# ENCRYPTION METRICS

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | | | | | | | |
| **Video Stream** | | | **v\_ApplyEyeMakeup\_g01\_c01** | | | | | | | |
| **Resolution** | | | **240p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0207771769 | 0.0078290844 | | 0.0238876333 | 7.9974460295 | 7.9976205793 | 7.9969653419 | 7.9991768454 | 99.6141493056 | 33.2255923203 |
| **2** | 0.0015138849 | -0.0139777801 | | 0.0100149336 | 7.9977040261 | 7.9973727226 | 7.9979277359 | 7.9992012473 | 99.6163194444 | 33.2651501225 |
| **3** | 0.0174979694 | -0.0227204324 | | -0.0383443966 | 7.9972491517 | 7.9980882189 | 7.9978104279 | 7.9991854093 | 99.6271701389 | 33.1981226171 |
| **4** | 0.0016708811 | 0.0055277191 | | -0.0427523420 | 7.9974145348 | 7.9977404550 | 7.9977056761 | 7.9992527934 | 99.6167534722 | 33.2655824483 |
| **5** | 0.0059186297 | 0.0067443850 | | -0.0113794538 | 7.9975774798 | 7.9974554434 | 7.9977825627 | 7.9992426419 | 99.6258680556 | 33.2299649374 |
| **6** | 0.0209641370 | 0.0078411567 | | -0.0421284574 | 7.9972193030 | 7.9976366752 | 7.9972215130 | 7.9991304692 | 99.6163194444 | 33.2008459286 |
| **7** | -0.0190188047 | 0.0107958857 | | 0.0090009001 | 7.9976739743 | 7.9977268884 | 7.9976290990 | 7.9992532886 | 99.5928819444 | 33.1953397331 |
| **8** | -0.0051109202 | 0.0222505351 | | -0.0026165256 | 7.9976254275 | 7.9981344026 | 7.9980474160 | 7.9991926514 | 99.6098090278 | 33.1661083878 |
| **9** | -0.0299978871 | 0.0289601669 | | -0.0084142057 | 7.9974459310 | 7.9976357909 | 7.9973969682 | 7.9991109288 | 99.6032986111 | 33.1582686547 |
| **10** | -0.0266077685 | -0.0290560023 | | 0.0019192590 | 7.9974170408 | 7.9975684478 | 7.9975068109 | 7.9991333831 | 99.6263020833 | 33.2640505855 |
| **11** | 0.0147942197 | 0.0086808884 | | 0.0156508635 | 7.9975181450 | 7.9974459134 | 7.9979851728 | 7.9992837248 | 99.5902777778 | 33.2060644744 |
| **12** | 0.0050708928 | -0.0010721160 | | -0.0630796307 | 7.9976064326 | 7.9973859916 | 7.9975240009 | 7.9991826125 | 99.5998263889 | 33.2293011302 |
| **13** | 0.0232493828 | -0.0012276385 | | 0.0252782811 | 7.9974924061 | 7.9978023393 | 7.9976653578 | 7.9991352177 | 99.6076388889 | 33.2771650327 |
| **14** | 0.0055068004 | 0.0050487727 | | -0.0256550475 | 7.9973467525 | 7.9975857830 | 7.9978040692 | 7.9992238623 | 99.6115451389 | 33.2656232979 |
| **15** | -0.0157419063 | -0.0014902274 | | -0.0067474020 | 7.9976561464 | 7.9976598131 | 7.9975257362 | 7.9991636249 | 99.6150173611 | 33.1775973584 |
| **16** | 0.0007765384 | 0.0090824317 | | 0.0047917255 | 7.9973089686 | 7.9975388967 | 7.9978924962 | 7.9993395872 | 99.5924479167 | 33.1959354575 |
| **17** | 0.0296733554 | -0.0102440408 | | 0.0226216369 | 7.9975835643 | 7.9972850640 | 7.9975869787 | 7.9991204522 | 99.6089409722 | 33.2781556373 |
| **18** | -0.0002066438 | -0.0002183790 | | -0.0517904808 | 7.9975022850 | 7.9977099430 | 7.9977199392 | 7.9992313821 | 99.6267361111 | 33.2710120507 |
| **19** | 0.0118932280 | -0.0178863458 | | -0.0447403090 | 7.9979352001 | 7.9975487547 | 7.9975530959 | 7.9993029570 | 99.6111111111 | 33.2240519472 |
| **20** | -0.0011247015 | -0.0050044622 | | -0.0419311800 | 7.9979808047 | 7.9975519835 | 7.9974464911 | 7.9992061154 | 99.6228298611 | 33.2985464325 |
| **21** | -0.0099643566 | 0.0016294257 | | -0.0303368195 | 7.9975247216 | 7.9976038941 | 7.9969276045 | 7.9990347908 | 99.6228298611 | 33.2310474537 |
| **22** | -0.0144474381 | -0.0002433083 | | 0.0096208291 | 7.9976119548 | 7.9977239671 | 7.9978754502 | 7.9993143937 | 99.6176215278 | 33.2350949755 |
| **23** | -0.0163381641 | 0.0196498735 | | 0.0560862875 | 7.9973267781 | 7.9976950512 | 7.9979400090 | 7.9991929057 | 99.6076388889 | 33.1774237473 |
| **24** | -0.0499337066 | 0.0082953360 | | -0.0123558540 | 7.9977241512 | 7.9974419282 | 7.9981016007 | 7.9991712203 | 99.6228298611 | 33.2189746732 |
| **25** | -0.0131161744 | -0.0134698390 | | 0.0041169756 | 7.9978236382 | 7.9974528668 | 7.9973786662 | 7.9992323299 | 99.6150173611 | 33.2395407816 |
| **26** | 0.0030308982 | -0.0032707957 | | 0.0148045115 | 7.9976003194 | 7.9976526090 | 7.9979215644 | 7.9992684841 | 99.6006944444 | 33.1724009395 |
| **27** | -0.0020119441 | -0.0144040781 | | -0.0074652991 | 7.9977116679 | 7.9977390722 | 7.9975938896 | 7.9992736109 | 99.5842013889 | 33.2049632353 |
| **28** | -0.0045014495 | -0.0111245673 | | 0.0043611326 | 7.9974558003 | 7.9976076681 | 7.9975297762 | 7.9992241203 | 99.6002604167 | 33.1732094227 |
| **29** | -0.0095780921 | -0.0041228199 | | 0.0709109553 | 7.9973625734 | 7.9979285501 | 7.9973759677 | 7.9991846196 | 99.5898437500 | 33.2103707108 |
| **30** | 0.0075960086 | 0.0290570719 | | 0.0109587376 | 7.9975862903 | 7.9975091695 | 7.9974863413 | 7.9992240356 | 99.6328125000 | 33.1801096133 |
| **31** | -0.0073758261 | -0.0193157466 | | -0.0137641811 | 7.9976273243 | 7.9979608974 | 7.9976832572 | 7.9991857045 | 99.6163194444 | 33.1920700572 |
| **32** | -0.0218014659 | 0.0387211224 | | 0.0001512874 | 7.9975653319 | 7.9975882830 | 7.9976988668 | 7.9992120450 | 99.6085069444 | 33.2458061002 |
| **33** | -0.0138140500 | -0.0146372002 | | 0.0109052487 | 7.9977209460 | 7.9976747573 | 7.9975458971 | 7.9991993926 | 99.6011284722 | 33.2577256944 |
| **34** | 0.0040128246 | 0.0225581486 | | -0.0014170330 | 7.9978643850 | 7.9978325642 | 7.9977002600 | 7.9993288027 | 99.6171875000 | 33.2038534858 |
| **35** | -0.0039282589 | -0.0001737874 | | -0.0600227258 | 7.9974009045 | 7.9978889054 | 7.9977129844 | 7.9992243325 | 99.6128472222 | 33.2559555419 |
| **36** | 0.0071316914 | 0.0051140952 | | 0.0505523400 | 7.9975909638 | 7.9973399655 | 7.9973369571 | 7.9991960325 | 99.6098090278 | 33.2216707516 |
| **37** | 0.0163696450 | 0.0246136662 | | 0.0337690919 | 7.9976037099 | 7.9980384659 | 7.9976788493 | 7.9992875972 | 99.6085069444 | 33.2088354439 |
| **38** | 0.0253188933 | -0.0212414937 | | -0.0099363663 | 7.9975685525 | 7.9978155663 | 7.9977022951 | 7.9992231056 | 99.5681423611 | 33.2134395425 |
| **39** | -0.0179238434 | 0.0294436349 | | -0.0246208409 | 7.9974129918 | 7.9974293432 | 7.9976277344 | 7.9992930149 | 99.6271701389 | 33.2421109069 |
| **40** | -0.0099302339 | -0.0009324214 | | -0.0117974525 | 7.9973067626 | 7.9971894916 | 7.9981352352 | 7.9992368661 | 99.5894097222 | 33.2309044798 |
| **41** | -0.0167810765 | -0.0111215410 | | 0.0039276732 | 7.9974163867 | 7.9976792915 | 7.9975494181 | 7.9992804425 | 99.6019965278 | 33.2522773693 |
| **42** | -0.0098462371 | 0.0357903707 | | 0.0237119097 | 7.9974924851 | 7.9978441719 | 7.9976445437 | 7.9992302880 | 99.6093750000 | 33.2401535267 |
| **43** | -0.0024442552 | -0.0189927100 | | 0.0502165745 | 7.9973463331 | 7.9974234432 | 7.9977060801 | 7.9992040027 | 99.6158854167 | 33.2300313181 |
| **44** | -0.0262475251 | -0.0197449476 | | 0.0177884894 | 7.9973713469 | 7.9977171835 | 7.9977279085 | 7.9992172849 | 99.5959201389 | 33.1808806509 |
| **45** | 0.0012107308 | 0.0131946771 | | -0.0254486577 | 7.9977852335 | 7.9974523430 | 7.9977398464 | 7.9992352903 | 99.6254340278 | 33.1764518655 |
| **46** | -0.0220894462 | -0.0006324612 | | 0.0485088946 | 7.9977240707 | 7.9979756936 | 7.9978673442 | 7.9992857565 | 99.6206597222 | 33.1954231345 |
| **47** | 0.0232733372 | -0.0342757361 | | 0.0289668487 | 7.9977275456 | 7.9972859639 | 7.9975383095 | 7.9991645276 | 99.5915798611 | 33.2841247958 |
| **48** | -0.0390371024 | 0.0023281860 | | -0.0004941445 | 7.9977146983 | 7.9978138077 | 7.9976471755 | 7.9992760404 | 99.6006944444 | 33.1969430828 |
| **49** | 0.0079640310 | -0.0120463312 | | 0.0399470002 | 7.9978443169 | 7.9975557325 | 7.9975037918 | 7.9991824671 | 99.6011284722 | 33.2597681781 |
| **50** | -0.0290091760 | 0.0100333020 | | 0.0175190261 | 7.9975505805 | 7.9972668900 | 7.9977339597 | 7.9992893112 | 99.5963541667 | 33.2807359749 |
| **Total** | -0.2242676510 | 0.0505427269 | | 0.0327502414 | 399.8780663687 | 399.8816216434 | 399.8823084736 | 399.9609420101 | 4980.4470486111 | 1661.2047760076 |
| **Average** | -0.0044853229 | 0.0010108542 | | 0.0006550047 | 7.9975613274 | 7.9976324329 | 7.9976461695 | 7.9992188402 | 99.6089409722 | 33.2240955202 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | | | | | | | |
| **Video Stream** | | | **v\_ApplyLipstick\_g01\_c01** | | | | | | | |
| **Resolution** | | | **240p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | 0.0052102367 | -0.0081554286 | | -0.0120667716 | 7.9977388651 | 7.9976675594 | 7.9977074777 | 7.9993464477 | 99.6328125000 | 33.2355017702 |
| **2** | -0.0236569222 | -0.0067726662 | | 0.0035187051 | 7.9980081329 | 7.9972602176 | 7.9978775755 | 7.9992461999 | 99.6210937500 | 33.2397501362 |
| **3** | -0.0045737795 | -0.0114816979 | | 0.0037978077 | 7.9976593151 | 7.9974700257 | 7.9975810046 | 7.9992911504 | 99.6154513889 | 33.2381076389 |
| **4** | -0.0292867875 | -0.0108484047 | | 0.0672411282 | 7.9973248345 | 7.9974090488 | 7.9974752898 | 7.9991791323 | 99.6041666667 | 33.1842150054 |
| **5** | -0.0211299537 | 0.0143162437 | | 0.0670709841 | 7.9977015590 | 7.9975682724 | 7.9973573538 | 7.9991930079 | 99.6037326389 | 33.1307495915 |
| **6** | 0.0135869512 | 0.0085787079 | | 0.0275319267 | 7.9974396682 | 7.9974608716 | 7.9975930727 | 7.9991392208 | 99.6150173611 | 33.2019505719 |
| **7** | 0.0092777591 | 0.0104499696 | | -0.0562085641 | 7.9977861894 | 7.9974170014 | 7.9975631577 | 7.9992337905 | 99.6015625000 | 33.2115110975 |
| **8** | 0.0274352666 | 0.0079622449 | | -0.0067466457 | 7.9976194468 | 7.9977193970 | 7.9976729187 | 7.9991897529 | 99.6276041667 | 33.2719788263 |
| **9** | 0.0059895123 | 0.0007727520 | | -0.0255835372 | 7.9974684050 | 7.9972507217 | 7.9978384384 | 7.9992228772 | 99.6215277778 | 33.1986791939 |
| **10** | 0.0254800962 | 0.0101043567 | | -0.0318585287 | 7.9978478534 | 7.9974103828 | 7.9974459906 | 7.9992548984 | 99.6024305556 | 33.2886046432 |
| **11** | -0.0045143865 | -0.0129019295 | | -0.0276021098 | 7.9978390959 | 7.9977356273 | 7.9973847561 | 7.9992748105 | 99.5976562500 | 33.1250782952 |
| **12** | 0.0075563089 | 0.0114582511 | | -0.0115896666 | 7.9975512402 | 7.9975426981 | 7.9974614628 | 7.9992773074 | 99.6102430556 | 33.2086397059 |
| **13** | -0.0203974029 | 0.0268031659 | | 0.0259854519 | 7.9978047194 | 7.9976766615 | 7.9971092510 | 7.9992554495 | 99.5946180556 | 33.1897280093 |
| **14** | -0.0144267114 | 0.0121565325 | | -0.0506525798 | 7.9977662706 | 7.9978800444 | 7.9977349152 | 7.9992345305 | 99.5928819444 | 33.2375953159 |
| **15** | -0.0176098181 | -0.0035909552 | | 0.0014738929 | 7.9978887605 | 7.9978584338 | 7.9977193169 | 7.9993168203 | 99.5967881944 | 33.1553376906 |
| **16** | 0.0163929636 | -0.0321196320 | | -0.0429306710 | 7.9974991112 | 7.9975051724 | 7.9977429498 | 7.9991311255 | 99.6180555556 | 33.2745404412 |
| **17** | -0.0415303551 | -0.0120898952 | | -0.0380453524 | 7.9974482009 | 7.9976788091 | 7.9975038199 | 7.9992768920 | 99.6041666667 | 33.2701269744 |
| **18** | 0.0367027170 | -0.0120725224 | | -0.0271512251 | 7.9975478388 | 7.9976271348 | 7.9978864507 | 7.9992315990 | 99.6050347222 | 33.2524135349 |
| **19** | -0.0053995369 | 0.0234385923 | | -0.0138864096 | 7.9975891017 | 7.9977670853 | 7.9976166820 | 7.9992164020 | 99.6145833333 | 33.2269250408 |
| **20** | -0.0044896484 | 0.0049022352 | | -0.0163729788 | 7.9976270347 | 7.9976695780 | 7.9979870143 | 7.9992586520 | 99.6223958333 | 33.1543436819 |
| **21** | 0.0026346935 | -0.0225923696 | | -0.0152487061 | 7.9977063841 | 7.9978944654 | 7.9974463099 | 7.9992673074 | 99.6019965278 | 33.2641935594 |
| **22** | -0.0148304800 | 0.0145825312 | | -0.0018773749 | 7.9975468762 | 7.9973386018 | 7.9975498883 | 7.9990665480 | 99.6115451389 | 33.2012544254 |
| **23** | 0.0007930679 | 0.0146221435 | | -0.0366852608 | 7.9973361751 | 7.9973027216 | 7.9980425832 | 7.9991760598 | 99.6219618056 | 33.2833214188 |
| **24** | 0.0023099914 | -0.0182260546 | | 0.0011406649 | 7.9978658368 | 7.9983966456 | 7.9976171457 | 7.9993237789 | 99.6150173611 | 33.3153390523 |
| **25** | -0.0076673137 | 0.0216118575 | | 0.0079780047 | 7.9977833089 | 7.9975279418 | 7.9972246540 | 7.9991614838 | 99.6145833333 | 33.2865893927 |
