Naïve Bayes  
Statistic results - 2013-04-18 20:11:44

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| --- | --- | --- | --- | --- | --- | --- |
| CATEGORIZATION | |  |  |  |  |  |
|  | books | camera | dvd | health | music | software |
| books | 336 | 3,4 | 18,4 | 17,6 | 4,6 | 20 |
| camera | 0 | 372,8 | 0 | 19 | 0 | 7,2 |
| dvd | 14,2 | 12,8 | 325,4 | 12,8 | 25,6 | 9,2 |
| health | 1 | 13,2 | 0 | 377,4 | 1 | 7,4 |
| music | 1,6 | 2,2 | 7,8 | 8 | 374,4 | 6 |
| software | 3,8 | 8,4 | 2 | 10,2 | 2,2 | 356,4 |

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| McNEMAR | |  |  |  |  |  |
|  | books | camera | dvd | health | music | software |
| books | 0,063 | 0,257 | 6,138 | 28,612 | 10,897 | 12,778 |
| camera | 0,054 | 0,01 | 0,012 | 19,862 | 14,201 | 16,592 |
| dvd | 29,165 | 106,603 | 23,704 | 110,704 | 15,745 | 96,514 |
| health | 7,173 | 33,146 | 0,08 | 0,964 | 1,078 | 21,202 |
| music | 7,118 | 75,056 | 36,797 | 72,118 | 6,137 | 119,755 |
| software | 138,06 | 62,775 | 114,221 | 22,68 | 86,3 | 2,103 |

