**Table 1. OMIM Expanded Disease Related Gene Database ( via EnrichR)**

|  |  |
| --- | --- |
| **Disease** | **Disease Related Genes in OMIM Expanded Database** |
| Gastric Cancer | POU2F1 FUS HSP90AA1 CDX2 CAV3 CAV1 HMGA2 AXIN2 PTPN13 CDC2 IL1B GIPC1 IRF1 NCOR2 PIK3CA ADORA2A ARHGEF4 TFAP2A PTPRU RGS18 RELA OPRD1 ADCY1 VIPR1 GTF2B ADCY5 IQGAP1 PTPRK AHR ADRB2 ADCY2 IL8RB EGFR CCND1 CASP10 CDH1 ERBB2 HNF4A DRD1 DRD2 MUTYH KPNA2 CREBBP LHCGR PPARA CSNK2A2 PTGIR CSNK2A1 STAT3 SMAD1 AIP ARNT FOS NR2F1 HNF1B NFKB1 SLC9A3R1 PPP2CA TSHR PTK2 CREB1 KLF6 HNF1A PIK3R1 GNAQ GNAS FGFR2 CEBPA IL1RN CRHR1 PLAG1 LHB HDAC2 THRA CTBP1 CTNNB1 GNAI2 IGF1R AKAP13 EP300 CGA BUB1 JAK1 MEN1 PRKACA TSHB JAK2 |
| Colorectal Cancer | CDX2 MSH2 PDGFRL APC BUB1B MSH6 BAX TP53 TFAP2A RGS18 RELA ADCY1 VIPR1 GTF2B ADCY5 AHR ADCY2 EGFR NRAS CCND1 CHEK2 PMS2 PMS1 KPNA2 CREBBP SMAD1 AIP NR2F1 HNF1B SMAD7 NFKB1 SLC9A3R1 PTK2 CREB1 HNF1A PIK3R1 GNAQ GNAS FGFR3 CRHR1 LHB CTBP1 CRCS11 CRCS10 IGF1R CGA MEN1 PRKACA POU2F1 FUS HSP90AA1 CAV3 PLA2G2A CAV1 HMGA2 AXIN2 PTPN13 BRAF MCC TGFBR2 TLR2 CDC2 GIPC1 HMPS1 NCOR2 PIK3CA ADORA2A ARHGEF4 TLR4 PTPRU OPRD1 IQGAP1 PTPRK ADRB2 IL8RB HNF4A DRD1 DRD2 CRCS6 LHCGR CRCS7 DCC MLH1 PPARA CRCS5 CSNK2A2 CRCS2 PTGIR CSNK2A1 STAT3 ARNT FOS MLH3 CRCS8 PPP2CA TSHR CRCS9 DLC1 CEBPA PLAG1 HDAC2 THRA CTNNB1 GNAI2 AKAP13 FLCN EP300 BUB1 JAK1 TSHB JAK2 |
| Breast Cancer | CDX2 BRCD2 APC TP53 TFAP2A RGS18 RELA ADCY1 VIPR1 GTF2B ADCY5 AHR ADCY2 EGFR CCND1 RAD54L CDH1 CHEK2 BCPR KPNA2 CREBBP SMAD1 XRCC3 AIP NR2F1 HNF1B ESR1 NFKB1 SLC9A3R1 PTK2 CREB1 HNF1A PIK3R1 GNAQ GNAS TSG101 CRHR1 LHB CTBP1 PHB IGF1R BRIP1 BRCD1 CGA MEN1 PRKACA BARD1 POU2F1 FUS HSP90AA1 CAV3 CAV1 HMGA2 AXIN2 PTPN13 PALB2 RAD51A CDC2 GIPC1 NCOR2 PIK3CA ADORA2A ARHGEF4 ATM PTPRU OPRD1 HMMR IQGAP1 PTPRK ADRB2 BRCA2 IL8RB BRCA3 CASP8 HNF4A DRD1 DRD2 NQO1 LHCGR PPARA CSNK2A2 PTGIR CSNK2A1 STAT3 ARNT FOS PPP2CA TSHR PPM1D SLC22A1L KRAS2 CEBPA PLAG1 HDAC2 THRA CTNNB1 RB1CC1 GNAI2 AKAP13 EP300 BRCATA BUB1 JAK1 TSHB JAK2 |
| Prostate Cancer | CDX2 HPCQTL19 APC TFAP2A RGS18 RELA ADCY1 CD82 VIPR1 GTF2B ADCY5 AHR ADCY2 EGFR CCND1 MXI1 CHEK2 KPNA2 MSR1 CREBBP SMAD1 AIP NR2F1 HNF1B NFKB1 SLC9A3R1 PTK2 CREB1 HNF1A PIK3R1 HPC3 GNAQ HPC5 GNAS HPC4 HPC7 HPC6 HPC9 MAD1L1 CRHR1 LHB CTBP1 HPCX2 IGF1R HPCX1 CGA MEN1 PRKACA POU2F1 FUS ZFHX3 HSP90AA1 CAV3 CAV1 ELAC2 HMGA2 AXIN2 PTPN13 CDC2 GIPC1 NCOR2 ADORA2A ARHGEF4 PTPRU HPC11 HPC10 OPRD1 PCAP HPC15 HPC14 IQGAP1 PTPRK ADRB2 BRCA2 IL8RB HNF4A DRD1 DRD2 LHCGR PPARA CSNK2A2 PTGIR CSNK2A1 STAT3 ARNT FOS PPP2CA TSHR EHBP1 KLF6 HIP1 CEBPA RNASEL PLAG1 HDAC2 THRA CTNNB1 PTEN GNAI2 AKAP13 EP300 EPHB2 BUB1 JAK1 MSMB TSHB JAK2 |