| **26** | 0.0206921243 | 0.0112844500 | | 0.0187545732 | 7.9976240662 | 7.9976848355 | 7.9976755668 | 7.9993225554 | 99.6158854167 | 33.2939151008 |
| **27** | 0.0392108968 | 0.0098722637 | | -0.0224891238 | 7.9978536188 | 7.9977530916 | 7.9974165438 | 7.9992412553 | 99.5993923611 | 33.1815189270 |
| **28** | -0.0133940669 | -0.0196242745 | | 0.0182408376 | 7.9975577043 | 7.9976276898 | 7.9977703817 | 7.9991772233 | 99.6115451389 | 33.1726766748 |
| **29** | -0.0020802332 | 0.0121505090 | | 0.0399063353 | 7.9974687931 | 7.9976884899 | 7.9977306491 | 7.9990543827 | 99.6258680556 | 33.1508459286 |
| **30** | 0.0114502333 | -0.0037581801 | | -0.0112779565 | 7.9976131742 | 7.9978248109 | 7.9976959402 | 7.9992331294 | 99.5972222222 | 33.1428342865 |
| **31** | -0.0354032335 | 0.0084840423 | | 0.0336889829 | 7.9976474289 | 7.9980190583 | 7.9976351520 | 7.9992550857 | 99.6171875000 | 33.2163347631 |
| **32** | 0.0183493502 | -0.0169269368 | | -0.0308808587 | 7.9976639473 | 7.9973869932 | 7.9974732760 | 7.9992443594 | 99.6006944444 | 33.2208350354 |
| **33** | -0.0308631768 | -0.0153996442 | | 0.0508240587 | 7.9978816312 | 7.9977085274 | 7.9976034179 | 7.9991719864 | 99.6019965278 | 33.4128914760 |
| **34** | 0.0131032899 | 0.0241128463 | | -0.0010009910 | 7.9975380931 | 7.9979492999 | 7.9976542345 | 7.9992447209 | 99.6319444444 | 33.2744655501 |
| **35** | 0.0141329924 | 0.0449738389 | | 0.0487874782 | 7.9977993647 | 7.9976115994 | 7.9974697364 | 7.9991860916 | 99.6145833333 | 33.1716656454 |
| **36** | -0.0145954402 | 0.0137968428 | | 0.0601948796 | 7.9976655232 | 7.9975116622 | 7.9973778076 | 7.9992553348 | 99.5989583333 | 33.1712520425 |
| **37** | -0.0160190696 | -0.0325687604 | | 0.0081219702 | 7.9977782853 | 7.9975536176 | 7.9980846229 | 7.9992007343 | 99.6106770833 | 33.1653713916 |
| **38** | 0.0288736538 | -0.0442748262 | | 0.0558865274 | 7.9973144909 | 7.9978819225 | 7.9973777749 | 7.9992330101 | 99.6006944444 | 33.1820125272 |
| **39** | 0.0053629111 | -0.0310171901 | | 0.0098030173 | 7.9975024441 | 7.9974181132 | 7.9974866004 | 7.9991301466 | 99.6067708333 | 33.1650003404 |
| **40** | 0.0000910632 | -0.0040763391 | | 0.0281954215 | 7.9979117135 | 7.9974870880 | 7.9974980526 | 7.9992914315 | 99.6180555556 | 33.2927730120 |
| **41** | 0.0106161469 | 0.0028456837 | | -0.0040133503 | 7.9973711796 | 7.9974545043 | 7.9976802355 | 7.9992329305 | 99.6241319444 | 33.3024220452 |
| **42** | 0.0097540743 | 0.0140701427 | | 0.0552982415 | 7.9975490459 | 7.9975069493 | 7.9978179643 | 7.9992279591 | 99.6041666667 | 33.2355392157 |
| **43** | -0.0038699592 | -0.0110746586 | | 0.0176477402 | 7.9975530815 | 7.9979252451 | 7.9980706688 | 7.9993014619 | 99.6310763889 | 33.3517071759 |
| **44** | -0.0168596546 | -0.0273627051 | | -0.0604581765 | 7.9976884647 | 7.9976067337 | 7.9978737640 | 7.9992056393 | 99.6154513889 | 33.2618038535 |
| **45** | 0.0255898722 | 0.0241534658 | | 0.0423643215 | 7.9975070194 | 7.9977822111 | 7.9978433639 | 7.9992651506 | 99.6093750000 | 33.2056304466 |
| **46** | -0.0158413656 | 0.0147987680 | | 0.0488427499 | 7.9973805248 | 7.9976182564 | 7.9976969001 | 7.9991534539 | 99.5924479167 | 33.2842711737 |
| **47** | -0.0166638946 | 0.0102934010 | | 0.0523560878 | 7.9975537104 | 7.9974571341 | 7.9976855820 | 7.9991467764 | 99.5733506944 | 33.2222903050 |
| **48** | -0.0215061393 | -0.0095650851 | | -0.0316517522 | 7.9979346116 | 7.9974767941 | 7.9973915569 | 7.9991542843 | 99.5980902778 | 33.1726970997 |
| **49** | -0.0190837038 | -0.0210326624 | | 0.0014549723 | 7.9973969799 | 7.9980092781 | 7.9980123798 | 7.9992445036 | 99.6046006944 | 33.1831835512 |
| **50** | -0.0144774129 | 0.0338914612 | | 0.0134604694 | 7.9978069428 | 7.9974956143 | 7.9973445298 | 7.9991337669 | 99.6076388889 | 33.1555572576 |
| **Total** | -0.0795742736 | 0.0189544808 | | 0.2332886397 | 399.8819560636 | 399.8814746392 | 399.8815061815 | 399.9610726185 | 4980.4787326389 | 1661.2359698393 |
| **Average** | -0.0015914841 | 0.0003790896 | | 0.0046657389 | 7.9976391213 | 7.9976294928 | 7.9976301236 | 7.9992214524 | 99.6095746528 | 33.2247193968 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | | | | | | | |
| **Video Stream** | | | **v\_Archery\_g01\_c01** | | | | | | | |
| **Resolution** | | | **240p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0090021971 | -0.0183574005 | | 0.0080513042 | 7.9976701056 | 7.9977122740 | 7.9977700648 | 7.9993173793 | 99.5742187500 | 33.1696418845 |
| **2** | 0.0087923038 | 0.0203554931 | | 0.0152569541 | 7.9969947871 | 7.9975267651 | 7.9974525629 | 7.9991294806 | 99.6106770833 | 33.2418521923 |
| **3** | -0.0213192978 | -0.0313955087 | | -0.0158615260 | 7.9974153057 | 7.9980950279 | 7.9977556732 | 7.9993145694 | 99.6440972222 | 33.2047606890 |
| **4** | -0.0204051531 | 0.0114158214 | | -0.0003920704 | 7.9976935983 | 7.9972869924 | 7.9973647711 | 7.9992813690 | 99.6145833333 | 33.1637884668 |
| **5** | -0.0144127989 | 0.0161678745 | | -0.0201481382 | 7.9977734674 | 7.9974493263 | 7.9975143649 | 7.9991793027 | 99.6206597222 | 33.2086941721 |
| **6** | -0.0090996948 | -0.0160312331 | | 0.0210052897 | 7.9974402657 | 7.9976104195 | 7.9975455449 | 7.9991333049 | 99.5976562500 | 33.1615042892 |
| **7** | 0.0418027926 | -0.0258677637 | | 0.0031451057 | 7.9977728629 | 7.9977236497 | 7.9976144584 | 7.9992450260 | 99.6158854167 | 33.2056236383 |
| **8** | -0.0021105050 | 0.0236266108 | | -0.0395459749 | 7.9974619684 | 7.9976740713 | 7.9974599996 | 7.9991814573 | 99.6349826389 | 33.2403662854 |
| **9** | 0.0066558272 | 0.0154423066 | | 0.0501531180 | 7.9975548567 | 7.9974810918 | 7.9975749254 | 7.9992020589 | 99.5846354167 | 33.1244264025 |
| **10** | -0.0039512003 | -0.0053614190 | | 0.0397952475 | 7.9976577932 | 7.9975097965 | 7.9974950045 | 7.9992535291 | 99.6150173611 | 33.2672862200 |
| **11** | 0.0133155414 | 0.0386881600 | | 0.0192465724 | 7.9976881089 | 7.9980201600 | 7.9974916346 | 7.9992959285 | 99.6128472222 | 33.2153611792 |
| **12** | 0.0078775484 | -0.0169666369 | | 0.0209153843 | 7.9976404477 | 7.9974106052 | 7.9975526983 | 7.9991783653 | 99.5972222222 | 33.2418607026 |
| **13** | -0.0311423080 | -0.0048725902 | | -0.0004594379 | 7.9978427569 | 7.9974757122 | 7.9974937770 | 7.9992597981 | 99.6202256944 | 33.2141578159 |
| **14** | 0.0251002901 | 0.0160020617 | | 0.0014860730 | 7.9979462852 | 7.9978515160 | 7.9977584394 | 7.9992518175 | 99.6089409722 | 33.1644199346 |
| **15** | 0.0153294621 | -0.0148292871 | | -0.0096124096 | 7.9977163909 | 7.9974905045 | 7.9977256699 | 7.9992832963 | 99.5950520833 | 33.2006144472 |
| **16** | -0.0226846242 | 0.0024781840 | | 0.0271658201 | 7.9976233652 | 7.9975044576 | 7.9978898989 | 7.9992017005 | 99.6167534722 | 33.1782918028 |
| **17** | -0.0032619187 | 0.0086557328 | | -0.0305269338 | 7.9977416858 | 7.9977234965 | 7.9976724142 | 7.9992131621 | 99.6085069444 | 33.2357179330 |
| **18** | -0.0277951034 | 0.0167861984 | | 0.0004573784 | 7.9973250615 | 7.9972829252 | 7.9976922202 | 7.9991713103 | 99.6284722222 | 33.1952290986 |
| **19** | 0.0211658692 | -0.0515417023 | | -0.0062699029 | 7.9976906026 | 7.9976140306 | 7.9977010596 | 7.9992490186 | 99.6006944444 | 33.2250765931 |
| **20** | 0.0058606668 | -0.0157494567 | | 0.0077665492 | 7.9979006088 | 7.9978515681 | 7.9973588004 | 7.9992573135 | 99.6124131944 | 33.1560917075 |
| **21** | 0.0021564372 | -0.0159563091 | | -0.0131114609 | 7.9976805709 | 7.9975328002 | 7.9974481481 | 7.9991256243 | 99.5920138889 | 33.1920411220 |
| **22** | -0.0161235165 | -0.0233621463 | | -0.0017783887 | 7.9978707344 | 7.9979274681 | 7.9976639295 | 7.9992559124 | 99.6019965278 | 33.2464665033 |
| **23** | 0.0060220996 | 0.0276161974 | | -0.0517728254 | 7.9976455491 | 7.9979427633 | 7.9974405217 | 7.9991021356 | 99.6024305556 | 33.2182461874 |
| **24** | 0.0177311185 | -0.0200481905 | | -0.0086084610 | 7.9981932279 | 7.9978162529 | 7.9975669682 | 7.9992933698 | 99.5937500000 | 33.2496766068 |
| **25** | -0.0022845421 | -0.0337410970 | | 0.0629394900 | 7.9976339910 | 7.9973288836 | 7.9974688199 | 7.9991148218 | 99.6241319444 | 33.2980255991 |
| **26** | -0.0257382722 | -0.0005951094 | | -0.0259532460 | 7.9977741975 | 7.9972583931 | 7.9982189649 | 7.9993116360 | 99.6111111111 | 33.1733047386 |
| **27** | -0.0109105021 | 0.0314059838 | | -0.0429994852 | 7.9973637923 | 7.9976105128 | 7.9973848203 | 7.9991596996 | 99.6141493056 | 33.2347903050 |
| **28** | -0.0175513103 | 0.0127161844 | | -0.0205070134 | 7.9976854450 | 7.9972092204 | 7.9973821955 | 7.9991895331 | 99.6145833333 | 33.1889297386 |
| **29** | -0.0002771534 | -0.0178649597 | | -0.0308596163 | 7.9974922600 | 7.9973836908 | 7.9980251004 | 7.9992938600 | 99.6310763889 | 33.2583231209 |
| **30** | 0.0143635055 | -0.0216448864 | | 0.0255269930 | 7.9975274887 | 7.9977575591 | 7.9977952012 | 7.9992993479 | 99.5924479167 | 33.2389161220 |
| **31** | 0.0092648148 | -0.0226347841 | | -0.0238571535 | 7.9974554968 | 7.9975489824 | 7.9973524125 | 7.9991204323 | 99.5959201389 | 33.1548900463 |
| **32** | -0.0097625205 | -0.0098771405 | | -0.0286084870 | 7.9981579831 | 7.9976728685 | 7.9975289712 | 7.9992428396 | 99.6015625000 | 33.1079010076 |
| **33** | 0.0099300383 | -0.0131165393 | | -0.0288272467 | 7.9971839121 | 7.9980039057 | 7.9976922804 | 7.9992384093 | 99.6223958333 | 33.1913994417 |
| **34** | 0.0249937330 | 0.0353389640 | | 0.0043921511 | 7.9970920505 | 7.9976681672 | 7.9975288635 | 7.9992200410 | 99.6167534722 | 33.2565206291 |
| **35** | -0.0065618023 | -0.0000905490 | | 0.0267381972 | 7.9978984751 | 7.9977454814 | 7.9978117401 | 7.9992656820 | 99.6011284722 | 33.1568321078 |
| **36** | 0.0164399600 | -0.0175390998 | | -0.0223355535 | 7.9976700929 | 7.9976250309 | 7.9978825233 | 7.9992917068 | 99.5915798611 | 33.1826014434 |
| **37** | -0.0420363230 | -0.0074205174 | | 0.0242747322 | 7.9974834570 | 7.9973853574 | 7.9975602903 | 7.9992672249 | 99.5980902778 | 33.1395629085 |
| **38** | -0.0318460704 | -0.0028465910 | | 0.0586693005 | 7.9972259764 | 7.9976244805 | 7.9975511371 | 7.9992273786 | 99.6219618056 | 33.1757421024 |
| **39** | 0.0376961556 | 0.0103179184 | | 0.0179206108 | 7.9976754667 | 7.9977370598 | 7.9977838047 | 7.9992082709 | 99.6124131944 | 33.2287717865 |
| **40** | -0.0179925425 | -0.0058533993 | | 0.0174115969 | 7.9977838973 | 7.9975276238 | 7.9976749312 | 7.9991538602 | 99.6124131944 | 33.3040696487 |
| **41** | -0.0098516728 | -0.0124039205 | | -0.0070713918 | 7.9972191397 | 7.9974338633 | 7.9978908541 | 7.9992071698 | 99.6193576389 | 33.2473600899 |
| **42** | -0.0110654905 | 0.0286561390 | | -0.0004066415 | 7.9977114306 | 7.9978763439 | 7.9973932233 | 7.9991854031 | 99.5846354167 | 33.1652454385 |
| **43** | -0.0009209838 | 0.0257702241 | | -0.0092949218 | 7.9974600288 | 7.9977664531 | 7.9980921218 | 7.9991898977 | 99.6067708333 | 33.1832601443 |
| **44** | 0.0281081889 | 0.0073023715 | | -0.0266039478 | 7.9977987133 | 7.9976774453 | 7.9978704702 | 7.9993909722 | 99.5967881944 | 33.1475966776 |
| **45** | -0.0007903895 | 0.0273141711 | | 0.0372436781 | 7.9976588966 | 7.9975752317 | 7.9976343275 | 7.9992215797 | 99.6401909722 | 33.1650139570 |
| **46** | 0.0104806120 | -0.0354732947 | | -0.0121994610 | 7.9979582642 | 7.9974751935 | 7.9978671893 | 7.9992323808 | 99.6037326389 | 33.1869247004 |
| **47** | -0.0153981503 | -0.0062405254 | | 0.0182093195 | 7.9978622719 | 7.9977372717 | 7.9976475526 | 7.9993074525 | 99.5872395833 | 33.2066806236 |
| **48** | 0.0220704675 | -0.0223789094 | | 0.0359611312 | 7.9978181571 | 7.9977074217 | 7.9972802844 | 7.9991138250 | 99.6271701389 | 33.1958792892 |
| **49** | 0.0237982243 | 0.0041045889 | | -0.0331269608 | 7.9975283003 | 7.9973868531 | 7.9973764908 | 7.9991822468 | 99.6367187500 | 33.2473464733 |
| **50** | -0.0155421511 | 0.0074503966 | | 0.0015247370 | 7.9974567412 | 7.9974584917 | 7.9972713030 | 7.9991837839 | 99.6401909722 | 33.2251514842 |
| **Total** | -0.0308825379 | -0.1024493843 | | 0.0345180783 | 399.8815163333 | 399.8806954615 | 399.8809694235 | 399.9611956856 | 4980.5082465278 | 1660.1822354984 |