“A train B test” means training on A and testing on B

# SENTIMENT ANALISIS

Books train books test

result: TP: 155,2 FP: 47,2 TN: 152,8 FN: 44,8Accuracy 0,77

Recall: Pos 0,776, Neg 0,764,

Precision: Pos 0,766798418972332 Neg 0,773279352226721

Books train camera test

result: TP: 136,2 FP: 58,2 TN: 140,8 FN: 63,8Accuracy 0,694235588972431

Recall: Pos 0,681, Neg 0,707537688442211,

Precision: Pos 0,700617283950617 Neg 0,688172043010753

Books train dvd test

result: TP: 138,4 FP: 37 TN: 163 FN: 61,6Accuracy 0,7535

Recall: Pos 0,692, Neg 0,815,

Precision: Pos 0,789053591790194 Neg 0,72573463935886

Books train health test

result: TP: 98,6 FP: 38,2 TN: 161,8 FN: 101,4Accuracy 0,651

Recall: Pos 0,493, Neg 0,809,

Precision: Pos 0,720760233918129 Neg 0,614741641337386

Books train music test

result: TP: 131,4 FP: 35 TN: 165 FN: 68,6Accuracy 0,741

Recall: Pos 0,657, Neg 0,825,

Precision: Pos 0,789663461538462 Neg 0,706335616438356

Books train software test

result: TP: 122,4 FP: 39 TN: 144 FN: 77,6Accuracy 0,69556135770235

Recall: Pos 0,612, Neg 0,786885245901639,

Precision: Pos 0,758364312267658 Neg 0,649819494584838

Camera train books test

result: TP: 136 FP: 61,4 TN: 138,6 FN: 64Accuracy 0,6865

Recall: Pos 0,68, Neg 0,693,

Precision: Pos 0,688956433637285 Neg 0,684106614017769

Camera train camera test

result: TP: 167,2 FP: 32 TN: 167 FN: 32,8Accuracy 0,837593984962406

Recall: Pos 0,836, Neg 0,839195979899497,

Precision: Pos 0,839357429718876 Neg 0,835835835835836

Camera train dvd test

result: TP: 138,6 FP: 60,2 TN: 139,8 FN: 61,4Accuracy 0,696

Recall: Pos 0,693, Neg 0,699,

Precision: Pos 0,697183098591549 Neg 0,694831013916501

Camera train health test

result: TP: 118 FP: 34 TN: 166 FN: 82Accuracy 0,71

Recall: Pos 0,59, Neg 0,83,

Precision: Pos 0,776315789473684 Neg 0,669354838709677

Camera train music test

result: TP: 113,4 FP: 43,6 TN: 156,4 FN: 86,6Accuracy 0,6745

Recall: Pos 0,567, Neg 0,782,

Precision: Pos 0,722292993630573 Neg 0,643621399176955

Camera train software test

result: TP: 131,2 FP: 28,6 TN: 154,4 FN: 68,8Accuracy 0,745691906005222

Recall: Pos 0,656, Neg 0,843715846994536,

Precision: Pos 0,821026282853567 Neg 0,691756272401434

Dvd train books test

result: TP: 115,8 FP: 27,2 TN: 172,8 FN: 84,2Accuracy 0,7215

Recall: Pos 0,579, Neg 0,864,

Precision: Pos 0,80979020979021 Neg 0,672373540856031

Dvd train camera test

result: TP: 62,2 FP: 11,6 TN: 187,4 FN: 137,8Accuracy 0,625563909774436

Recall: Pos 0,311, Neg 0,941708542713568,

Precision: Pos 0,842818428184282 Neg 0,576260762607626

Dvd train dvd test

result: TP: 127,4 FP: 24,6 TN: 175,4 FN: 72,6Accuracy 0,757

Recall: Pos 0,637, Neg 0,877,

Precision: Pos 0,838157894736842 Neg 0,707258064516129

Dvd train health test

result: TP: 58 FP: 11,6 TN: 188,4 FN: 142Accuracy 0,616

Recall: Pos 0,29, Neg 0,942,

Precision: Pos 0,833333333333333 Neg 0,570217917675545

Dvd train music test

result: TP: 170 FP: 69,6 TN: 130,4 FN: 30Accuracy 0,751

Recall: Pos 0,85, Neg 0,652,

Precision: Pos 0,709515859766277 Neg 0,812967581047382

Dvd train software test

result: TP: 75 FP: 10,6 TN: 172,4 FN: 125Accuracy 0,645953002610966

Recall: Pos 0,375, Neg 0,94207650273224,

Precision: Pos 0,876168224299065 Neg 0,579690652320108

Health train books test

result: TP: 153 FP: 76,8 TN: 123,2 FN: 47Accuracy 0,6905

Recall: Pos 0,765, Neg 0,616,

Precision: Pos 0,66579634464752 Neg 0,72385428907168

Health train camera test

result: TP: 121,6 FP: 21 TN: 178 FN: 78,4Accuracy 0,750877192982456

Recall: Pos 0,608, Neg 0,894472361809045,

Precision: Pos 0,85273492286115 Neg 0,694227769110764

Health train dvd test

result: TP: 142,2 FP: 54,8 TN: 145,2 FN: 57,8Accuracy 0,7185

Recall: Pos 0,711, Neg 0,726,

Precision: Pos 0,721827411167513 Neg 0,715270935960591

Health train health test

