# All variables without tuition with\_cv\_3

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | best\_params | best\_score | best\_model | confusion\_matrix | TP (mean) | FP (mean) | FN (mean) | TN (mean) | precision | recall | f1\_score | training\_time |
| CART | {'max\_depth': 5, 'min\_samples\_leaf': 2, 'min\_samples\_split': 5} | 0.8701611565351346 | DecisionTreeClassifier(max\_depth=5, min\_samples\_leaf=2, min\_samples\_split=5) | [[220 57]  [ 33 416]] | 416 | 57 | 33 | 220 | 0.8757048798997842 | 0.8760330578512396 | 0.8748397117703904 | 21.08915519714355 |
| Random Forest | {'max\_depth': 20, 'min\_samples\_split': 2, 'n\_estimators': 300} | 0.897023343998104 | RandomForestClassifier(max\_depth=20, n\_estimators=300) | [[219 58]  [ 26 423]] | 423 | 58 | 26 | 219 | 0.8849348615582383 | 0.8842975206611571 | 0.8827416648025406 | 676.3029205799103 |
| LightGBM | {'learning\_rate': 0.05, 'n\_estimators': 150, 'num\_leaves': 31} | 0.8987617016234151 | LGBMClassifier(learning\_rate=0.05, n\_estimators=150) | [[236 41]  [ 23 426]] | 426 | 41 | 23 | 236 | 0.9118207220212281 | 0.9118457300275482 | 0.9112316723071997 | 197.9825568199158 |
| XGBoost | {'learning\_rate': 0.1, 'max\_depth': 5, 'n\_estimators': 250} | 0.8970375636923805 | XGBClassifier(base\_score=None, booster=None, callbacks=None,  colsample\_bylevel=None, colsample\_bynode=None,  colsample\_bytree=None, device=None, early\_stopping\_rounds=None,  enable\_categorical=True, eval\_metric=None, feature\_types=None,  gamma=None, grow\_policy=None, importance\_type=None,  interaction\_constraints=None, learning\_rate=0.1, max\_bin=None,  max\_cat\_threshold=None, max\_cat\_to\_onehot=None,  max\_delta\_step=None, max\_depth=5, max\_leaves=None,  min\_child\_weight=None, missing=nan, monotone\_constraints=None,  multi\_strategy=None, n\_estimators=250, n\_jobs=None,  num\_parallel\_tree=None, random\_state=None, ...) | [[232 45]  [ 30 419]] | 419 | 45 | 30 | 232 | 0.896332209541876 | 0.8966942148760331 | 0.8961053739790885 | 263.7599172592163 |

# Before 1st sem without tuition\_cv\_3

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | best\_params | best\_score | best\_model | confusion\_matrix | TP (mean) | FP (mean) | FN (mean) | TN (mean) | precision | recall | f1\_score | training\_time |
| CART | {'max\_depth': 5, 'min\_samples\_leaf': 5, 'min\_samples\_split': 10} | 0.7293612987320773 | DecisionTreeClassifier(max\_depth=5, min\_samples\_leaf=5, min\_samples\_split=10) | [[204 73]  [114 335]] | 335 | 73 | 114 | 204 | 0.752565191313804 | 0.7424242424242424 | 0.745137320866609 | 16.74492311477661 |
| Random Forest | {'max\_depth': 20, 'min\_samples\_split': 10, 'n\_estimators': 150} | 0.7551735987676265 | RandomForestClassifier(max\_depth=20, min\_samples\_split=10, n\_estimators=150) | [[181 96]  [ 86 363]] | 363 | 96 | 86 | 181 | 0.7477555502550995 | 0.7493112947658402 | 0.7483876150489321 | 625.2701163291931 |
| LightGBM | {'learning\_rate': 0.15, 'n\_estimators': 50, 'num\_leaves': 50} | 0.7613757554212583 | LGBMClassifier(learning\_rate=0.15, n\_estimators=50, num\_leaves=50) | [[183 94]  [ 90 359]] | 359 | 94 | 90 | 183 | 0.7458833894715893 | 0.7465564738292011 | 0.7461968200448346 | 222.5531287193298 |
| XGBoost | {'learning\_rate': 0.05, 'max\_depth': 3, 'n\_estimators': 150} | 0.7692913852352175 | XGBClassifier(base\_score=None, booster=None, callbacks=None,  colsample\_bylevel=None, colsample\_bynode=None,  colsample\_bytree=None, device=None, early\_stopping\_rounds=None,  enable\_categorical=True, eval\_metric=None, feature\_types=None,  gamma=None, grow\_policy=None, importance\_type=None,  interaction\_constraints=None, learning\_rate=0.05, max\_bin=None,  max\_cat\_threshold=None, max\_cat\_to\_onehot=None,  max\_delta\_step=None, max\_depth=3, max\_leaves=None,  min\_child\_weight=None, missing=nan, monotone\_constraints=None,  multi\_strategy=None, n\_estimators=150, n\_jobs=None,  num\_parallel\_tree=None, random\_state=None, ...) | [[186 91]  [ 75 374]] | 374 | 91 | 75 | 186 | 0.7693298645265477 | 0.7713498622589532 | 0.7699511743266545 | 274.0794744491577 |