| **Average** | -0.0006176507 | -0.0020489848 | | 0.0006903615 | 7.9976303267 | 7.9976139092 | 7.9976193885 | 7.9992239137 | 99.6101649306 | 33.2036447100 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | | | | | | | |
| **Video Stream** | | | **v\_BabyCrawling\_g01\_c01** | | | | | | | |
| **Resolution** | | | **240p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0221619264 | 0.0266323374 | | -0.0474804901 | 7.9977374264 | 7.9975060821 | 7.9975701672 | 7.9992327687 | 99.6011284722 | 33.2778390523 |
| **2** | -0.0023163698 | 0.0152533807 | | -0.0258565164 | 7.9974174927 | 7.9975682968 | 7.9974305446 | 7.9991749980 | 99.6241319444 | 33.1755208333 |
| **3** | 0.0072799819 | -0.0246680255 | | 0.0014671624 | 7.9978145129 | 7.9975746843 | 7.9976753569 | 7.9992121149 | 99.6354166667 | 33.2172419662 |
| **4** | 0.0150743957 | -0.0337658436 | | -0.0079601232 | 7.9978450998 | 7.9976136533 | 7.9976471377 | 7.9991682372 | 99.6111111111 | 33.2475388072 |
| **5** | -0.0004525644 | -0.0198504996 | | -0.0307405132 | 7.9975905846 | 7.9975918345 | 7.9976164687 | 7.9991363095 | 99.5985243056 | 33.1930623638 |
| **6** | 0.0094176335 | -0.0040507131 | | -0.0250466532 | 7.9975288160 | 7.9976797082 | 7.9975599035 | 7.9991887647 | 99.6302083333 | 33.1835801334 |
| **7** | 0.0033151030 | -0.0120771650 | | 0.0053323822 | 7.9978198151 | 7.9977719411 | 7.9974982036 | 7.9993410641 | 99.5998263889 | 33.1734800517 |
| **8** | -0.0091474293 | -0.0041980845 | | 0.0395371291 | 7.9974331983 | 7.9974462550 | 7.9976410694 | 7.9991532661 | 99.6180555556 | 33.2896616285 |
| **9** | 0.0050585357 | -0.0185948682 | | 0.0287505052 | 7.9975699407 | 7.9974087770 | 7.9973304988 | 7.9990740533 | 99.6085069444 | 33.1703652642 |
| **10** | -0.0028309471 | -0.0177822228 | | -0.0011289297 | 7.9974339198 | 7.9974499442 | 7.9977538775 | 7.9992023750 | 99.5920138889 | 33.2534262663 |
| **11** | -0.0029992624 | 0.0072087362 | | 0.0002208002 | 7.9976106344 | 7.9979398915 | 7.9976861437 | 7.9992652335 | 99.5959201389 | 33.2241387527 |
| **12** | -0.0311336128 | 0.0018473614 | | 0.0422355161 | 7.9977746527 | 7.9972445974 | 7.9976225063 | 7.9991750566 | 99.6236979167 | 33.2625680828 |
| **13** | 0.0171821963 | -0.0140932637 | | -0.0481364848 | 7.9978096266 | 7.9975758670 | 7.9978250405 | 7.9993125509 | 99.6093750000 | 33.1928853486 |
| **14** | -0.0031241447 | 0.0144025634 | | -0.0143824316 | 7.9977495058 | 7.9973447353 | 7.9974140716 | 7.9992249918 | 99.6271701389 | 33.2977005038 |
| **15** | 0.0064702497 | 0.0310371203 | | -0.0045530807 | 7.9972499700 | 7.9977193563 | 7.9978007342 | 7.9991473612 | 99.6263020833 | 33.2912990196 |
| **16** | 0.0146998918 | -0.0142320450 | | 0.0114843783 | 7.9977062234 | 7.9974766552 | 7.9976762783 | 7.9991676257 | 99.6202256944 | 33.2137935730 |
| **17** | 0.0426773583 | -0.0124037276 | | -0.0009212629 | 7.9973426396 | 7.9977786125 | 7.9975018835 | 7.9992940683 | 99.6254340278 | 33.2423015387 |
| **18** | 0.0200329295 | 0.0004809811 | | -0.0067923269 | 7.9971937207 | 7.9976032142 | 7.9976733668 | 7.9991782018 | 99.5989583333 | 33.2028254357 |
| **19** | -0.0333954745 | -0.0112475080 | | -0.0060127417 | 7.9978894498 | 7.9976198211 | 7.9978079616 | 7.9993158966 | 99.5941840278 | 33.1626719090 |
| **20** | -0.0308439259 | 0.0227436506 | | 0.0016392624 | 7.9971426409 | 7.9977801402 | 7.9974426166 | 7.9992210098 | 99.5855034722 | 33.2719958470 |
| **21** | 0.0216388852 | -0.0225133057 | | 0.0759346694 | 7.9978476469 | 7.9980563543 | 7.9977049625 | 7.9992764609 | 99.5959201389 | 33.2368906590 |
| **22** | -0.0095816129 | -0.0013802821 | | 0.0031141710 | 7.9975900272 | 7.9976001224 | 7.9972814993 | 7.9991331527 | 99.5946180556 | 33.2028850082 |
| **23** | -0.0283872929 | 0.0046798829 | | 0.0070067056 | 7.9979137124 | 7.9975456646 | 7.9975405284 | 7.9992214209 | 99.6254340278 | 33.2886080474 |
| **24** | 0.0163746408 | -0.0405108853 | | -0.0037735872 | 7.9976881037 | 7.9977917257 | 7.9975804965 | 7.9992925373 | 99.6241319444 | 33.2679755583 |
| **25** | -0.0308906118 | 0.0053584587 | | -0.0068495289 | 7.9974927186 | 7.9977011452 | 7.9975003546 | 7.9991566459 | 99.6228298611 | 33.2320874183 |
| **26** | -0.0341371583 | 0.0205430318 | | -0.0395981549 | 7.9980098610 | 7.9976895689 | 7.9976084485 | 7.9992666274 | 99.6006944444 | 33.2735719635 |
| **27** | 0.0239944978 | 0.0147840115 | | 0.0522834818 | 7.9976779988 | 7.9974465224 | 7.9974709444 | 7.9992186886 | 99.6197916667 | 33.2348311547 |
| **28** | 0.0331876652 | 0.0140264302 | | -0.0172590595 | 7.9973535151 | 7.9977196516 | 7.9976970274 | 7.9992116397 | 99.6163194444 | 33.2394097222 |
| **29** | 0.0146090958 | 0.0119937809 | | 0.0030638789 | 7.9979844936 | 7.9976704358 | 7.9974927948 | 7.9992356973 | 99.6250000000 | 33.2728400735 |
| **30** | 0.0153071533 | -0.0116859575 | | -0.0217559352 | 7.9975657030 | 7.9978545389 | 7.9976784703 | 7.9992188720 | 99.6063368056 | 33.2753114788 |
| **31** | -0.0182220009 | -0.0049941903 | | 0.0035053376 | 7.9976928634 | 7.9977911557 | 7.9974933982 | 7.9991515153 | 99.5820312500 | 33.2102583742 |
| **32** | -0.0272275366 | -0.0049610893 | | -0.0403577004 | 7.9973238878 | 7.9971568118 | 7.9975458200 | 7.9991361039 | 99.6067708333 | 33.2174325980 |
| **33** | 0.0410084415 | 0.0252780024 | | 0.0540741404 | 7.9978985998 | 7.9976178850 | 7.9974758009 | 7.9992599135 | 99.6102430556 | 33.1786049837 |
| **34** | 0.0358676481 | 0.0169620237 | | 0.0416007651 | 7.9977754929 | 7.9977270744 | 7.9973580541 | 7.9992193818 | 99.6002604167 | 33.1835290714 |
| **35** | -0.0032800884 | -0.0009851312 | | 0.0453714950 | 7.9974419579 | 7.9973864379 | 7.9980591741 | 7.9992501056 | 99.6158854167 | 33.1864106754 |
| **36** | -0.0006562877 | 0.0005097476 | | 0.0443606515 | 7.9976433310 | 7.9977844397 | 7.9976419630 | 7.9991851513 | 99.6006944444 | 33.2155518110 |
| **37** | 0.0058122280 | 0.0054716860 | | 0.0167967982 | 7.9977056162 | 7.9976585908 | 7.9975730407 | 7.9993329215 | 99.6076388889 | 33.1692384940 |
| **38** | -0.0063939622 | -0.0063777070 | | -0.0546868521 | 7.9973569693 | 7.9975303610 | 7.9974004484 | 7.9991418718 | 99.6189236111 | 33.1414470997 |
| **39** | -0.0121130157 | 0.0008391744 | | -0.0245287493 | 7.9975568656 | 7.9976607695 | 7.9976589748 | 7.9992489360 | 99.6475694444 | 33.2554091776 |
| **40** | -0.0011060580 | -0.0104985613 | | -0.0491285490 | 7.9976058685 | 7.9974287913 | 7.9973032539 | 7.9991734672 | 99.5872395833 | 33.1990127996 |
| **41** | -0.0109900525 | 0.0013043583 | | 0.0051949900 | 7.9977226556 | 7.9975760789 | 7.9975970005 | 7.9992437429 | 99.5928819444 | 33.0922998366 |
| **42** | -0.0080695052 | -0.0150319690 | | 0.0153029246 | 7.9972126761 | 7.9973480133 | 7.9978690432 | 7.9992578475 | 99.6067708333 | 33.2393127042 |
| **43** | -0.0096450146 | -0.0196471404 | | -0.0266555542 | 7.9976481617 | 7.9980030061 | 7.9976789939 | 7.9993198480 | 99.6028645833 | 33.1983132489 |
| **44** | 0.0117519983 | 0.0168404731 | | -0.0190198441 | 7.9976467083 | 7.9977069080 | 7.9972125748 | 7.9992774070 | 99.5998263889 | 33.1750476580 |
| **45** | 0.0077318241 | -0.0129424097 | | -0.0054121927 | 7.9976470733 | 7.9977466854 | 7.9975300025 | 7.9992354871 | 99.5889756944 | 33.1186580882 |
| **46** | 0.0157342816 | 0.0205020434 | | -0.0397386052 | 7.9976054012 | 7.9974009887 | 7.9976457609 | 7.9992341794 | 99.6223958333 | 33.2879867919 |
| **47** | -0.0238495436 | 0.0306547701 | | -0.0308683618 | 7.9972087246 | 7.9979402303 | 7.9978340945 | 7.9993016555 | 99.6098090278 | 33.2025599129 |
| **48** | -0.0337326646 | 0.0016090193 | | 0.0363419072 | 7.9978003076 | 7.9974711732 | 7.9977994237 | 7.9992374447 | 99.6028645833 | 33.1209797113 |
| **49** | -0.0197168676 | -0.0043986667 | | 0.0224168205 | 7.9977710333 | 7.9977129047 | 7.9980095153 | 7.9992133341 | 99.5928819444 | 33.2384293301 |
| **50** | 0.0304717918 | -0.0249451837 | | -0.0029315342 | 7.9976296769 | 7.9976075967 | 7.9975547877 | 7.9992240486 | 99.6111111111 | 33.1893790850 |
| **Total** | -0.0017065038 | -0.0568734203 | | -0.0445398905 | 399.8806775213 | 399.8810256993 | 399.8799704829 | 399.9610620528 | 4980.4644097222 | 1660.8881689134 |
| **Average** | -0.0000341301 | -0.0011374679 | | -0.0008907976 | 7.9976135504 | 7.9976205140 | 7.9975994097 | 7.9992212411 | 99.6092881944 | 33.2177633783 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | | | | | | | |
| **Video Stream** | | | **v\_BalanceBeam\_g01\_c01** | | | | | | | |
| **Resolution** | | | **240p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0301335390 | -0.0129851662 | | 0.0125066886 | 7.9978317705 | 7.9975158498 | 7.9975364315 | 7.9992384348 | 99.6163194444 | 33.1987847222 |
| **2** | -0.0061358007 | -0.0254832830 | | 0.0275986932 | 7.9978507165 | 7.9975443454 | 7.9976183583 | 7.9992482941 | 99.6098090278 | 33.2693235975 |
| **3** | 0.0141276338 | -0.0074264539 | | 0.0036783773 | 7.9978457830 | 7.9977929221 | 7.9974661707 | 7.9993410895 | 99.5954861111 | 33.2596932870 |
| **4** | 0.0090764766 | -0.0034865156 | | 0.0672727471 | 7.9976956447 | 7.9976262784 | 7.9977139376 | 7.9992331693 | 99.6219618056 | 33.2285794526 |
| **5** | -0.0308947496 | 0.0083969594 | | -0.0169807843 | 7.9973374581 | 7.9976382849 | 7.9975108833 | 7.9991832017 | 99.6059027778 | 33.2040781590 |
| **6** | -0.0035715684 | 0.0049402294 | | -0.0030598005 | 7.9977987890 | 7.9972000100 | 7.9976206497 | 7.9991532930 | 99.6171875000 | 33.2333997141 |
| **7** | -0.0096007335 | -0.0274407741 | | 0.0075895166 | 7.9975287091 | 7.9974167282 | 7.9976383041 | 7.9992390722 | 99.6163194444 | 33.2174325980 |
| **8** | 0.0234622155 | -0.0329489037 | | 0.0053092483 | 7.9975770879 | 7.9976741150 | 7.9978254269 | 7.9992208319 | 99.5998263889 | 33.1993906590 |
| **9** | 0.0060549219 | -0.0047750430 | | -0.0229274579 | 7.9976978094 | 7.9978606905 | 7.9969916286 | 7.9992418308 | 99.6258680556 | 33.2973634940 |
| **10** | -0.0038744818 | -0.0072634743 | | 0.0244961026 | 7.9975141509 | 7.9978185163 | 7.9977059825 | 7.9991402978 | 99.6232638889 | 33.2136301743 |
| **11** | 0.0168083605 | 0.0287939554 | | 0.0534216997 | 7.9974674270 | 7.9977882569 | 7.9974942007 | 7.9991864830 | 99.6128472222 | 33.2652658633 |
| **12** | -0.0252187066 | 0.0027028254 | | -0.0628363556 | 7.9977040751 | 7.9974842683 | 7.9976389066 | 7.9992459065 | 99.5989583333 | 33.2477890114 |
| **13** | -0.0060568979 | -0.0154417657 | | 0.0374480085 | 7.9975894967 | 7.9974125403 | 7.9976047143 | 7.9991976255 | 99.6093750000 | 33.1476647603 |
| **14** | 0.0105097959 | 0.0124277720 | | -0.0288125782 | 7.9976487075 | 7.9975823899 | 7.9969739220 | 7.9991760866 | 99.6176215278 | 33.1338865060 |
| **15** | 0.0202832017 | -0.0104961992 | | 0.0345380443 | 7.9976735016 | 7.9976673810 | 7.9973591852 | 7.9991301194 | 99.6219618056 | 33.3161117919 |
| **16** | -0.0088559533 | 0.0131475468 | | 0.0393963001 | 7.9974010478 | 7.9975029631 | 7.9974583946 | 7.9991160046 | 99.6128472222 | 33.1995183143 |
| **17** | -0.0062522197 | 0.0350194871 | | 0.0125589364 | 7.9976809338 | 7.9970463818 | 7.9979532394 | 7.9992000665 | 99.6076388889 | 33.2677934368 |
| **18** | -0.0079071811 | -0.0012649990 | | -0.0102584707 | 7.9977437481 | 7.9977018363 | 7.9979767190 | 7.9992684534 | 99.6080729167 | 33.3598651961 |
| **19** | 0.0086024829 | -0.0146741286 | | 0.0322716185 | 7.9974959776 | 7.9976234629 | 7.9979703884 | 7.9992896359 | 99.6067708333 | 33.2539215686 |
| **20** | 0.0185528211 | -0.0401257755 | | 0.0074248388 | 7.9975705531 | 7.9976973594 | 7.9975261585 | 7.9992005121 | 99.6119791667 | 33.2003506264 |
| **21** | 0.0033868715 | -0.0020290230 | | 0.0066950747 | 7.9975285463 | 7.9974045857 | 7.9972305508 | 7.9991675758 | 99.6310763889 | 33.2941023284 |
| **22** | 0.0040810190 | 0.0077384725 | | 0.0411351716 | 7.9978550178 | 7.9977358361 | 7.9974313461 | 7.9992225232 | 99.5781250000 | 33.2313061683 |
| **23** | 0.0021266518 | -0.0073553269 | | 0.0027703705 | 7.9978386811 | 7.9975293446 | 7.9979800825 | 7.9992599101 | 99.6046006944 | 33.2501242511 |
| **24** | -0.0036576121 | -0.0170929757 | | 0.0333142684 | 7.9974893029 | 7.9977494136 | 7.9975532721 | 7.9992511605 | 99.6180555556 | 33.2315274374 |