result: TP: 159,2 FP: 32,4 TN: 167,6 FN: 40,8Accuracy 0,817

Recall: Pos 0,796, Neg 0,838,

Precision: Pos 0,830897703549061 Neg 0,804222648752399

Health train music test

result: TP: 131,8 FP: 56,6 TN: 143,4 FN: 68,2Accuracy 0,688

Recall: Pos 0,659, Neg 0,717,

Precision: Pos 0,699575371549894 Neg 0,677693761814745

Health train software test

result: TP: 135,4 FP: 21,8 TN: 161,2 FN: 64,6Accuracy 0,774412532637076

Recall: Pos 0,677, Neg 0,880874316939891,

Precision: Pos 0,861323155216285 Neg 0,713906111603189

Music train books test

result: TP: 137 FP: 36,4 TN: 163,6 FN: 63Accuracy 0,7515

Recall: Pos 0,685, Neg 0,818,

Precision: Pos 0,790080738177624 Neg 0,721977052074139

Music train camera test

result: TP: 78,2 FP: 19 TN: 180 FN: 121,8Accuracy 0,647117794486216

Recall: Pos 0,391, Neg 0,904522613065327,

Precision: Pos 0,804526748971193 Neg 0,596421471172962

Music train dvd test

result: TP: 119,8 FP: 19,6 TN: 180,4 FN: 80,2Accuracy 0,7505

Recall: Pos 0,599, Neg 0,902,

Precision: Pos 0,859397417503587 Neg 0,69224865694551

Music train health test

result: TP: 73,4 FP: 22,8 TN: 177,2 FN: 126,6Accuracy 0,6265

Recall: Pos 0,367, Neg 0,886,

Precision: Pos 0,762993762993763 Neg 0,583278472679394

Music train music test

result: TP: 145,4 FP: 31,6 TN: 168,4 FN: 54,6Accuracy 0,7845

Recall: Pos 0,727, Neg 0,842,

Precision: Pos 0,821468926553672 Neg 0,755156950672646

Music train software test

result: TP: 59 FP: 7,6 TN: 175,4 FN: 141Accuracy 0,61201044386423

Recall: Pos 0,295, Neg 0,958469945355191,

Precision: Pos 0,885885885885886 Neg 0,554361567635904

Software train books test

result: TP: 191,6 FP: 161,6 TN: 38,4 FN: 8,4Accuracy 0,575

Recall: Pos 0,958, Neg 0,192,

Precision: Pos 0,54246885617214 Neg 0,82051282051282

Software train camera test

result: TP: 188,4 FP: 92,4 TN: 106,6 FN: 11,6Accuracy 0,739348370927318

Recall: Pos 0,942, Neg 0,535678391959799,

Precision: Pos 0,670940170940171 Neg 0,901861252115059

Software train dvd test

result: TP: 188,8 FP: 144,6 TN: 55,4 FN: 11,2Accuracy 0,6105

Recall: Pos 0,944, Neg 0,277,

Precision: Pos 0,56628674265147 Neg 0,831831831831832

Software train health test

result: TP: 169,2 FP: 81,2 TN: 118,8 FN: 30,8Accuracy 0,72

Recall: Pos 0,846, Neg 0,594,

Precision: Pos 0,675718849840256 Neg 0,794117647058824

Software train music test

result: TP: 183,8 FP: 127,6 TN: 72,4 FN: 16,2Accuracy 0,6405

Recall: Pos 0,919, Neg 0,362,

Precision: Pos 0,590237636480411 Neg 0,817155756207675

Software train software test

result: TP: 161 FP: 27,2 TN: 155,8 FN: 39Accuracy 0,827154046997389

Recall: Pos 0,805, Neg 0,851366120218579,

Precision: Pos 0,855472901168969 Neg 0,799794661190965

Perceptron  
Statistic results - 2013-04-18 20:34:53

Please note that for time saving reasons, we only run 100 iterations of the perceptron this time. Results are better with more iterations.

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| --- | --- | --- | --- | --- | --- | --- |
| CATEGORIZATION | |  |  |  |  |  |
|  | books | camera | dvd | health | music | software |
| books | 356,6 | 3,8 | 8 | 18,2 | 6 | 7,4 |
| camera | 1 | 327,2 | 2,8 | 51,4 | 3,4 | 13,2 |
| dvd | 21,8 | 5,2 | 295,2 | 36,4 | 24,6 | 16,8 |
| health | 5,8 | 20,6 | 2 | 343,2 | 7,6 | 20,8 |
| music | 19,4 | 4,4 | 24,4 | 37,6 | 303,4 | 10,8 |
| software | 12,8 | 11,4 | 2,6 | 52 | 6,4 | 297,8 |

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| nMcNEMAR | |  |  |  |  |  |
|  | books | camera | dvd | health | music | software |
| books | 0,231 | 10,227 | 7,543 | 13,551 | 4,98 | 13,17 |
| camera | 6,065 | 0,867 | 5,879 | 7,895 | 0,305 | 6,513 |
| dvd | 7,442 | 25,521 | 1,082 | 2,293 | 14,853 | 6,835 |
| health | 6,154 | 1,634 | 0,121 | 0,911 | 0,095 | 1,745 |
| music | 0,999 | 1,398 | 3,39 | 2,489 | 4,411 | 0,001 |
| software | 1,674 | 1,467 | 1,445 | 0,395 | 0,033 | 6,5 |