# Before 2nd sem without tuition\_cv\_3

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | best\_params | best\_score | best\_model | confusion\_matrix | TP (mean) | FP (mean) | FN (mean) | TN (mean) | precision | recall | f1\_score | training\_time |
| CART | {'max\_depth': 5, 'min\_samples\_leaf': 1, 'min\_samples\_split': 2} | 0.8474499348264011 | DecisionTreeClassifier(max\_depth=5) | [[200 77]  [ 34 415]] | 415 | 77 | 34 | 200 | 0.84777109028772 | 0.8471074380165289 | 0.844167875167461 | 17.09272265434265 |
| Random Forest | {'max\_depth': 25, 'min\_samples\_split': 2, 'n\_estimators': 150} | 0.8694869060315205 | RandomForestClassifier(max\_depth=25, n\_estimators=150) | [[211 66]  [ 23 426]] | 426 | 66 | 23 | 211 | 0.8795341555873707 | 0.8774104683195593 | 0.8750535215306668 | 694.8173654079437 |
| LightGBM | {'learning\_rate': 0.2, 'n\_estimators': 50, 'num\_leaves': 31} | 0.8746474700793933 | LGBMClassifier(learning\_rate=0.2, n\_estimators=50) | [[227 50]  [ 33 416]] | 416 | 50 | 33 | 227 | 0.8852153471447268 | 0.8856749311294766 | 0.8849273526042128 | 237.3406167030334 |
| XGBoost | {'learning\_rate': 0.1, 'max\_depth': 3, 'n\_estimators': 100} | 0.8725844294347672 | XGBClassifier(base\_score=None, booster=None, callbacks=None,  colsample\_bylevel=None, colsample\_bynode=None,  colsample\_bytree=None, device=None, early\_stopping\_rounds=None,  enable\_categorical=True, eval\_metric=None, feature\_types=None,  gamma=None, grow\_policy=None, importance\_type=None,  interaction\_constraints=None, learning\_rate=0.1, max\_bin=None,  max\_cat\_threshold=None, max\_cat\_to\_onehot=None,  max\_delta\_step=None, max\_depth=3, max\_leaves=None,  min\_child\_weight=None, missing=nan, monotone\_constraints=None,  multi\_strategy=None, n\_estimators=100, n\_jobs=None,  num\_parallel\_tree=None, random\_state=None, ...) | [[219 58]  [ 23 426]] | 426 | 58 | 23 | 219 | 0.8896250256130045 | 0.8884297520661157 | 0.8867604390243378 | 290.6994128227234 |