| **25** | -0.0103242170 | 0.0186738004 | | -0.0130276572 | 7.9975640289 | 7.9980345207 | 7.9973367719 | 7.9992478149 | 99.5868055556 | 33.2253455202 |
| **26** | -0.0166031006 | 0.0213238390 | | -0.0150994653 | 7.9976037390 | 7.9977243814 | 7.9976347533 | 7.9992176701 | 99.6297743056 | 33.2962605528 |
| **27** | -0.0095172720 | -0.0135182006 | | -0.0074752783 | 7.9978329671 | 7.9975945302 | 7.9977382520 | 7.9991767285 | 99.6280381944 | 33.1645101443 |
| **28** | 0.0055927882 | 0.0052237836 | | -0.0016940649 | 7.9978811137 | 7.9975070760 | 7.9976697013 | 7.9992590737 | 99.6184895833 | 33.2003404139 |
| **29** | 0.0019678822 | -0.0092376463 | | -0.0297343682 | 7.9974402614 | 7.9972634633 | 7.9974030249 | 7.9990915205 | 99.6002604167 | 33.1724332789 |
| **30** | -0.0144195070 | 0.0086700562 | | 0.0412104606 | 7.9975417191 | 7.9974991672 | 7.9976836222 | 7.9991132844 | 99.6085069444 | 33.3021395016 |
| **31** | 0.0061775493 | 0.0352630163 | | 0.0135267039 | 7.9976910980 | 7.9976304179 | 7.9976210643 | 7.9992621801 | 99.5985243056 | 33.2571810321 |
| **32** | 0.0056647558 | 0.0058323277 | | 0.0058259933 | 7.9977875187 | 7.9979628636 | 7.9974998953 | 7.9992869821 | 99.6184895833 | 33.1374829793 |
| **33** | -0.0149786582 | -0.0129191066 | | -0.0184089448 | 7.9977564044 | 7.9976964300 | 7.9976143769 | 7.9992509793 | 99.5998263889 | 33.2052730120 |
| **34** | -0.0222453145 | -0.0366535579 | | 0.0031192166 | 7.9974860179 | 7.9978659745 | 7.9975635264 | 7.9992887923 | 99.5963541667 | 33.2418862337 |
| **35** | 0.0066059088 | 0.0222638994 | | 0.0281950410 | 7.9978056533 | 7.9973807905 | 7.9972457048 | 7.9993125615 | 99.6080729167 | 33.1827001634 |
| **36** | -0.0023637880 | -0.0169663937 | | -0.0156428787 | 7.9976755792 | 7.9971182206 | 7.9974843934 | 7.9991043133 | 99.5972222222 | 33.2087894880 |
| **37** | -0.0137724830 | 0.0317014513 | | 0.0503855983 | 7.9976224569 | 7.9973379809 | 7.9976418784 | 7.9992333059 | 99.6193576389 | 33.2478809232 |
| **38** | -0.0145743532 | -0.0321994202 | | 0.0313484619 | 7.9971177043 | 7.9976691652 | 7.9977844048 | 7.9991134284 | 99.5950520833 | 33.2294372958 |
| **39** | -0.0019620126 | -0.0425491776 | | 0.0116173365 | 7.9976986136 | 7.9976109427 | 7.9974892512 | 7.9991803730 | 99.5924479167 | 33.2523539624 |
| **40** | -0.0116947097 | 0.0035458570 | | 0.0263088233 | 7.9979525516 | 7.9977337529 | 7.9977181565 | 7.9992400657 | 99.5976562500 | 33.1943440223 |
| **41** | -0.0001754583 | -0.0039472437 | | -0.0065895007 | 7.9975323846 | 7.9972455449 | 7.9973468990 | 7.9990930749 | 99.5837673611 | 33.1836073666 |
| **42** | -0.0239387057 | 0.0040694056 | | 0.0057674561 | 7.9976311153 | 7.9976634017 | 7.9972443044 | 7.9991593285 | 99.6284722222 | 33.2367766204 |
| **43** | 0.0055259484 | 0.0000971095 | | -0.0205627598 | 7.9976889565 | 7.9974613756 | 7.9977537996 | 7.9991821411 | 99.6215277778 | 33.2324874047 |
| **44** | 0.0069366809 | -0.0214897402 | | 0.0391418862 | 7.9975187066 | 7.9975905535 | 7.9975160089 | 7.9991568018 | 99.5933159722 | 33.2530518110 |
| **45** | -0.0141376476 | -0.0264148581 | | -0.0370930222 | 7.9973173453 | 7.9978120319 | 7.9975703898 | 7.9991779412 | 99.6223958333 | 33.2562806373 |
| **46** | -0.0216731841 | -0.0099362314 | | -0.0232454439 | 7.9979658946 | 7.9978601254 | 7.9976871240 | 7.9993859790 | 99.6354166667 | 33.2290611383 |
| **47** | -0.0031547470 | -0.0479305377 | | -0.0120030877 | 7.9974022656 | 7.9975913425 | 7.9977444313 | 7.9992092420 | 99.6011284722 | 33.1723447712 |
| **48** | 0.0010547450 | 0.0141101102 | | -0.0446900064 | 7.9978933208 | 7.9978114293 | 7.9974703255 | 7.9992828759 | 99.5963541667 | 33.2435440496 |
| **49** | -0.0186358321 | -0.0339713500 | | 0.0553252091 | 7.9979031481 | 7.9979359321 | 7.9980900420 | 7.9992901123 | 99.6202256944 | 33.2179670479 |
| **50** | -0.0074349238 | -0.0167843660 | | -0.0003600068 | 7.9978174730 | 7.9978394256 | 7.9975701597 | 7.9992488143 | 99.6080729167 | 33.1512867647 |
| **Total** | -0.1871666472 | -0.2708657333 | | 0.3706959595 | 399.8824929730 | 399.8804546004 | 399.8789011148 | 399.9607169627 | 4980.4774305556 | 1661.4156692538 |
| **Average** | -0.0037433155 | -0.0054172617 | | 0.0074137834 | 7.9976498595 | 7.9976090920 | 7.9975780223 | 7.9992143393 | 99.6095486111 | 33.2283133851 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | | | | | | | |
| **Video Stream** | | | **v\_BandMarching\_g01\_c01** | | | | | | | |
| **Resolution** | | | **240p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0023428153 | -0.0006922647 | | 0.0179314316 | 7.9976979189 | 7.9975805056 | 7.9974237523 | 7.9990967916 | 99.6145833333 | 33.2160522195 |
| **2** | -0.0286221608 | -0.0360855835 | | -0.0023437094 | 7.9977648747 | 7.9973039266 | 7.9978747102 | 7.9992481542 | 99.6124131944 | 33.1336260893 |
| **3** | 0.0191597117 | 0.0058651044 | | -0.0285437748 | 7.9980281259 | 7.9975269052 | 7.9979322808 | 7.9991355018 | 99.5946180556 | 33.2133169935 |
| **4** | -0.0344668574 | -0.0007964125 | | -0.0293697830 | 7.9979330297 | 7.9974066682 | 7.9978382179 | 7.9992317198 | 99.6215277778 | 33.1230494281 |
| **5** | 0.0528187995 | 0.0255869085 | | 0.0319778041 | 7.9977521219 | 7.9976839006 | 7.9978367030 | 7.9993149153 | 99.6202256944 | 33.0828890931 |
| **6** | 0.0113666039 | -0.0114358501 | | -0.0556055329 | 7.9973467458 | 7.9975623555 | 7.9976455090 | 7.9991561037 | 99.6054687500 | 33.2042075163 |
| **7** | -0.0162066477 | 0.0190769438 | | -0.0043685888 | 7.9976841637 | 7.9974567331 | 7.9973751489 | 7.9991699564 | 99.5785590278 | 33.2476154003 |
| **8** | 0.0033024846 | 0.0010170876 | | -0.0596231181 | 7.9971785420 | 7.9972687247 | 7.9973306062 | 7.9991101984 | 99.6063368056 | 33.1877416939 |
| **9** | -0.0363088194 | -0.0419548744 | | 0.0254378393 | 7.9973671504 | 7.9975891998 | 7.9973986748 | 7.9991508452 | 99.6393229167 | 33.3174938725 |
| **10** | -0.0402151831 | 0.0264408956 | | 0.0393745935 | 7.9977477356 | 7.9975822612 | 7.9972141182 | 7.9991302754 | 99.6223958333 | 33.2902182053 |
| **11** | -0.0045371737 | -0.0600223127 | | 0.0091985736 | 7.9973765639 | 7.9977980749 | 7.9972728308 | 7.9992130855 | 99.5941840278 | 33.1933040577 |
| **12** | 0.0059249156 | -0.0244327949 | | 0.0378715556 | 7.9976079301 | 7.9976565465 | 7.9975658117 | 7.9990849246 | 99.6093750000 | 33.2051828023 |
| **13** | 0.0078928684 | 0.0000444756 | | 0.0057009075 | 7.9976001195 | 7.9977939020 | 7.9971636856 | 7.9991831071 | 99.5876736111 | 33.1268909995 |
| **14** | 0.0135122198 | -0.0105201594 | | -0.0001726024 | 7.9975485312 | 7.9977370112 | 7.9976564185 | 7.9991855497 | 99.6254340278 | 33.2293743192 |
| **15** | -0.0066120486 | -0.0161058240 | | -0.0115489593 | 7.9974304150 | 7.9973789235 | 7.9977724939 | 7.9990898671 | 99.5959201389 | 33.1887510212 |
| **16** | -0.0023943559 | 0.0151274499 | | 0.0216464263 | 7.9978701449 | 7.9976804901 | 7.9975300548 | 7.9991687642 | 99.6059027778 | 33.1999183007 |
| **17** | 0.0131482996 | -0.0080362575 | | 0.0185127797 | 7.9975253505 | 7.9976730966 | 7.9975765685 | 7.9992053130 | 99.6041666667 | 33.2101256127 |
| **18** | 0.0216771095 | -0.0169806261 | | 0.0435009135 | 7.9971597656 | 7.9976741680 | 7.9974727605 | 7.9992323923 | 99.5993923611 | 33.2021446078 |
| **19** | -0.0232145135 | -0.0242914721 | | -0.0261449219 | 7.9973820036 | 7.9975982356 | 7.9976392487 | 7.9991357530 | 99.6158854167 | 33.1548934504 |
| **20** | 0.0062415650 | 0.0071519918 | | -0.0132495504 | 7.9976111697 | 7.9976983633 | 7.9978641242 | 7.9992458579 | 99.5928819444 | 33.2490655637 |
| **21** | -0.0050655341 | -0.0208458327 | | -0.0272415822 | 7.9976324836 | 7.9976014234 | 7.9975580050 | 7.9992551352 | 99.6115451389 | 33.2093273420 |
| **22** | -0.0028916324 | -0.0269183291 | | -0.0302924620 | 7.9975413988 | 7.9975102253 | 7.9974997431 | 7.9991902148 | 99.6080729167 | 33.1611996187 |
| **23** | 0.0075988018 | 0.0034088645 | | 0.0435907331 | 7.9977559084 | 7.9977184133 | 7.9976740863 | 7.9991739942 | 99.6154513889 | 33.2152692674 |
| **24** | 0.0080375358 | 0.0206255206 | | -0.0392505696 | 7.9975091897 | 7.9979823100 | 7.9975458857 | 7.9992497164 | 99.6046006944 | 33.1135331563 |
| **25** | 0.0081663026 | 0.0170946824 | | 0.0008092066 | 7.9973127365 | 7.9974255155 | 7.9975935666 | 7.9991535300 | 99.6197916667 | 33.2559334150 |
| **26** | 0.0145718487 | 0.0172680894 | | 0.0207609661 | 7.9972567732 | 7.9973374718 | 7.9973295030 | 7.9990413735 | 99.5881076389 | 33.2863579112 |
| **27** | 0.0080774781 | 0.0171861201 | | 0.0081861349 | 7.9977125007 | 7.9970907563 | 7.9977051951 | 7.9990706328 | 99.5820312500 | 33.2082754630 |
| **28** | 0.0123049624 | 0.0307666795 | | 0.0112115460 | 7.9977264742 | 7.9976560949 | 7.9977631750 | 7.9992862702 | 99.6006944444 | 33.1874897876 |
| **29** | -0.0132504954 | -0.0060730706 | | -0.0563624754 | 7.9975030107 | 7.9976241671 | 7.9978106078 | 7.9992593613 | 99.6245659722 | 33.2681644880 |
| **30** | 0.0122854657 | -0.0129734585 | | -0.0083943941 | 7.9975880885 | 7.9973396822 | 7.9973874827 | 7.9991590669 | 99.5894097222 | 33.0633527369 |
| **31** | -0.0264433293 | -0.0001668766 | | 0.0314252672 | 7.9974252641 | 7.9974877448 | 7.9974256080 | 7.9991979348 | 99.6115451389 | 33.1548338780 |
| **32** | -0.0325015210 | -0.0091640093 | | -0.0392576812 | 7.9974865128 | 7.9976655273 | 7.9977665416 | 7.9993351819 | 99.6137152778 | 33.2609426062 |
| **33** | 0.0075763798 | -0.0224621633 | | -0.0130651586 | 7.9977082190 | 7.9975966435 | 7.9973836515 | 7.9991813164 | 99.5954861111 | 33.2385297522 |
| **34** | 0.0115778520 | -0.0141797175 | | -0.0645005476 | 7.9975316096 | 7.9977151789 | 7.9972309565 | 7.9990731766 | 99.6202256944 | 33.2509412446 |
| **35** | -0.0237278266 | 0.0105315590 | | -0.0058325437 | 7.9973195371 | 7.9975228475 | 7.9974245869 | 7.9991355066 | 99.5755208333 | 33.2682189542 |
| **36** | -0.0148703346 | 0.0146951328 | | -0.0198557764 | 7.9975195679 | 7.9975373594 | 7.9974848010 | 7.9991664751 | 99.6154513889 | 33.2086397059 |
| **37** | 0.0248219122 | -0.0412830269 | | -0.0049066678 | 7.9978783184 | 7.9979029725 | 7.9980446238 | 7.9992300725 | 99.6024305556 | 33.2889739924 |
| **38** | -0.0088930194 | 0.0325462132 | | 0.0600472570 | 7.9977239231 | 7.9978207270 | 7.9970505939 | 7.9993178675 | 99.6098090278 | 33.1703431373 |
| **39** | -0.0215254914 | 0.0283819234 | | 0.0036377657 | 7.9972812593 | 7.9977221125 | 7.9977115844 | 7.9991697797 | 99.6028645833 | 33.2034092456 |
| **40** | 0.0060760354 | -0.0248914829 | | 0.0223739796 | 7.9974746737 | 7.9974580638 | 7.9974252077 | 7.9990542560 | 99.6189236111 | 33.2009208197 |
| **41** | -0.0113030953 | 0.0032927918 | | 0.0166462752 | 7.9975300769 | 7.9975102736 | 7.9977320803 | 7.9991729173 | 99.5976562500 | 33.1469039352 |
| **42** | 0.0095022477 | -0.0247305461 | | -0.0105945780 | 7.9976474650 | 7.9978260971 | 7.9975855969 | 7.9992346365 | 99.6032986111 | 33.2409705202 |
| **43** | 0.0363784935 | -0.0462194063 | | -0.0098772374 | 7.9977525669 | 7.9978907823 | 7.9973726676 | 7.9992899849 | 99.6176215278 | 33.2067810458 |
| **44** | -0.0315922058 | -0.0001942973 | | 0.0261226031 | 7.9970518624 | 7.9976753212 | 7.9973473100 | 7.9990719807 | 99.6289062500 | 33.2009106073 |
| **45** | -0.0031352593 | -0.0018258116 | | 0.0199031952 | 7.9973911541 | 7.9976113613 | 7.9975995011 | 7.9992277029 | 99.6080729167 | 33.1941670071 |
| **46** | -0.0043278910 | -0.0159694792 | | -0.0256295498 | 7.9977422136 | 7.9981000143 | 7.9980222347 | 7.9993641859 | 99.5998263889 | 33.2253965822 |
| **47** | -0.0066151945 | 0.0016283152 | | -0.0093227185 | 7.9975223054 | 7.9975023728 | 7.9975570956 | 7.9992119531 | 99.6236979167 | 33.1632829521 |
| **48** | 0.0372044576 | 0.0151101874 | | -0.0733096528 | 7.9977902320 | 7.9976975141 | 7.9974249858 | 7.9991416234 | 99.5959201389 | 33.1462060866 |
| **49** | 0.0075511591 | -0.0089268699 | | -0.0533033798 | 7.9973356238 | 7.9976178033 | 7.9973604966 | 7.9990328313 | 99.6050347222 | 33.1918607026 |
| **50** | -0.0223951302 | 0.0076170874 | | -0.0514079580 | 7.9978944237 | 7.9977494134 | 7.9979565207 | 7.9992721463 | 99.5924479167 | 33.2195176334 |
| **Total** | -0.0566830256 | -0.2077147858 | | -0.2575077194 | 399.8781577754 | 399.8805461825 | 399.8781576133 | 399.9592099010 | 4980.3289930556 | 1660.1265148421 |