# SENTIMENT ANALISIS

Books train books test

result: TP: 138,8 FP: 56 TN: 144 FN: 61,2Accuracy 0,707

Recall: Pos 0,694, Neg 0,72,

Precision: Pos 0,712525667351129 Neg 0,701754385964912

Books train camera test

result: TP: 110,4 FP: 51,6 TN: 147,4 FN: 89,6Accuracy 0,646115288220551

Recall: Pos 0,552, Neg 0,74070351758794,

Precision: Pos 0,681481481481481 Neg 0,621940928270042

Books train dvd test

result: TP: 120,8 FP: 48,2 TN: 151,8 FN: 79,2Accuracy 0,6815

Recall: Pos 0,604, Neg 0,759,

Precision: Pos 0,714792899408284 Neg 0,657142857142857

Books train health test

result: TP: 108,8 FP: 47,8 TN: 152,2 FN: 91,2Accuracy 0,6525

Recall: Pos 0,544, Neg 0,761,

Precision: Pos 0,694763729246488 Neg 0,625308134757601

Books train music test

result: TP: 121,4 FP: 53 TN: 147 FN: 78,6Accuracy 0,671

Recall: Pos 0,607, Neg 0,735,

Precision: Pos 0,696100917431193 Neg 0,651595744680851

Books train software test

result: TP: 109,8 FP: 47,6 TN: 135,4 FN: 90,2Accuracy 0,640208877284595

Recall: Pos 0,549, Neg 0,739890710382514,

Precision: Pos 0,697585768742058 Neg 0,600177304964539

Camera train books test

result: TP: 140,8 FP: 89,2 TN: 110,8 FN: 59,2Accuracy 0,629

Recall: Pos 0,704, Neg 0,554,

Precision: Pos 0,612173913043478 Neg 0,651764705882353

Camera train camera test

result: TP: 148,8 FP: 42,2 TN: 156,8 FN: 51,2Accuracy 0,765914786967419

Recall: Pos 0,744, Neg 0,787939698492462,

Precision: Pos 0,779057591623037 Neg 0,753846153846154

Camera train dvd test

result: TP: 145,6 FP: 82,8 TN: 117,2 FN: 54,4Accuracy 0,657

Recall: Pos 0,728, Neg 0,586,

Precision: Pos 0,637478108581436 Neg 0,682983682983683

Camera train health test

result: TP: 125,4 FP: 44 TN: 156 FN: 74,6Accuracy 0,7035

Recall: Pos 0,627, Neg 0,78,

Precision: Pos 0,74025974025974 Neg 0,676496097137901

Camera train music test

result: TP: 125,2 FP: 68,2 TN: 131,8 FN: 74,8Accuracy 0,6425

Recall: Pos 0,626, Neg 0,659,

Precision: Pos 0,647362978283351 Neg 0,637947725072604

Camera train software test

result: TP: 136 FP: 38,2 TN: 144,8 FN: 64Accuracy 0,733159268929504

Recall: Pos 0,68, Neg 0,791256830601093,

Precision: Pos 0,780711825487945 Neg 0,693486590038314

Dvd train books test

result: TP: 115,2 FP: 52,8 TN: 147,2 FN: 84,8Accuracy 0,656

Recall: Pos 0,576, Neg 0,736,

Precision: Pos 0,685714285714286 Neg 0,63448275862069

Dvd train camera test

result: TP: 96,6 FP: 42,4 TN: 156,6 FN: 103,4Accuracy 0,634586466165413

Recall: Pos 0,483, Neg 0,786934673366834,

Precision: Pos 0,694964028776978 Neg 0,602307692307692

Dvd train dvd test

result: TP: 132 FP: 56,4 TN: 143,6 FN: 68Accuracy 0,689

Recall: Pos 0,66, Neg 0,718,

Precision: Pos 0,700636942675159 Neg 0,678638941398866

Dvd train health test

result: TP: 110 FP: 70,8 TN: 129,2 FN: 90Accuracy 0,598

Recall: Pos 0,55, Neg 0,646,

Precision: Pos 0,608407079646018 Neg 0,589416058394161

Dvd train music test

result: TP: 152,8 FP: 92,8 TN: 107,2 FN: 47,2Accuracy 0,65

Recall: Pos 0,764, Neg 0,536,

Precision: Pos 0,62214983713355 Neg 0,694300518134715

Dvd train software test

result: TP: 114,2 FP: 54,8 TN: 128,2 FN: 85,8Accuracy 0,63289817232376

Recall: Pos 0,571, Neg 0,700546448087432,

Precision: Pos 0,675739644970414 Neg 0,599065420560748