# During 1st sem without tuition\_cv\_3

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | best\_params | best\_score | best\_model | confusion\_matrix | TP (mean) | FP (mean) | FN (mean) | TN (mean) | precision | recall | f1\_score | training\_time |
| CART | {'max\_depth': 5, 'min\_samples\_leaf': 1, 'min\_samples\_split': 10} | 0.7548169214361892 | DecisionTreeClassifier(max\_depth=5, min\_samples\_split=10) | [[184 93]  [ 87 362]] | 362 | 93 | 87 | 184 | 0.7511021685459794 | 0.7520661157024794 | 0.7515316028552195 | 14.93812298774719 |
| Random Forest | {'max\_depth': 20, 'min\_samples\_split': 15, 'n\_estimators': 300} | 0.7734103566773315 | RandomForestClassifier(max\_depth=20, min\_samples\_split=15, n\_estimators=300) | [[187 90]  [ 79 370]] | 370 | 90 | 79 | 187 | 0.7656821716526314 | 0.7672176308539945 | 0.7662682725664163 | 612.4709684848785 |
| LightGBM | {'learning\_rate': 0.05, 'n\_estimators': 100, 'num\_leaves': 31} | 0.7758336295769641 | LGBMClassifier(learning\_rate=0.05) | [[190 87]  [ 79 370]] | 370 | 87 | 79 | 190 | 0.7702114787201045 | 0.7713498622589532 | 0.7706842625566286 | 229.6474709510803 |
| XGBoost | {'learning\_rate': 0.2, 'max\_depth': 3, 'n\_estimators': 50} | 0.7844448394359522 | XGBClassifier(base\_score=None, booster=None, callbacks=None,  colsample\_bylevel=None, colsample\_bynode=None,  colsample\_bytree=None, device=None, early\_stopping\_rounds=None,  enable\_categorical=True, eval\_metric=None, feature\_types=None,  gamma=None, grow\_policy=None, importance\_type=None,  interaction\_constraints=None, learning\_rate=0.2, max\_bin=None,  max\_cat\_threshold=None, max\_cat\_to\_onehot=None,  max\_delta\_step=None, max\_depth=3, max\_leaves=None,  min\_child\_weight=None, missing=nan, monotone\_constraints=None,  multi\_strategy=None, n\_estimators=50, n\_jobs=None,  num\_parallel\_tree=None, random\_state=None, ...) | [[191 86]  [ 78 371]] | 371 | 86 | 78 | 191 | 0.7729831513185786 | 0.7741046831955923 | 0.7734471027667897 | 297.6617162227631 |

# During 2nd sem without tuition\_cv\_3

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | best\_params | best\_score | best\_model | confusion\_matrix | TP (mean) | FP (mean) | FN (mean) | TN (mean) | precision | recall | f1\_score | training\_time |
| CART | {'max\_depth': 5, 'min\_samples\_leaf': 2, 'min\_samples\_split': 10} | 0.8471027372911483 | DecisionTreeClassifier(max\_depth=5, min\_samples\_leaf=2, min\_samples\_split=10) | [[200 77]  [ 34 415]] | 415 | 77 | 34 | 200 | 0.84777109028772 | 0.8471074380165289 | 0.844167875167461 | 17.63518118858337 |
| Random Forest | {'max\_depth': 25, 'min\_samples\_split': 2, 'n\_estimators': 250} | 0.8715535015997155 | RandomForestClassifier(max\_depth=25, n\_estimators=250) | [[215 62]  [ 24 425]] | 425 | 62 | 24 | 215 | 0.882950251734535 | 0.8815426997245179 | 0.8795854818582091 | 626.4200420379639 |
| LightGBM | {'learning\_rate': 0.05, 'n\_estimators': 100, 'num\_leaves': 50} | 0.8753371252518072 | LGBMClassifier(learning\_rate=0.05, num\_leaves=50) | [[225 52]  [ 28 421]] | 421 | 52 | 28 | 225 | 0.8897828530565497 | 0.8898071625344353 | 0.8887464104625692 | 217.9192698001862 |
| XGBoost | {'learning\_rate': 0.1, 'max\_depth': 3, 'n\_estimators': 150} | 0.8749946676146463 | XGBClassifier(base\_score=None, booster=None, callbacks=None,  colsample\_bylevel=None, colsample\_bynode=None,  colsample\_bytree=None, device=None, early\_stopping\_rounds=None,  enable\_categorical=True, eval\_metric=None, feature\_types=None,  gamma=None, grow\_policy=None, importance\_type=None,  interaction\_constraints=None, learning\_rate=0.1, max\_bin=None,  max\_cat\_threshold=None, max\_cat\_to\_onehot=None,  max\_delta\_step=None, max\_depth=3, max\_leaves=None,  min\_child\_weight=None, missing=nan, monotone\_constraints=None,  multi\_strategy=None, n\_estimators=150, n\_jobs=None,  num\_parallel\_tree=None, random\_state=None, ...) | [[221 56]  [ 28 421]] | 421 | 56 | 28 | 221 | 0.8844884536673994 | 0.8842975206611571 | 0.8829672685356211 | 265.2381844520569 |