| **Average** | -0.0011336600 | -0.0041542718 | | -0.0051501089 | 7.9975631555 | 7.9976109237 | 7.9975631523 | 7.9991841980 | 99.6065798611 | 33.2025302968 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | | | | | | | |
| **Video Stream** | | | **v\_BaseballPitch\_g01\_c01** | | | | | | | |
| **Resolution** | | | **240p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | 0.0167149140 | -0.0247533740 | | -0.0030381578 | 7.9970778852 | 7.9977070640 | 7.9973447793 | 7.9992681934 | 99.6028645833 | 33.2073648557 |
| **2** | -0.0167113086 | -0.0090816424 | | 0.0147289945 | 7.9975200438 | 7.9975499948 | 7.9975540566 | 7.9992055446 | 99.6015625000 | 33.2668947440 |
| **3** | -0.0173748406 | -0.0228299122 | | -0.0147818584 | 7.9976610590 | 7.9975273583 | 7.9975465891 | 7.9992253883 | 99.6024305556 | 33.2263735703 |
| **4** | -0.0025525884 | -0.0020215255 | | -0.0134394898 | 7.9978091906 | 7.9977307004 | 7.9976713624 | 7.9991786163 | 99.6115451389 | 33.2162700844 |
| **5** | -0.0083572365 | 0.0229372860 | | -0.0399946185 | 7.9977410306 | 7.9974318614 | 7.9974962105 | 7.9991288920 | 99.5937500000 | 33.1928019472 |
| **6** | 0.0020323253 | 0.0075101138 | | 0.0102427066 | 7.9976808843 | 7.9973792554 | 7.9975536068 | 7.9992632804 | 99.5998263889 | 33.2056610839 |
| **7** | 0.0192658725 | -0.0077473355 | | 0.0391802935 | 7.9978513215 | 7.9976250864 | 7.9973880857 | 7.9992230328 | 99.6271701389 | 33.2184521378 |
| **8** | 0.0034145896 | 0.0154056092 | | 0.0138663886 | 7.9975801513 | 7.9974125167 | 7.9973682155 | 7.9991606536 | 99.6150173611 | 33.1146701389 |
| **9** | 0.0065431965 | 0.0147040418 | | -0.0359269832 | 7.9976876196 | 7.9977016485 | 7.9976876134 | 7.9992150023 | 99.5972222222 | 33.1820176334 |
| **10** | 0.0216285715 | -0.0197296640 | | -0.0204213220 | 7.9977390232 | 7.9971033630 | 7.9971823457 | 7.9991926294 | 99.6150173611 | 33.2728587963 |
| **11** | -0.0119196779 | -0.0064230770 | | 0.0257187464 | 7.9978236837 | 7.9973782107 | 7.9977308042 | 7.9991483780 | 99.6002604167 | 33.1443491285 |
| **12** | 0.0239049547 | 0.0279495316 | | -0.0164549547 | 7.9976704229 | 7.9978957153 | 7.9978116297 | 7.9993052252 | 99.6124131944 | 33.2167313453 |
| **13** | 0.0039902360 | 0.0019356192 | | 0.0284870081 | 7.9974388016 | 7.9975213982 | 7.9976776569 | 7.9991969622 | 99.6250000000 | 33.1724809368 |
| **14** | -0.0405139198 | -0.0107186516 | | -0.0083530138 | 7.9977237640 | 7.9978866646 | 7.9977302345 | 7.9993067227 | 99.5933159722 | 33.2021633306 |
| **15** | -0.0150248093 | -0.0103982861 | | 0.0395426738 | 7.9980440994 | 7.9975456507 | 7.9974285358 | 7.9992245049 | 99.5755208333 | 33.2202359069 |
| **16** | 0.0133057110 | 0.0382967710 | | 0.0266948291 | 7.9979338829 | 7.9974494642 | 7.9974992778 | 7.9991490587 | 99.6197916667 | 33.2377399918 |
| **17** | 0.0076983206 | 0.0251599966 | | -0.0644598934 | 7.9974772609 | 7.9976240016 | 7.9974824113 | 7.9991628642 | 99.6232638889 | 33.2274067266 |
| **18** | 0.0428025424 | -0.0026191892 | | 0.0052688954 | 7.9975233926 | 7.9975833198 | 7.9975820697 | 7.9991660666 | 99.6189236111 | 33.2209405637 |
| **19** | 0.0233812952 | 0.0103798546 | | 0.0297313598 | 7.9973119062 | 7.9975325316 | 7.9975083559 | 7.9992510566 | 99.6141493056 | 33.1630889161 |
| **20** | -0.0215141324 | -0.0224808739 | | -0.0565705493 | 7.9974669739 | 7.9975167841 | 7.9974838379 | 7.9991193966 | 99.6193576389 | 33.2152096950 |
| **21** | -0.0009220928 | 0.0134728119 | | -0.0186975168 | 7.9975493987 | 7.9978887778 | 7.9977360574 | 7.9992730276 | 99.6245659722 | 33.3068967865 |
| **22** | -0.0073679497 | 0.0072238549 | | -0.0626402458 | 7.9975333127 | 7.9975756529 | 7.9975978401 | 7.9991334606 | 99.5768229167 | 33.2125357435 |
| **23** | 0.0271920663 | -0.0290086286 | | -0.0145234296 | 7.9979101515 | 7.9973876240 | 7.9976960978 | 7.9991562147 | 99.6215277778 | 33.2120898012 |
| **24** | 0.0230946454 | 0.0028794117 | | 0.0125420663 | 7.9976477413 | 7.9977205924 | 7.9974740688 | 7.9992044269 | 99.5911458333 | 33.2051759940 |
| **25** | -0.0066773555 | -0.0054957390 | | 0.0148458290 | 7.9974645325 | 7.9976673404 | 7.9976189986 | 7.9992224837 | 99.6037326389 | 33.2111621732 |
| **26** | -0.0133662859 | -0.0136557557 | | 0.0468464019 | 7.9977419113 | 7.9975660859 | 7.9979147265 | 7.9992704212 | 99.6006944444 | 33.2347562636 |
| **27** | 0.0199404066 | -0.0092730995 | | -0.0148418929 | 7.9973898758 | 7.9976341512 | 7.9978584760 | 7.9992633277 | 99.6072048611 | 33.2380106209 |
| **28** | -0.0088362434 | -0.0042236976 | | -0.0258040785 | 7.9977289534 | 7.9977143151 | 7.9976627981 | 7.9992869411 | 99.6067708333 | 33.2504306236 |
| **29** | -0.0055293354 | -0.0680474217 | | 0.0297674220 | 7.9975969830 | 7.9979523364 | 7.9977692291 | 7.9992831986 | 99.6167534722 | 33.1593324483 |
| **30** | -0.0038049585 | 0.0247257802 | | 0.0467600827 | 7.9976440028 | 7.9978991596 | 7.9977375216 | 7.9992633549 | 99.6163194444 | 33.1725575300 |
| **31** | -0.0128042177 | 0.0023215083 | | 0.0802027935 | 7.9974996540 | 7.9974110661 | 7.9976013018 | 7.9991363572 | 99.6046006944 | 33.2020084423 |
| **32** | 0.0088911331 | -0.0213568049 | | 0.0202575725 | 7.9977761252 | 7.9975333791 | 7.9978196271 | 7.9991589157 | 99.6046006944 | 33.1757165714 |
| **33** | -0.0209858770 | 0.0152467846 | | 0.0215632178 | 7.9976167704 | 7.9977149594 | 7.9975543010 | 7.9992262595 | 99.6245659722 | 33.2614634395 |
| **34** | 0.0129822950 | -0.0342877632 | | -0.0222533432 | 7.9979725295 | 7.9973180837 | 7.9977100767 | 7.9992295350 | 99.6106770833 | 33.2496340550 |
| **35** | 0.0170553916 | -0.0179794987 | | -0.0239771513 | 7.9974926836 | 7.9978646454 | 7.9976196097 | 7.9991936450 | 99.5954861111 | 33.2279990468 |
| **36** | 0.0157528728 | 0.0131230483 | | 0.0130557883 | 7.9977051434 | 7.9978524172 | 7.9977467478 | 7.9993495237 | 99.6024305556 | 33.2067997685 |
| **37** | 0.0250000326 | 0.0258904251 | | -0.0408235017 | 7.9972060416 | 7.9976160583 | 7.9972019537 | 7.9991759307 | 99.6085069444 | 33.1878761574 |
| **38** | -0.0188124699 | -0.0082644903 | | 0.0563093995 | 7.9973764794 | 7.9979229507 | 7.9973909643 | 7.9991321232 | 99.5941840278 | 33.1863289760 |
| **39** | 0.0036148845 | 0.0416475483 | | -0.0189067712 | 7.9978316963 | 7.9975491451 | 7.9974272099 | 7.9992351481 | 99.6289062500 | 33.2615315223 |
| **40** | -0.0133317390 | 0.0266745817 | | -0.0212911067 | 7.9979140159 | 7.9974518884 | 7.9977149864 | 7.9991701708 | 99.6371527778 | 33.1903373502 |
| **41** | -0.0063345490 | 0.0299005037 | | 0.0158088784 | 7.9976422505 | 7.9977468329 | 7.9977459066 | 7.9991689833 | 99.6041666667 | 33.3566857298 |
| **42** | -0.0140304233 | 0.0001636172 | | -0.0059104830 | 7.9975749315 | 7.9975621873 | 7.9979616440 | 7.9992602421 | 99.6028645833 | 33.2081920615 |
| **43** | -0.0098571114 | -0.0256283249 | | -0.0424173402 | 7.9976174085 | 7.9972699077 | 7.9973998148 | 7.9991365956 | 99.5941840278 | 33.1852753949 |
| **44** | 0.0052023506 | 0.0001733452 | | -0.0409471957 | 7.9975689735 | 7.9975315995 | 7.9974578624 | 7.9992282362 | 99.6245659722 | 33.2966213916 |
| **45** | -0.0045534495 | 0.0402073293 | | 0.0710963991 | 7.9975938643 | 7.9976428798 | 7.9974821731 | 7.9992812594 | 99.6219618056 | 33.2672249455 |
| **46** | -0.0089362631 | 0.0280872537 | | -0.0120353622 | 7.9977041452 | 7.9973380308 | 7.9978961733 | 7.9991497279 | 99.6132812500 | 33.1848788126 |
| **47** | 0.0142677344 | -0.0249840347 | | -0.0056409656 | 7.9978275142 | 7.9976108374 | 7.9981067977 | 7.9992585412 | 99.6024305556 | 33.2014586737 |
| **48** | 0.0225881624 | 0.0240794538 | | -0.0142984769 | 7.9976923938 | 7.9975452180 | 7.9976446650 | 7.9992046393 | 99.5898437500 | 33.3384157135 |
| **49** | -0.0260151060 | 0.0160629164 | | -0.0190278944 | 7.9975194826 | 7.9977711026 | 7.9978565668 | 7.9992417761 | 99.6197916667 | 33.2550994009 |
| **50** | -0.0044784626 | -0.0126469370 | | -0.0031525402 | 7.9974472239 | 7.9977955755 | 7.9975446931 | 7.9991802491 | 99.5924479167 | 33.2463609749 |
| **Total** | 0.0596521013 | 0.0625032711 | | -0.0181123900 | 399.8815485873 | 399.8801573904 | 399.8806765681 | 399.9605661850 | 4980.4105902778 | 1661.0165679466 |
| **Average** | 0.0011930415 | 0.0012500648 | | -0.0003622478 | 7.9976309717 | 7.9976031478 | 7.9976135314 | 7.9992113237 | 99.6082118056 | 33.2203313589 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | | | | | | | |
| **Video Stream** | | | **v\_Basketball\_g01\_c01** | | | | | | | |
| **Resolution** | | | **240p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0266449182 | 0.0059235065 | | -0.0475905776 | 7.9975856719 | 7.9980945720 | 7.9977140282 | 7.9992775364 | 99.6289062500 | 33.2109511166 |
| **2** | 0.0167920104 | 0.0327312236 | | -0.0458405349 | 7.9974471090 | 7.9975612141 | 7.9975871794 | 7.9992626277 | 99.6202256944 | 33.2378591367 |
| **3** | -0.0094541258 | -0.0130514860 | | -0.0030771216 | 7.9974415052 | 7.9975708422 | 7.9976412296 | 7.9991491894 | 99.6080729167 | 33.2314099946 |
| **4** | -0.0281708545 | -0.0039273706 | | 0.0131400230 | 7.9975011891 | 7.9979999105 | 7.9973053309 | 7.9991706991 | 99.5980902778 | 33.2658735022 |
| **5** | 0.0148474800 | -0.0085420978 | | 0.0037613357 | 7.9978799941 | 7.9978687851 | 7.9977240586 | 7.9992609017 | 99.6432291667 | 33.1951201661 |
| **6** | 0.0124630950 | -0.0050445211 | | 0.0143490561 | 7.9976468712 | 7.9974608154 | 7.9974841364 | 7.9991078066 | 99.6046006944 | 33.2225711465 |
| **7** | 0.0116506026 | -0.0156145917 | | 0.0666944638 | 7.9974820534 | 7.9975297234 | 7.9974699874 | 7.9992054792 | 99.5911458333 | 33.2200163399 |
| **8** | -0.0248452774 | 0.0020717153 | | 0.0424505748 | 7.9980486010 | 7.9976757004 | 7.9972737702 | 7.9991252209 | 99.6323784722 | 33.2081495098 |
| **9** | 0.0076226051 | -0.0247365164 | | -0.0070178405 | 7.9979060096 | 7.9974871185 | 7.9978818013 | 7.9991269527 | 99.6011284722 | 33.2605051743 |
| **10** | -0.0262942123 | 0.0015873369 | | 0.0244781061 | 7.9973624563 | 7.9979174776 | 7.9976640215 | 7.9993028078 | 99.6093750000 | 33.2688589325 |
| **11** | -0.0285323992 | -0.0167883862 | | 0.0408225787 | 7.9973461530 | 7.9978525298 | 7.9978008522 | 7.9991955557 | 99.6080729167 | 33.2593715959 |
| **12** | -0.0170314316 | -0.0016163837 | | -0.0021808640 | 7.9977480955 | 7.9974552474 | 7.9974068822 | 7.9990912181 | 99.6072048611 | 33.2721235022 |
| **13** | -0.0032521252 | -0.0401000394 | | 0.0021124419 | 7.9974612492 | 7.9975542851 | 7.9978900073 | 7.9992093813 | 99.6059027778 | 33.1805215142 |
| **14** | 0.0025991012 | -0.0250662459 | | -0.0343667757 | 7.9976297794 | 7.9975499052 | 7.9976804468 | 7.9991851964 | 99.6219618056 | 33.2027182053 |
| **15** | -0.0195922125 | 0.0339332621 | | -0.0001372736 | 7.9977921929 | 7.9978743415 | 7.9977384598 | 7.9993197218 | 99.6128472222 | 33.1115553513 |
| **16** | -0.0189878309 | -0.0043294884 | | -0.0234544226 | 7.9974842918 | 7.9976315179 | 7.9976452881 | 7.9991622328 | 99.6232638889 | 33.1362574891 |
| **17** | 0.0244905133 | 0.0194196968 | | -0.0178080002 | 7.9978485340 | 7.9978219879 | 7.9974046908 | 7.9992327397 | 99.6119791667 | 33.1835460920 |
| **18** | 0.0232683073 | 0.0110311795 | | 0.0147110911 | 7.9975589448 | 7.9974357992 | 7.9973536398 | 7.9991421300 | 99.6432291667 | 33.1982706972 |
| **19** | -0.0230024087 | 0.0097275871 | | -0.0119747269 | 7.9976069655 | 7.9976771303 | 7.9974185192 | 7.9991055559 | 99.6011284722 | 33.2890897331 |
| **20** | -0.0098361751 | 0.0037189131 | | 0.0086840407 | 7.9973239830 | 7.9974776533 | 7.9976913917 | 7.9991885637 | 99.6184895833 | 33.2888344227 |
| **21** | -0.0012569148 | -0.0026137186 | | -0.0203646307 | 7.9974713349 | 7.9975730721 | 7.9978171959 | 7.9992095121 | 99.5980902778 | 33.2145254630 |
| **22** | -0.0374570473 | -0.0287744284 | | 0.0664523928 | 7.9973525924 | 7.9978496831 | 7.9977143743 | 7.9991431394 | 99.5946180556 | 33.2273573666 |
| **23** | -0.0129307938 | -0.0121600173 | | -0.0168476065 | 7.9978203295 | 7.9973438611 | 7.9973968873 | 7.9991578679 | 99.6223958333 | 33.1810610703 |
| **24** | -0.0031425157 | -0.0080459318 | | 0.0012781556 | 7.9978716863 | 7.9977042489 | 7.9976655307 | 7.9992833690 | 99.6245659722 | 33.2109289897 |
