

Feature: d.bpm, Score: 0.00335

Feature: dcontrib.1, Score: 0.00441

Feature: dvorp.gm, Score: 0.00445

Feature: prod.gm, Score: 0.05120

Feature: exp.bpm, Score: 0.03765

Feature: truetalentbpm, Score: 0.02853

Feature: exp.min, Score: 0.00987

Feature: truetalentvorp, Score: 0.04675

Feature: truesalary, Score: 0.05421

Feature: truetimevorp, Score: 0.01456

Feature: worp, Score: 0.03219

Feature: o.worp, Score: 0.01459

Feature: d.worp, Score: 0.00487

Feature: adjusted.worp, Score: 0.01350

Feature: bbref.pos, Score: 0.00211

Feature: age.on.feb.1, Score: 0.00713

Feature: yrs.experience, Score: 0.00722

Feature: height, Score: 0.00584

Feature: weight, Score: 0.00744

Feature: rounded.position, Score: 0.00210

Chart, histogram

Description automatically generated

**K- neighbours classifier -> takes time to compute features importance -> could use PARALLEL COMPUTING**

[0.9573575672841663, 0.9584061516952115, 0.9513986013986014]