| Lung Cancer | CDX2 DLEC1 APC TFAP2A RGS18 RELA TSG11 CHRNA3 ADCY1 CHRNA5 VIPR GTF2B ADCY5 MPO AHR ADCY2 EGFR CCND1 MAP3K8 KPNA2 CREBBP SMAD1 AIP NR2F1 HNF1B NFKB1 SLC9A3R1 PTK2 LNCR4 CREB1 LNCR3 CYP2A6 HNF1A PIK3R1 GNAQ GNAS CRHR1 LHB CTBP1 IGF1R RASSF1 CGA MEN1 PRKACA POU2F1 FUS HSP90AA1 CAV3 CAV1 HMGA2 AXIN2 PTPN13 CDC2 GIPC1 IRF1 NCOR2 PIK3CA ADORA2A ARHGEF4 PTPRU OPRD1 IQGAP1 PTPRK ADRB2 IL8RB LNCR1 CASP8 HNF4A DRD1 DRD2 LHCGR PPARA CSNK2A2 PTGIR CSNK2A1 STAT3 ARNT FOS PPP2CA TSHR SLC22A1L ERCC6 KRAS2 CEBPA PLAG1 HDAC2 THRA DDX26 CTNNB1 GNAI2 AKAP13 PPP2R1B EP300 BUB1 JAK1 TSHB JAK2 |

**Table 2. Detailed Performance Results of LSI Based Genes**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Disease** | **Algorithm** | **TopN** | **Precision** | **Recall** | **F-Measure** |
| Gastric | PAC | 10 | 0.18182 | 0.02299 | 0.04082 |
| 50 | 0.08163 | 0.04598 | 0.05882 |
| 100 | 0.05714 | 0.06897 | 0.06250 |
| AA | 10 | 0.00000 | 0.00000 | 0.00000 |
| 50 | 0.06977 | 0.03448 | 0.04615 |
| 100 | 0.04938 | 0.04598 | 0.04762 |
| Jaccard | 10 | 0.00000 | 0.00000 | 0.00000 |
| 50 | 0.00000 | 0.00000 | 0.00000 |
| 100 | 0.00935 | 0.01149 | 0.01031 |
| RAI | 10 | 0.00000 | 0.00000 | 0.00000 |
| 50 | 0.02000 | 0.01149 | 0.01460 |
| 100 | 0.06383 | 0.06897 | 0.06630 |
| Colorectal | PAC | 10 | 0.11111 | 0.00901 | 0.01667 |
| 50 | 0.09756 | 0.03604 | 0.05263 |
| 100 | 0.06250 | 0.04505 | 0.05236 |
| AA | 10 | 0.10000 | 0.00901 | 0.01653 |
| 50 | 0.21739 | 0.09009 | 0.12739 |
| 100 | 0.15476 | 0.11712 | 0.13333 |
| Jaccard | 10 | 0.00000 | 0.00000 | 0.00000 |
| 50 | 0.01961 | 0.00901 | 0.01235 |
| 100 | 0.01786 | 0.01802 | 0.01794 |
| RAI | 10 | 0.40000 | 0.03604 | 0.06612 |
| 50 | 0.12245 | 0.05405 | 0.07500 |
| 100 | 0.11702 | 0.09910 | 0.10732 |
| Breast | PAC | 10 | 0.22222 | 0.01905 | 0.03509 |
| 50 | 0.11905 | 0.04762 | 0.06803 |
| 100 | 0.07229 | 0.05714 | 0.06383 |
| AA | 10 | 0.20000 | 0.01905 | 0.03478 |
| 50 | 0.19565 | 0.08571 | 0.11921 |
| 100 | 0.16484 | 0.14286 | 0.15306 |
| Jaccard | 10 | 0.00000 | 0.00000 | 0.00000 |
| 50 | 0.00000 | 0.00000 | 0.00000 |