| **25** | -0.0056059271 | -0.0050992556 | | 0.0145561487 | 7.9980523295 | 7.9972983656 | 7.9975312453 | 7.9992541709 | 99.6193576389 | 33.2613987609 |
| **26** | 0.0339192155 | 0.0099685912 | | -0.0467941952 | 7.9978290294 | 7.9975031873 | 7.9975907730 | 7.9991705192 | 99.5976562500 | 33.1932938453 |
| **27** | 0.0265511640 | -0.0028287648 | | -0.0338693866 | 7.9977408925 | 7.9973016374 | 7.9975210866 | 7.9991946098 | 99.6106770833 | 33.1904581972 |
| **28** | 0.0215256746 | 0.0118789457 | | 0.0034386132 | 7.9972840496 | 7.9978772616 | 7.9974874985 | 7.9992204694 | 99.6111111111 | 33.2604643246 |
| **29** | -0.0116297859 | -0.0299814968 | | -0.0289674367 | 7.9974048379 | 7.9976825338 | 7.9978143355 | 7.9992806127 | 99.5993923611 | 33.1675755719 |
| **30** | 0.0077838843 | -0.0167346871 | | 0.0147194154 | 7.9977852639 | 7.9975887960 | 7.9977172824 | 7.9993223039 | 99.6180555556 | 33.1454078159 |
| **31** | 0.0352514010 | -0.0122048315 | | 0.0180046445 | 7.9977430136 | 7.9975391929 | 7.9975427028 | 7.9991276562 | 99.6171875000 | 33.1761420888 |
| **32** | -0.0269545260 | 0.0125252818 | | 0.0073963602 | 7.9975967852 | 7.9974078878 | 7.9975952332 | 7.9991321173 | 99.6202256944 | 33.2516016476 |
| **33** | -0.0437363151 | -0.0150458062 | | -0.0348842236 | 7.9979283221 | 7.9975209592 | 7.9977082622 | 7.9992639219 | 99.6176215278 | 33.2409296705 |
| **34** | 0.0133140813 | -0.0180150818 | | 0.0306025961 | 7.9974105255 | 7.9976436824 | 7.9978040842 | 7.9992434236 | 99.6128472222 | 33.1847937092 |
| **35** | -0.0161677586 | 0.0238012307 | | 0.0060620974 | 7.9974876869 | 7.9976163942 | 7.9979526171 | 7.9992287600 | 99.6271701389 | 33.1291904956 |
| **36** | 0.0141872630 | -0.0094828910 | | -0.0272912162 | 7.9975310994 | 7.9980459631 | 7.9973306724 | 7.9992245735 | 99.5937500000 | 33.2579333470 |
| **37** | -0.0137629187 | -0.0232656339 | | 0.0198254941 | 7.9975110731 | 7.9973771653 | 7.9975437321 | 7.9991947492 | 99.6028645833 | 33.2818372141 |
| **38** | -0.0126439604 | 0.0306548241 | | -0.0332506258 | 7.9975046249 | 7.9974923496 | 7.9975713093 | 7.9990593150 | 99.5772569444 | 33.2702512255 |
| **39** | -0.0146580382 | 0.0252656519 | | 0.0151587817 | 7.9968906628 | 7.9972915424 | 7.9974614663 | 7.9990922850 | 99.6006944444 | 33.2183517157 |
| **40** | -0.0048388108 | -0.0044268695 | | -0.0597048460 | 7.9976415988 | 7.9977113548 | 7.9975412440 | 7.9990888013 | 99.5985243056 | 33.2885382625 |
| **41** | -0.0051003948 | 0.0078107355 | | 0.0060770550 | 7.9975369740 | 7.9975854431 | 7.9976079279 | 7.9991429269 | 99.5915798611 | 33.2037139161 |
| **42** | 0.0266380566 | -0.0102634603 | | -0.0253025742 | 7.9971941925 | 7.9975834986 | 7.9976638851 | 7.9991433622 | 99.5950520833 | 33.2697457108 |
| **43** | -0.0051006054 | -0.0118315968 | | 0.0084304790 | 7.9974679353 | 7.9975842231 | 7.9979833800 | 7.9992679340 | 99.6193576389 | 33.2544287854 |
| **44** | 0.0130501489 | 0.0119444000 | | -0.0162017539 | 7.9978214396 | 7.9974717220 | 7.9976821962 | 7.9992588759 | 99.5972222222 | 33.2148335376 |
| **45** | 0.0326493168 | 0.0010123301 | | 0.0647753706 | 7.9975797317 | 7.9977081456 | 7.9979972368 | 7.9993229862 | 99.6080729167 | 33.2008799700 |
| **46** | -0.0143102440 | -0.0041551444 | | 0.0317922320 | 7.9979519239 | 7.9974627124 | 7.9978401845 | 7.9992812429 | 99.5842013889 | 33.1268433415 |
| **47** | -0.0018759223 | -0.0067162461 | | -0.0660523709 | 7.9976934709 | 7.9973124975 | 7.9978453967 | 7.9992436643 | 99.6145833333 | 33.1827886710 |
| **48** | 0.0140580942 | -0.0135647982 | | 0.0240130374 | 7.9974406846 | 7.9972706352 | 7.9977098951 | 7.9991215675 | 99.5972222222 | 33.1878982843 |
| **49** | -0.0016410263 | 0.0332892701 | | -0.0169377799 | 7.9977744459 | 7.9972413694 | 7.9972296819 | 7.9990741771 | 99.6054687500 | 33.1352039080 |
| **50** | -0.0197034262 | -0.0070090843 | | -0.0182300412 | 7.9976501397 | 7.9975089392 | 7.9975154252 | 7.9992345823 | 99.6297743056 | 33.1167790033 |
| **Total** | -0.1354988876 | -0.1127411896 | | -0.0743602392 | 399.8800703260 | 399.8795948816 | 399.8811584639 | 399.9598050134 | 4980.4978298611 | 1660.6887595316 |
| **Average** | -0.0027099711 | -0.0022548200 | | -0.0014872037 | 7.9976014065 | 7.9975918976 | 7.9976231693 | 7.9991961003 | 99.6099565972 | 33.2137751906 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | | | | | | | |
| **Video Stream** | | | **v\_BasketballDunk\_g01\_c01** | | | | | | | |
| **Resolution** | | | **240p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0056881017 | 0.0169917838 | | -0.0240442084 | 7.9979730429 | 7.9976283058 | 7.9973887045 | 7.9992473370 | 99.6098090278 | 33.2836788535 |
| **2** | 0.0148854949 | 0.0058321818 | | 0.0086125806 | 7.9978062928 | 7.9976330066 | 7.9978214450 | 7.9992401979 | 99.6002604167 | 33.1749234069 |
| **3** | 0.0143342358 | -0.0075473529 | | -0.0017395802 | 7.9977069523 | 7.9976166096 | 7.9979059753 | 7.9993566151 | 99.6050347222 | 33.2906369145 |
| **4** | -0.0122308164 | -0.0007465000 | | 0.0028856642 | 7.9976454318 | 7.9977100757 | 7.9977128797 | 7.9992424407 | 99.6111111111 | 33.1819461465 |
| **5** | 0.0344560092 | 0.0037663185 | | -0.0155800384 | 7.9977315920 | 7.9974561797 | 7.9974686327 | 7.9991679936 | 99.5963541667 | 33.1923849401 |
| **6** | -0.0011573939 | -0.0024459795 | | -0.0761116839 | 7.9976342877 | 7.9975665435 | 7.9978453191 | 7.9993096415 | 99.6341145833 | 33.2008442266 |
| **7** | -0.0042647918 | 0.0023369758 | | -0.0266276235 | 7.9980796617 | 7.9975950749 | 7.9974898393 | 7.9992455042 | 99.6115451389 | 33.2068218954 |
| **8** | -0.0001619748 | 0.0204978043 | | 0.0033678690 | 7.9974839059 | 7.9978931952 | 7.9974165401 | 7.9991100232 | 99.6089409722 | 33.2131365741 |
| **9** | 0.0257937209 | -0.0192177686 | | -0.0172729248 | 7.9975526367 | 7.9976593608 | 7.9978428425 | 7.9992996990 | 99.6115451389 | 33.1750170207 |
| **10** | 0.0179590678 | -0.0349601040 | | 0.0560904575 | 7.9976419957 | 7.9976920053 | 7.9976384056 | 7.9992908035 | 99.6219618056 | 33.2555810866 |
| **11** | 0.0351587609 | -0.0081726331 | | 0.0644610037 | 7.9973603890 | 7.9975510816 | 7.9975980879 | 7.9991402460 | 99.6163194444 | 33.2582737609 |
| **12** | -0.0157312074 | -0.0081371185 | | 0.0572778180 | 7.9978818765 | 7.9975549651 | 7.9980726358 | 7.9992849991 | 99.6150173611 | 33.3082226988 |
| **13** | -0.0220735032 | 0.0331577230 | | 0.0213149720 | 7.9974946512 | 7.9978181523 | 7.9971929908 | 7.9991604832 | 99.6145833333 | 33.2433023557 |
| **14** | 0.0174752924 | 0.0167387236 | | 0.0125242567 | 7.9974001764 | 7.9977404465 | 7.9977922047 | 7.9992233598 | 99.6063368056 | 33.2539385893 |
| **15** | 0.0177001805 | 0.0279605955 | | 0.0082673531 | 7.9974739324 | 7.9976413810 | 7.9977119687 | 7.9992809154 | 99.6197916667 | 33.2110447304 |
| **16** | 0.0338241925 | 0.0173539585 | | -0.0411823363 | 7.9973691791 | 7.9977070964 | 7.9977236727 | 7.9991761294 | 99.6098090278 | 33.1959048203 |
| **17** | -0.0247904723 | -0.0098217616 | | -0.0342541277 | 7.9975405102 | 7.9974746724 | 7.9976128679 | 7.9991316585 | 99.5989583333 | 33.2116557734 |
| **18** | -0.0116914884 | -0.0095430148 | | -0.0088516870 | 7.9975969168 | 7.9979245974 | 7.9974561487 | 7.9992771559 | 99.6102430556 | 33.1888803785 |
| **19** | -0.0414122217 | -0.0193100713 | | 0.0319304971 | 7.9978332804 | 7.9973381325 | 7.9974137694 | 7.9991481271 | 99.6028645833 | 33.2212945942 |
| **20** | -0.0022281554 | -0.0054394090 | | -0.0091456335 | 7.9975981039 | 7.9972931490 | 7.9975373939 | 7.9991320606 | 99.6098090278 | 33.2614923747 |
| **21** | 0.0157348209 | 0.0117488569 | | -0.0130410111 | 7.9974419046 | 7.9974888664 | 7.9977134985 | 7.9990158461 | 99.6050347222 | 33.1683568219 |
| **22** | 0.0008472486 | -0.0242406410 | | -0.0768659384 | 7.9972631888 | 7.9977595228 | 7.9975041407 | 7.9991355793 | 99.6197916667 | 33.2860004766 |
| **23** | -0.0232028188 | -0.0191528594 | | -0.0364082631 | 7.9972823584 | 7.9978406159 | 7.9979437573 | 7.9991771762 | 99.6046006944 | 33.1997770289 |
| **24** | -0.0188343298 | 0.0101196046 | | 0.0375835687 | 7.9977624624 | 7.9975201635 | 7.9977204620 | 7.9991711725 | 99.5959201389 | 33.2408241422 |
| **25** | 0.0093417982 | -0.0044432393 | | -0.0243359057 | 7.9976642690 | 7.9975340436 | 7.9976516570 | 7.9990870683 | 99.6085069444 | 33.1503897740 |
| **26** | -0.0215003376 | 0.0413541140 | | -0.0027966599 | 7.9977617485 | 7.9975014111 | 7.9975576501 | 7.9992586219 | 99.5855034722 | 33.2414334831 |
| **27** | 0.0024155078 | 0.0377390256 | | -0.0184400223 | 7.9974762322 | 7.9975217584 | 7.9977695862 | 7.9991599867 | 99.6006944444 | 33.2001565904 |
| **28** | 0.0101553730 | 0.0327704449 | | 0.0172734345 | 7.9976154963 | 7.9975436251 | 7.9976763421 | 7.9991347472 | 99.6258680556 | 33.2403016068 |
| **29** | 0.0203471707 | -0.0070032500 | | 0.0294313250 | 7.9976168071 | 7.9978135606 | 7.9976991464 | 7.9991275915 | 99.6245659722 | 33.1564985022 |
| **30** | -0.0106458285 | 0.0005530077 | | -0.0125363083 | 7.9979798109 | 7.9977502771 | 7.9977372934 | 7.9992256325 | 99.6158854167 | 33.1315206291 |
| **31** | 0.0612975923 | -0.0435743600 | | -0.0121557990 | 7.9979832683 | 7.9975421621 | 7.9978496573 | 7.9993441300 | 99.6154513889 | 33.2418521923 |
| **32** | -0.0123666890 | -0.0114485422 | | -0.0129651757 | 7.9979436314 | 7.9970400311 | 7.9975371085 | 7.9992853041 | 99.5998263889 | 33.2326167620 |
| **33** | -0.0195799469 | -0.0100070105 | | -0.0199814191 | 7.9976497459 | 7.9977364451 | 7.9975455018 | 7.9992916032 | 99.6189236111 | 33.2128438181 |
| **34** | 0.0177902399 | -0.0377768877 | | 0.0092353464 | 7.9974360451 | 7.9974169364 | 7.9978884256 | 7.9992072689 | 99.5950520833 | 33.2179006672 |
| **35** | -0.0241496154 | 0.0079990704 | | 0.0217446496 | 7.9975753906 | 7.9976849603 | 7.9979241060 | 7.9992719752 | 99.5920138889 | 33.1925687636 |
| **36** | 0.0046762090 | 0.0242910443 | | 0.0475792846 | 7.9973304796 | 7.9979707029 | 7.9973118573 | 7.9990544224 | 99.6085069444 | 33.2635859205 |
| **37** | 0.0344738964 | -0.0135874509 | | 0.0026439618 | 7.9976397562 | 7.9973043169 | 7.9972077894 | 7.9991941324 | 99.6067708333 | 33.2295530365 |
| **38** | -0.0140277465 | 0.0163158822 | | 0.0384278936 | 7.9979149960 | 7.9973444977 | 7.9974413154 | 7.9992575489 | 99.6028645833 | 33.1439542484 |
| **39** | -0.0072682590 | 0.0072547256 | | 0.0259921667 | 7.9976245881 | 7.9977821440 | 7.9975656082 | 7.9992496521 | 99.6132812500 | 33.2059980937 |
| **40** | 0.0165012584 | -0.0080623604 | | 0.0038331176 | 7.9977059641 | 7.9975910811 | 7.9977679953 | 7.9992350723 | 99.6380208333 | 33.1437108524 |
| **41** | 0.0033070270 | -0.0040271738 | | 0.0590853943 | 7.9979298616 | 7.9976123331 | 7.9977727370 | 7.9992485189 | 99.6241319444 | 33.2603060321 |
| **42** | -0.0205702681 | 0.0235886323 | | -0.0494470966 | 7.9978451059 | 7.9972309880 | 7.9977402133 | 7.9992273938 | 99.6293402778 | 33.2683466095 |
| **43** | 0.0154763436 | -0.0135976754 | | 0.0663504965 | 7.9976193484 | 7.9979592408 | 7.9975233353 | 7.9992426555 | 99.6323784722 | 33.2124557462 |
| **44** | 0.0083217279 | -0.0061996041 | | -0.0106249432 | 7.9979901161 | 7.9971063704 | 7.9975954912 | 7.9992327858 | 99.5833333333 | 33.1755225354 |
| **45** | -0.0272962726 | -0.0218152893 | | -0.0449785485 | 7.9975984190 | 7.9975914617 | 7.9976752487 | 7.9992109488 | 99.5963541667 | 33.2070618873 |
| **46** | -0.0358795392 | -0.0128640861 | | 0.0026395156 | 7.9976687715 | 7.9980025686 | 7.9978179788 | 7.9993197300 | 99.5980902778 | 33.2643858932 |
| **47** | 0.0003379291 | -0.0139114120 | | -0.0104560678 | 7.9977028808 | 7.9976326416 | 7.9978267202 | 7.9992894834 | 99.6128472222 | 33.1849043437 |
| **48** | 0.0205937484 | 0.0124742182 | | -0.0124682949 | 7.9976415710 | 7.9977283490 | 7.9975928395 | 7.9992425880 | 99.6063368056 | 33.1940257353 |
| **49** | -0.0082097645 | 0.0377532401 | | -0.0258959608 | 7.9973683963 | 7.9974265909 | 7.9971637745 | 7.9991423958 | 99.6015625000 | 33.2900786356 |
| **50** | -0.0105723265 | 0.0241002189 | | -0.0044963989 | 7.9977453226 | 7.9979190309 | 7.9977278629 | 7.9992446172 | 99.6310763889 | 33.1946946487 |