Health train books test

result: TP: 141 FP: 89,2 TN: 110,8 FN: 59Accuracy 0,6295

Recall: Pos 0,705, Neg 0,554,

Precision: Pos 0,612510860121633 Neg 0,652532391048292

Health train camera test

result: TP: 141,8 FP: 45,2 TN: 153,8 FN: 58,2Accuracy 0,740852130325815

Recall: Pos 0,709, Neg 0,77286432160804,

Precision: Pos 0,758288770053476 Neg 0,725471698113208

Health train dvd test

result: TP: 125 FP: 70,8 TN: 129,2 FN: 75Accuracy 0,6355

Recall: Pos 0,625, Neg 0,646,

Precision: Pos 0,638406537282942 Neg 0,632713026444662

Health train health test

result: TP: 146,8 FP: 43,8 TN: 156,2 FN: 53,2Accuracy 0,7575

Recall: Pos 0,734, Neg 0,781,

Precision: Pos 0,770199370409234 Neg 0,745940783190067

Health train music test

result: TP: 122,4 FP: 73,8 TN: 126,2 FN: 77,6Accuracy 0,6215

Recall: Pos 0,612, Neg 0,631,

Precision: Pos 0,623853211009174 Neg 0,619234543670265

Health train software test

result: TP: 140,2 FP: 46,2 TN: 136,8 FN: 59,8Accuracy 0,723237597911227

Recall: Pos 0,701, Neg 0,747540983606557,

Precision: Pos 0,752145922746781 Neg 0,695829094608342

Music train books test

result: TP: 142,8 FP: 68,4 TN: 131,6 FN: 57,2Accuracy 0,686

Recall: Pos 0,714, Neg 0,658,

Precision: Pos 0,676136363636364 Neg 0,697033898305085

Music train camera test

result: TP: 138,8 FP: 75 TN: 124 FN: 61,2Accuracy 0,658646616541353

Recall: Pos 0,694, Neg 0,623115577889447,

Precision: Pos 0,649204864359214 Neg 0,669546436285097

Music train dvd test

result: TP: 151 FP: 69 TN: 131 FN: 49Accuracy 0,705

Recall: Pos 0,755, Neg 0,655,

Precision: Pos 0,686363636363636 Neg 0,727777777777778

Music train health test

result: TP: 138,4 FP: 80,4 TN: 119,6 FN: 61,6Accuracy 0,645

Recall: Pos 0,692, Neg 0,598,

Precision: Pos 0,63254113345521 Neg 0,660044150110375

Music train music test

result: TP: 153,4 FP: 69,2 TN: 130,8 FN: 46,6Accuracy 0,7105

Recall: Pos 0,767, Neg 0,654,

Precision: Pos 0,689128481581312 Neg 0,737316798196167

Music train software test

result: TP: 132 FP: 67,6 TN: 115,4 FN: 68Accuracy 0,645953002610966

Recall: Pos 0,66, Neg 0,630601092896175,

Precision: Pos 0,661322645290581 Neg 0,629225736095965

Software train books test

result: TP: 126 FP: 90,6 TN: 109,4 FN: 74Accuracy 0,5885

Recall: Pos 0,63, Neg 0,547,

Precision: Pos 0,581717451523546 Neg 0,596510359869138

Software train camera test

result: TP: 152,2 FP: 60,4 TN: 138,6 FN: 47,8Accuracy 0,728822055137845

Recall: Pos 0,761, Neg 0,696482412060301,

Precision: Pos 0,715898400752587 Neg 0,743562231759657

Software train dvd test

result: TP: 116,8 FP: 68,4 TN: 131,6 FN: 83,2Accuracy 0,621

Recall: Pos 0,584, Neg 0,658,

Precision: Pos 0,630669546436285 Neg 0,612662942271881

Software train health test

result: TP: 138 FP: 69,2 TN: 130,8 FN: 62Accuracy 0,672

Recall: Pos 0,69, Neg 0,654,

Precision: Pos 0,666023166023166 Neg 0,678423236514523

Software train music test

result: TP: 125,6 FP: 72,2 TN: 127,8 FN: 74,4Accuracy 0,6335

Recall: Pos 0,628, Neg 0,639,

Precision: Pos 0,634984833164813 Neg 0,632047477744807

Software train software test

result: TP: 142 FP: 33,6 TN: 149,4 FN: 58Accuracy 0,760835509138381

Recall: Pos 0,71, Neg 0,816393442622951,

Precision: Pos 0,808656036446469 Neg 0,720347155255545