| 100 | 0.00000 | 0.00000 | 0.00000 |
| RAI | 10 | 0.00000 | 0.00000 | 0.00000 |
| 50 | 0.10000 | 0.04762 | 0.06452 |
| 100 | 0.11702 | 0.10476 | 0.11055 |
| Prostate | PAC | 10 | 0.09091 | 0.00935 | 0.01695 |
| 50 | 0.03922 | 0.01869 | 0.02532 |
| 100 | 0.03175 | 0.03738 | 0.03433 |
| AA | 10 | 0.30000 | 0.02804 | 0.05128 |
| 50 | 0.14000 | 0.06542 | 0.08917 |
| 100 | 0.10000 | 0.09346 | 0.09662 |
| Jaccard | 10 | 0.00000 | 0.00000 | 0.00000 |
| 50 | 0.00000 | 0.00000 | 0.00000 |
| 100 | 0.00971 | 0.00935 | 0.00952 |
| RAI | 10 | 0.10000 | 0.00935 | 0.01709 |
| 50 | 0.10000 | 0.04673 | 0.06369 |
| 100 | 0.09184 | 0.08411 | 0.08780 |
| Lung | PAC | 10 | 0.30000 | 0.03093 | 0.05607 |
| 50 | 0.09804 | 0.05155 | 0.06757 |
| 100 | 0.05825 | 0.06186 | 0.06000 |
| AA | 10 | 0.10000 | 0.01031 | 0.01869 |
| 50 | 0.10638 | 0.05155 | 0.06944 |
| 100 | 0.09783 | 0.09278 | 0.09524 |
| Jaccard | 10 | 0.00000 | 0.00000 | 0.00000 |
| 50 | 0.02128 | 0.01031 | 0.01389 |
| 100 | 0.01010 | 0.01031 | 0.01020 |
| RAI | 10 | 0.00000 | 0.00000 | 0.00000 |
| 50 | 0.06250 | 0.03093 | 0.04138 |
| 100 | 0.06186 | 0.06186 | 0.06186 |

**Table 3. F- measure Values of Single Best (SB)- Single Worst (SW) and SMV Results with All Details**

|  |  |  |  |
| --- | --- | --- | --- |
| **Disease** | **Algorithm** | **TopN** | **F-Measure** |
| Gastric Cancer | SB | 10 | 0.04082 |
| SW | 10 | 0 |
| SMV | 10 | 0 |
| SB | 50 | 0.05882 |
| SW | 50 | 0 |
| SMV | 50 | 0.034188 |
| SB | 100 | 0.06630 |
| SW | 100 | 0.01031 |
| SMV | 100 | 0.052288 |
| Colorectal Cancer | SB | 10 | 0.06612 |
| SW | 10 | 0.00000 |
| SMV | 10 | 0.017241 |
| SB | 50 | 0.12739 |
| SW | 50 | 0.01235 |
| SMV | 50 | 0.09589 |
| SB | 100 | 0.13333 |
| SW | 100 | 0.01794 |
| SMV | 100 | 0.130952 |
| Breast Cancer | SB | 10 | 0.03509 |
| SW | 10 | 0.00000 |
| SMV | 10 | 0 |
| SB | 50 | 0.11921 |
| SW | 50 | 0.00000 |
| SMV | 50 | 0.115942 |
| SB | 100 | 0.15306 |
| SW | 100 | 0.00000 |
| SMV | 100 | 0.1375 |
| Prostate Cancer | SB | 10 | 0.05128 |
| SW | 10 | 0 |
| SMV | 10 | 0.035088 |
| SB | 50 | 0.08917 |
| SW | 50 | 0 |
| SMV | 50 | 0.065041 |
| SB | 100 | 0.09662 |
| SW | 100 | 0.00952 |
| SMV | 100 | 0.11465 |
| Lung Cancer | SB | 10 | 0.05607 |
| SW | 10 | 0 |
| SMV | 10 | 0 |
| SB | 50 | 0.06944 |
| SW | 50 | 0.01389 |
| SMV | 50 | 0.065574 |
| SB | 100 | 0.09524 |
| SW | 100 | 0.01020 |
| SMV | 100 | 0.101266 |