| **Total** | 0.0576709767 | 0.0556445949 | | -0.0141510304 | 399.8825827521 | 399.8803907285 | 399.8820914243 | 399.9607510396 | 4980.5069444444 | 1660.8806066177 |
| **Average** | 0.0011534190 | 0.0011128914 | | -0.0002830206 | 7.9976516550 | 7.9976078146 | 7.9976418285 | 7.9992150208 | 99.6101388889 | 33.2176121324 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | | | | | | | |
| **Video Stream** | | | **v\_BenchPress\_g01\_c01** | | | | | | | |
| **Resolution** | | | **240p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | 0.0132083381 | -0.0307073700 | | 0.0296232372 | 7.9971541273 | 7.9976143864 | 7.9978940520 | 7.9992451804 | 99.6106770833 | 33.2771360975 |
| **2** | 0.0011420744 | -0.0018257279 | | -0.0071212094 | 7.9974881998 | 7.9974172777 | 7.9978198417 | 7.9992631430 | 99.5946180556 | 33.3123008578 |
| **3** | 0.0073609451 | -0.0174191742 | | 0.0344743142 | 7.9975820948 | 7.9974789405 | 7.9977071582 | 7.9992332589 | 99.5980902778 | 33.1917721950 |
| **4** | -0.0064700290 | -0.0260769295 | | -0.0761227204 | 7.9973240399 | 7.9974311797 | 7.9976590553 | 7.9991884045 | 99.6128472222 | 33.2319189134 |
| **5** | -0.0042421513 | -0.0219908908 | | 0.0201727057 | 7.9975688237 | 7.9974985626 | 7.9975098905 | 7.9992567744 | 99.6059027778 | 33.2320925245 |
| **6** | -0.0274747227 | -0.0132531108 | | 0.0670657126 | 7.9977634825 | 7.9974902307 | 7.9978055438 | 7.9991749399 | 99.5941840278 | 33.2475932734 |
| **7** | -0.0415253635 | -0.0165899689 | | 0.0075546947 | 7.9981135716 | 7.9975700712 | 7.9976594221 | 7.9992898229 | 99.6019965278 | 33.1851205065 |
| **8** | 0.0067183667 | 0.0364726699 | | -0.0225513921 | 7.9979539121 | 7.9974787513 | 7.9977852157 | 7.9993409733 | 99.6050347222 | 33.1704503676 |
| **9** | 0.0152424845 | 0.0159559241 | | -0.0052629021 | 7.9975212399 | 7.9975614771 | 7.9976724359 | 7.9991395806 | 99.5863715278 | 33.1836107707 |
| **10** | 0.0043908845 | 0.0034543889 | | 0.0450975171 | 7.9972546195 | 7.9977399977 | 7.9975131953 | 7.9991750008 | 99.6015625000 | 33.2166087963 |
| **11** | 0.0171579099 | -0.0104902619 | | 0.0171894858 | 7.9974634853 | 7.9975069324 | 7.9978807441 | 7.9991730186 | 99.5820312500 | 33.1355494281 |
| **12** | 0.0152065339 | 0.0301237399 | | -0.0622986445 | 7.9976644579 | 7.9975016790 | 7.9974218708 | 7.9990896926 | 99.6115451389 | 33.2270526961 |
| **13** | -0.0161830063 | 0.0185667062 | | 0.0274089092 | 7.9975208765 | 7.9972680280 | 7.9977595675 | 7.9991265088 | 99.6002604167 | 33.1583741830 |
| **14** | -0.0180999089 | -0.0023861818 | | 0.0440017854 | 7.9977634546 | 7.9978992063 | 7.9978492863 | 7.9992070463 | 99.6158854167 | 33.1524577887 |
| **15** | 0.0152019377 | -0.0083454106 | | 0.0286598969 | 7.9975577436 | 7.9978895335 | 7.9974682492 | 7.9992274984 | 99.5907118056 | 33.2100456155 |
| **16** | 0.0121757094 | -0.0076201014 | | 0.0351941103 | 7.9980067927 | 7.9973917600 | 7.9976045972 | 7.9991722461 | 99.6145833333 | 33.2056066176 |
| **17** | 0.0111564018 | 0.0095829738 | | -0.0297368910 | 7.9976203266 | 7.9973971608 | 7.9969806280 | 7.9990585263 | 99.6098090278 | 33.1897535403 |
| **18** | -0.0087883414 | 0.0131939334 | | -0.0310634270 | 7.9970742502 | 7.9974843098 | 7.9976599558 | 7.9992059948 | 99.6163194444 | 33.2347937092 |
| **19** | -0.0053868571 | -0.0302163215 | | -0.0161292530 | 7.9974237049 | 7.9972966170 | 7.9976628586 | 7.9992181178 | 99.6132812500 | 33.2902454385 |
| **20** | -0.0213585892 | -0.0033889658 | | 0.0122531174 | 7.9977140173 | 7.9976789802 | 7.9976210975 | 7.9991780721 | 99.5911458333 | 33.0909500953 |
| **21** | -0.0212203107 | -0.0355541695 | | 0.0159529778 | 7.9979768531 | 7.9973087257 | 7.9975619405 | 7.9991831794 | 99.6037326389 | 33.3834780093 |
| **22** | 0.0034335497 | 0.0233147153 | | -0.0535996066 | 7.9976886179 | 7.9975553165 | 7.9978076704 | 7.9992016399 | 99.6019965278 | 33.1752859477 |
| **23** | 0.0043270678 | -0.0336613556 | | 0.0122111540 | 7.9968746468 | 7.9974922547 | 7.9973292338 | 7.9991258822 | 99.6254340278 | 33.2388956972 |
| **24** | 0.0093795326 | 0.0051774685 | | -0.0155176610 | 7.9973962537 | 7.9978115577 | 7.9974995682 | 7.9992309941 | 99.5985243056 | 33.2650973584 |
| **25** | 0.0161128101 | 0.0126877619 | | -0.0258602323 | 7.9976834880 | 7.9973256642 | 7.9971027350 | 7.9990011269 | 99.5980902778 | 33.2060780910 |
| **26** | -0.0017219671 | -0.0243434457 | | -0.0031199250 | 7.9976839363 | 7.9976232373 | 7.9975939988 | 7.9992286516 | 99.6093750000 | 33.2228315632 |
| **27** | 0.0090997479 | -0.0226427117 | | -0.0184823221 | 7.9979098816 | 7.9975880385 | 7.9973584736 | 7.9992532402 | 99.6011284722 | 33.2243174700 |
| **28** | 0.0024728791 | -0.0255537713 | | 0.0122785708 | 7.9971794399 | 7.9977209948 | 7.9973817292 | 7.9990556758 | 99.6380208333 | 33.2339818219 |
| **29** | -0.0381536635 | 0.0011158124 | | -0.0247641836 | 7.9978285201 | 7.9978254324 | 7.9975472263 | 7.9993092524 | 99.6197916667 | 33.2792721950 |
| **30** | 0.0159769548 | 0.0041350888 | | 0.0508109789 | 7.9971780160 | 7.9977115281 | 7.9975223166 | 7.9992267208 | 99.5937500000 | 33.1517088780 |
| **31** | -0.0034797073 | 0.0025916273 | | -0.0055885814 | 7.9976446875 | 7.9974421499 | 7.9978976285 | 7.9991487006 | 99.5950520833 | 33.2117749183 |
| **32** | 0.0210392337 | -0.0104275859 | | -0.0006276890 | 7.9978254671 | 7.9972243751 | 7.9975880780 | 7.9990960443 | 99.6232638889 | 33.2323818764 |
| **33** | -0.0013555417 | -0.0057484478 | | 0.0131359003 | 7.9972440137 | 7.9975432464 | 7.9978128788 | 7.9992554839 | 99.6154513889 | 33.1249285131 |
| **34** | -0.0024827668 | -0.0518013171 | | -0.0576969246 | 7.9977230745 | 7.9977938500 | 7.9976431038 | 7.9992907421 | 99.6293402778 | 33.2942027505 |
| **35** | -0.0136991715 | 0.0028613217 | | -0.0023576332 | 7.9975418614 | 7.9976613748 | 7.9975089510 | 7.9991285858 | 99.6102430556 | 33.1926896106 |
| **36** | -0.0111464414 | 0.0048314299 | | -0.0253190724 | 7.9977590063 | 7.9977640651 | 7.9979822357 | 7.9992899481 | 99.6163194444 | 33.2183346950 |
| **37** | 0.0303055873 | 0.0103320516 | | -0.0029364588 | 7.9978257727 | 7.9979831153 | 7.9976551388 | 7.9993819640 | 99.6163194444 | 33.1802168437 |
| **38** | -0.0201286310 | -0.0279682046 | | -0.0486685588 | 7.9974437847 | 7.9977725334 | 7.9976362946 | 7.9992550085 | 99.5937500000 | 33.2216605392 |
| **39** | -0.0145735407 | -0.0360198265 | | 0.0363764699 | 7.9969614867 | 7.9975563769 | 7.9973707222 | 7.9991607450 | 99.6193576389 | 33.2242749183 |
| **40** | -0.0109164460 | -0.0264065055 | | 0.0221408405 | 7.9973752652 | 7.9978119656 | 7.9977838983 | 7.9992305586 | 99.6141493056 | 33.2686785131 |
| **41** | -0.0152000903 | 0.0097766391 | | 0.0010239321 | 7.9975255074 | 7.9978531824 | 7.9977823727 | 7.9993186456 | 99.6163194444 | 33.2782322304 |
| **42** | -0.0007256430 | -0.0231011239 | | 0.0066422743 | 7.9975791642 | 7.9973219067 | 7.9972651157 | 7.9992316539 | 99.6054687500 | 33.2256076389 |
| **43** | 0.0121243037 | -0.0075177891 | | 0.0242039736 | 7.9974323091 | 7.9975348361 | 7.9973763395 | 7.9990731873 | 99.6028645833 | 33.2176845044 |
| **44** | -0.0076282175 | 0.0121808916 | | -0.0027268576 | 7.9977322155 | 7.9972719781 | 7.9974746501 | 7.9991803827 | 99.6115451389 | 33.1908564815 |
| **45** | 0.0103966460 | 0.0204142851 | | -0.0233345758 | 7.9973077468 | 7.9973492105 | 7.9976880127 | 7.9991656485 | 99.6124131944 | 33.1852583742 |
| **46** | 0.0119928922 | -0.0038337300 | | -0.0283348916 | 7.9976374259 | 7.9973326233 | 7.9975554925 | 7.9991794847 | 99.5898437500 | 33.1511727260 |
| **47** | -0.0162520278 | 0.0192016486 | | -0.0645737551 | 7.9973857664 | 7.9978048923 | 7.9974551719 | 7.9992498946 | 99.6006944444 | 33.2229251770 |
| **48** | -0.0041415443 | -0.0151315814 | | 0.0277472015 | 7.9975527654 | 7.9978009182 | 7.9975134014 | 7.9992407556 | 99.6124131944 | 33.2635127315 |
| **49** | 0.0216332246 | 0.0264593564 | | 0.0117654968 | 7.9975416258 | 7.9978246781 | 7.9977566503 | 7.9991612761 | 99.5881076389 | 33.3088609749 |
| **50** | 0.0284759131 | -0.0057034803 | | -0.0654672629 | 7.9978403227 | 7.9975794991 | 7.9976293416 | 7.9993046944 | 99.5902777778 | 33.2681866149 |
| **Total** | -0.0166227516 | -0.2632950265 | | -0.1162773743 | 399.8778121431 | 399.8787846091 | 399.8800150361 | 399.9601235681 | 4980.3098958333 | 1661.0058210784 |
| **Average** | -0.0003324550 | -0.0052658519 | | -0.0023255433 | 7.9975562429 | 7.9975756922 | 7.9976003007 | 7.9992024714 | 99.6061979167 | 33.2201164216 |

# DECRYPTION METRICS

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_ApplyEyeMakeup\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0537784057 | | 12.6939207710 |
| **2** | 0.0520930178 | | 12.8322048237 |
| **3** | 0.0538378248 | | 12.6891249519 |
| **4** | 0.0539097750 | | 12.6833248114 |
| **5** | 0.0544693593 | | 12.6384773279 |
| **6** | 0.0537793413 | | 12.6938452157 |
| **7** | 0.0546775611 | | 12.6219086532 |
| **8** | 0.0542691227 | | 12.6544719943 |
| **9** | 0.0537140339 | | 12.6991223136 |
| **10** | 0.0540953774 | | 12.6683984461 |
| **11** | 0.0530707561 | | 12.7514472488 |
| **12** | 0.0535155791 | | 12.7151977029 |
| **13** | 0.0552044447 | | 12.5802595454 |
| **14** | 0.0538018748 | | 12.6920259038 |
| **15** | 0.0533829850 | | 12.7259714575 |
| **16** | 0.0528861702 | | 12.7665788126 |
| **17** | 0.0526580313 | | 12.7853538169 |
| **18** | 0.0531563751 | | 12.7444464274 |
| **19** | 0.0528240222 | | 12.7716853313 |
| **20** | 0.0522807461 | | 12.8165822305 |
| **21** | 0.0522531896 | | 12.8188719443 |
| **22** | 0.0519201040 | | 12.8466444589 |
| **23** | 0.0526321972 | | 12.7874849981 |
| **24** | 0.0519914564 | | 12.8406801672 |
| **25** | 0.0562629389 | | 12.4977758642 |
| **26** | 0.0521391658 | | 12.8283592139 |
| **27** | 0.0522753169 | | 12.8170332615 |
| **28** | 0.0528556602 | | 12.7690849806 |
| **29** | 0.0525235201 | | 12.7964617513 |
| **30** | 0.0518264933 | | 12.8544817512 |
| **31** | 0.0525332610 | | 12.7956563972 |
| **32** | 0.0540688453 | | 12.6705290504 |
| **33** | 0.0545148599 | | 12.6348509993 |
| **34** | 0.0538465909 | | 12.6884178763 |
| **35** | 0.0532649348 | | 12.7355860057 |
| **36** | 0.0546170940 | | 12.6267141110 |
| **37** | 0.0589817707 | | 12.2928219357 |
| **38** | 0.0550638918 | | 12.5913309716 |
| **39** | 0.0547114639 | | 12.6192166498 |
| **40** | 0.0549131958 | | 12.6032328042 |
| **41** | 0.0539471766 | | 12.6803127952 |
| **42** | 0.0567781502 | | 12.4581876092 |
| **43** | 0.0576616003 | | 12.3911330863 |
| **44** | 0.0559835091 | | 12.5193988317 |
| **45** | 0.0560442735 | | 12.5146875618 |
| **46** | 0.0577855670 | | 12.3818062114 |
| **47** | 0.0567253122 | | 12.4622310536 |
| **48** | 0.0564725610 | | 12.4816251653 |
| **49** | 0.0602025271 | | 12.2038527785 |
| **50** | 0.0570728776 | | 12.4357022974 |
| **Total** | 2.7132743087 | | 632.8685203688 |
| **Average** | 0.0542654862 | | 12.6573704074 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_ApplyLipstick\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0993884396 | | 10.0266412773 |
| **2** | 0.0979227445 | | 10.0911642316 |
| **3** | 0.1039472279 | | 9.8318708811 |
| **4** | 0.1042557569 | | 9.8189995424 |
| **5** | 0.1069972351 | | 9.7062744469 |
| **6** | 0.1075631555 | | 9.6833646557 |
| **7** | 0.1131021768 | | 9.4652903650 |
| **8** | 0.1109987347 | | 9.5468197196 |
| **9** | 0.1106579179 | | 9.5601750560 |
| **10** | 0.1099381499 | | 9.5885157576 |
| **11** | 0.1088688194 | | 9.6309648684 |
| **12** | 0.1079519213 | | 9.6676962392 |
| **13** | 0.1193064861 | | 9.2333594530 |
| **14** | 0.1162473522 | | 9.3461693020 |
| **15** | 0.1152225465 | | 9.3846253085 |
| **16** | 0.1153430894 | | 9.3800842045 |
| **17** | 0.1156011770 | | 9.3703774423 |
| **18** | 0.1147167842 | | 9.4037303584 |
| **19** | 0.1139987125 | | 9.4310005355 |
| **20** | 0.1134368239 | | 9.4524594169 |
| **21** | 0.1169335162 | | 9.3206099102 |
| **22** | 0.1137170115 | | 9.4417456221 |
| **23** | 0.1140696794 | | 9.4282977908 |
| **24** | 0.1147360069 | | 9.4030026891 |
| **25** | 0.1212735400 | | 9.1623394501 |
| **26** | 0.1154245025 | | 9.3770198855 |
| **27** | 0.1168938144 | | 9.3220846949 |
| **28** | 0.1154774087 | | 9.3750297009 |
| **29** | 0.1153414767 | | 9.3801449267 |
| **30** | 0.1141436287 | | 9.4254832525 |
| **31** | 0.1144486843 | | 9.4138919548 |
| **32** | 0.1146914665 | | 9.4046889417 |
| **33** | 0.1149449200 | | 9.3951021756 |
| **34** | 0.1131652596 | | 9.4628687614 |
| **35** | 0.1150757645 | | 9.3901613135 |
| **36** | 0.1158528746 | | 9.3609318595 |
| **37** | 0.1180861630 | | 9.2780098864 |
| **38** | 0.1149328081 | | 9.3955598227 |
| **39** | 0.1142365980 | | 9.4219473866 |
| **40** | 0.1145390184 | | 9.4104654294 |
| **41** | 0.1162195104 | | 9.3472095849 |
| **42** | 0.1150041410 | | 9.3928652167 |
| **43** | 0.1148517575 | | 9.3986235481 |
| **44** | 0.1136981993 | | 9.4424641325 |
| **45** | 0.1152604616 | | 9.3831964552 |
| **46** | 0.1159119083 | | 9.3587194424 |
| **47** | 0.1166321516 | | 9.3318171269 |
| **48** | 0.1150900016 | | 9.3896240374 |
| **49** | 0.1211932059 | | 9.1652172593 |
| **50** | 0.1138020391 | | 9.4384995628 |
| **Total** | 5.6711127695 | | 472.8372048823 |
| **Average** | 0.1134222554 | | 9.4567440976 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_Archery\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0002240701 | | 36.4961602234 |
| **2** | 0.0002343590 | | 36.3011827618 |
| **3** | 0.0002108955 | | 36.7593265480 |
| **4** | 0.0002372131 | | 36.2486142049 |
| **5** | 0.0002332295 | | 36.3221644343 |
| **6** | 0.0002449694 | | 36.1088813290 |
| **7** | 0.0002278326 | | 36.4238417611 |
| **8** | 0.0002426838 | | 36.1495926684 |
| **9** | 0.0002499402 | | 36.0216389752 |
| **10** | 0.0002509949 | | 36.0033514369 |
| **11** | 0.0002295101 | | 36.3919822758 |
| **12** | 0.0002791657 | | 35.5413799659 |
| **13** | 0.0002949804 | | 35.3020689459 |
| **14** | 0.0003092147 | | 35.0973990773 |
| **15** | 0.0002722513 | | 35.6503010556 |
| **16** | 0.0002931913 | | 35.3284898915 |
| **17** | 0.0002822569 | | 35.4935544637 |
| **18** | 0.0003280801 | | 34.8402005117 |
| **19** | 0.0003154808 | | 35.0102712446 |
| **20** | 0.0003282066 | | 34.8385273503 |
| **21** | 0.0002639906 | | 35.7841151622 |
| **22** | 0.0002838955 | | 35.4684151651 |
| **23** | 0.0003369250 | | 34.7246680495 |
| **24** | 0.0003332790 | | 34.7719204971 |
| **25** | 0.0003739677 | | 34.2716585467 |
| **26** | 0.0003621746 | | 34.4108200568 |
| **27** | 0.0003846451 | | 34.1493983889 |
| **28** | 0.0003724442 | | 34.2893883260 |
| **29** | 0.0003209190 | | 34.9360451894 |
| **30** | 0.0003823014 | | 34.1759409812 |
| **31** | 0.0003281553 | | 34.8392057246 |
| **32** | 0.0003252247 | | 34.8781642490 |
| **33** | 0.0002988762 | | 35.2450871548 |
| **34** | 0.0003049168 | | 35.1581867684 |
| **35** | 0.0002809202 | | 35.5141703267 |
| **36** | 0.0003123131 | | 35.0540979043 |
| **37** | 0.0002650549 | | 35.7666415159 |
| **38** | 0.0002743685 | | 35.6166575302 |
| **39** | 0.0002624970 | | 35.8087566169 |
| **40** | 0.0002419383 | | 36.1629532082 |
| **41** | 0.0002234936 | | 36.5073497072 |
| **42** | 0.0002500758 | | 36.0192828885 |
| **43** | 0.0002404299 | | 36.1901153127 |
| **44** | 0.0002607353 | | 35.8380013263 |
| **45** | 0.0002368366 | | 36.2555119452 |
| **46** | 0.0002638986 | | 35.7856285766 |
| **47** | 0.0002586561 | | 35.8727734365 |
| **48** | 0.0002691331 | | 35.7003283364 |
| **49** | 0.0002593659 | | 35.8608708581 |
| **50** | 0.0003013650 | | 35.2090719714 |
| **Total** | 0.0141613228 | | 1776.5941548460 |
| **Average** | 0.0002832265 | | 35.5318830969 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_BabyCrawling\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.1347567697 | | 8.7044940819 |
| **2** | 0.1345855516 | | 8.7100156131 |
| **3** | 0.1337433488 | | 8.7372780655 |
| **4** | 0.1364392543 | | 8.6506066297 |
| **5** | 0.1360853902 | | 8.6618849699 |
| **6** | 0.1368078393 | | 8.6388901606 |
| **7** | 0.1343232214 | | 8.7184890139 |
| **8** | 0.1340845447 | | 8.7262127823 |
| **9** | 0.1318756456 | | 8.7983540130 |
| **10** | 0.1319553804 | | 8.7957289696 |
| **11** | 0.1302538351 | | 8.8520948091 |
| **12** | 0.1287471971 | | 8.9026221716 |
| **13** | 0.1323234300 | | 8.7836325029 |
| **14** | 0.1290284437 | | 8.8931454095 |
| **15** | 0.1283534282 | | 8.9159252734 |
| **16** | 0.1266031362 | | 8.9755553584 |
| **17** | 0.1268205173 | | 8.9681047972 |
| **18** | 0.1284775370 | | 8.9117279786 |
| **19** | 0.1251119326 | | 9.0270126717 |
| **20** | 0.1262021132 | | 8.9893337283 |
| **21** | 0.1260964674 | | 8.9929708014 |
| **22** | 0.1256596961 | | 9.0080399485 |
| **23** | 0.1259488445 | | 8.9980581242 |
| **24** | 0.1260943838 | | 8.9930425642 |
| **25** | 0.1332410804 | | 8.7536185438 |
| **26** | 0.1259851805 | | 8.9968053742 |
| **27** | 0.1270600096 | | 8.9599111628 |
| **28** | 0.1262217052 | | 8.9886595702 |
| **29** | 0.1270135166 | | 8.9615005968 |
| **30** | 0.1264364972 | | 8.9812754421 |
| **31** | 0.1263435490 | | 8.9844692783 |
| **32** | 0.1265096063 | | 8.9787649586 |
| **33** | 0.1254510897 | | 9.0152556209 |
| **34** | 0.1267494826 | | 8.9705380491 |
| **35** | 0.1268095085 | | 8.9684818074 |
| **36** | 0.1255390041 | | 9.0122132094 |
| **37** | 0.1312684930 | | 8.8183950071 |
| **38** | 0.1255619647 | | 9.0114189746 |
| **39** | 0.1256298881 | | 9.0090702714 |
| **40** | 0.1270017184 | | 8.9619040292 |
| **41** | 0.1273414993 | | 8.9503004102 |
| **42** | 0.1279963330 | | 8.9280247236 |
| **43** | 0.1273729403 | | 8.9492282576 |
| **44** | 0.1274360225 | | 8.9470779218 |
| **45** | 0.1269408208 | | 8.9639869773 |
| **46** | 0.1263235895 | | 8.9851554235 |
| **47** | 0.1257148392 | | 9.0061345563 |
| **48** | 0.1266647849 | | 8.9734411001 |
| **49** | 0.1352299054 | | 8.6892725589 |
| **50** | 0.1280382498 | | 8.9266027109 |
| **Total** | 6.4422591866 | | 445.0447269749 |
| **Average** | 0.1288451837 | | 8.9008945395 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_BalanceBeam\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.1113659378 | | 9.5324762125 |
| **2** | 0.1110478601 | | 9.5448980580 |
| **3** | 0.1102903635 | | 9.5746243198 |
| **4** | 0.1119872172 | | 9.5083154716 |
| **5** | 0.1121944999 | | 9.5002843289 |
| **6** | 0.1103404572 | | 9.5726522087 |
| **7** | 0.1117666752 | | 9.5168766809 |
| **8** | 0.1103832759 | | 9.5709672145 |
| **9** | 0.1102102595 | | 9.5777797512 |
| **10** | 0.1087542428 | | 9.6355379119 |
| **11** | 0.1084330648 | | 9.6483826693 |
| **12** | 0.1076094179 | | 9.6814971805 |
| **13** | 0.1091393781 | | 9.6201852532 |
| **14** | 0.1070275966 | | 9.7050422711 |
| **15** | 0.1080031120 | | 9.6656373064 |
| **16** | 0.1061482770 | | 9.7408705103 |
| **17** | 0.1056466465 | | 9.7614428394 |
| **18** | 0.1061462153 | | 9.7409548637 |
| **19** | 0.1061076430 | | 9.7425333236 |
| **20** | 0.1053696446 | | 9.7728448469 |
| **21** | 0.1051330316 | | 9.7826081230 |
| **22** | 0.1052752847 | | 9.7767357551 |
| **23** | 0.1033152146 | | 9.8583571773 |
| **24** | 0.1046231376 | | 9.8037225981 |
| **25** | 0.1082248283 | | 9.6567309470 |
| **26** | 0.1052262878 | | 9.7787575062 |
| **27** | 0.1042298657 | | 9.8200782175 |
| **28** | 0.1048514091 | | 9.7942572861 |
| **29** | 0.1048383825 | | 9.7947968803 |
| **30** | 0.1042298791 | | 9.8200776613 |
| **31** | 0.1046168213 | | 9.8039847999 |
| **32** | 0.1055237776 | | 9.7664966987 |
| **33** | 0.1046986302 | | 9.8005900027 |
| **34** | 0.1035008968 | | 9.8505588708 |
| **35** | 0.1048010452 | | 9.7963438601 |
| **36** | 0.1039460044 | | 9.8319219991 |
| **37** | 0.1086037343 | | 9.6415524154 |
| **38** | 0.1055814623 | | 9.7641232723 |
| **39** | 0.1051243497 | | 9.7829667756 |
| **40** | 0.1068121020 | | 9.7137953826 |
| **41** | 0.1043355263 | | 9.8156778904 |
| **42** | 0.1040455803 | | 9.8277636327 |
| **43** | 0.1038731535 | | 9.8349668342 |
| **44** | 0.1042056608 | | 9.8210868827 |
| **45** | 0.1048518157 | | 9.7942404464 |
| **46** | 0.1050601686 | | 9.7856190672 |
| **47** | 0.1042851084 | | 9.8177770327 |
| **48** | 0.1046570946 | | 9.8023132610 |
| **49** | 0.1077361996 | | 9.6763834820 |
| **50** | 0.1051769801 | | 9.7807930315 |
| **Total** | 5.3293552172 | | 486.2088810123 |
| **Average** | 0.1065871043 | | 9.7241776202 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_BandMarching\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0014601881 | | 28.3559120850 |
| **2** | 0.0011073985 | | 29.5569608352 |
| **3** | 0.0010473103 | | 29.7992461311 |
| **4** | 0.0010846056 | | 29.6472815205 |
| **5** | 0.0010904960 | | 29.6237593248 |
| **6** | 0.0009660289 | | 30.1500988490 |
| **7** | 0.0010589839 | | 29.7511063250 |
| **8** | 0.0011187123 | | 29.5128159178 |
| **9** | 0.0009975817 | | 30.0105151497 |
| **10** | 0.0008961276 | | 30.4763016702 |
| **11** | 0.0009503558 | | 30.2211375551 |
| **12** | 0.0008690309 | | 30.6096479369 |
| **13** | 0.0010004909 | | 29.9978684400 |
| **14** | 0.0008598726 | | 30.6556588714 |
| **15** | 0.0009546498 | | 30.2015591979 |
| **16** | 0.0009915286 | | 30.0369476949 |
| **17** | 0.0009749796 | | 30.1100445250 |
| **18** | 0.0010537556 | | 29.7726011807 |
| **19** | 0.0010474855 | | 29.7985199020 |
| **20** | 0.0010575045 | | 29.7571776542 |
| **21** | 0.0011806960 | | 29.2786191065 |
| **22** | 0.0011495837 | | 29.3945940506 |
| **23** | 0.0012238788 | | 29.1226157498 |
| **24** | 0.0011794430 | | 29.2832304182 |
| **25** | 0.0012856712 | | 28.9087007002 |
| **26** | 0.0011922627 | | 29.2362803372 |
| **27** | 0.0011537676 | | 29.3788166804 |
| **28** | 0.0010863873 | | 29.6401531454 |
| **29** | 0.0009335663 | | 30.2985484168 |
| **30** | 0.0008283621 | | 30.8177978571 |
| **31** | 0.0010714217 | | 29.7003955564 |
| **32** | 0.0008924074 | | 30.4943685301 |
| **33** | 0.0009302451 | | 30.3140260360 |
| **34** | 0.0010377847 | | 29.8389271702 |
| **35** | 0.0008843285 | | 30.5338638980 |
| **36** | 0.0009707294 | | 30.1290181380 |
| **37** | 0.0010980854 | | 29.5936388069 |
| **38** | 0.0009877633 | | 30.0534713440 |
| **39** | 0.0010428586 | | 29.8177458027 |
| **40** | 0.0012357750 | | 29.0806060579 |
| **41** | 0.0012088693 | | 29.1762066882 |
| **42** | 0.0010070746 | | 29.9693835631 |
| **43** | 0.0011459575 | | 29.4083149465 |
| **44** | 0.0011510079 | | 29.3892169848 |
| **45** | 0.0011217390 | | 29.5010819297 |
| **46** | 0.0012224727 | | 29.1276082113 |
| **47** | 0.0012780944 | | 28.9343705800 |
| **48** | 0.0011906352 | | 29.2422127756 |
| **49** | 0.0011001631 | | 29.5854293942 |
| **50** | 0.0011276840 | | 29.4781258258 |
| **Total** | 0.0535058021 | | 1486.7725294681 |
| **Average** | 0.0010701160 | | 29.7354505894 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_BaseballPitch\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0002089501 | | 36.7995745138 |
| **2** | 0.0002042711 | | 36.8979315688 |
| **3** | 0.0001955569 | | 37.0872693623 |
| **4** | 0.0002329326 | | 36.3276976418 |
| **5** | 0.0002459662 | | 36.0912463630 |
| **6** | 0.0002532968 | | 35.9637028150 |
| **7** | 0.0001945928 | | 37.1087317730 |
| **8** | 0.0002366497 | | 36.2589404291 |
| **9** | 0.0002514881 | | 35.9948260137 |
| **10** | 0.0002370013 | | 36.2524934472 |
| **11** | 0.0002511688 | | 36.0003438793 |
| **12** | 0.0002451957 | | 36.1048716573 |
| **13** | 0.0002530863 | | 35.9673138690 |
| **14** | 0.0002228348 | | 36.5201691873 |
| **15** | 0.0002625667 | | 35.8076038540 |
| **16** | 0.0002827575 | | 35.4858586714 |
| **17** | 0.0002698469 | | 35.6888251223 |
| **18** | 0.0003094648 | | 35.0938877647 |
| **19** | 0.0002245316 | | 36.4872259905 |
| **20** | 0.0002490209 | | 36.0376424337 |
| **21** | 0.0002252712 | | 36.4729433436 |
| **22** | 0.0002811822 | | 35.5101219982 |
| **23** | 0.0002969264 | | 35.2735119326 |
| **24** | 0.0002979328 | | 35.2588175050 |
| **25** | 0.0002920397 | | 35.3455807618 |
| **26** | 0.0002264458 | | 36.4503581045 |
| **27** | 0.0002329207 | | 36.3279191666 |
| **28** | 0.0002684629 | | 35.7111569434 |
| **29** | 0.0002609525 | | 35.8343861882 |
| **30** | 0.0002546962 | | 35.9397757339 |
| **31** | 0.0002294598 | | 36.3929334548 |
| **32** | 0.0002324435 | | 36.3368256023 |
| **33** | 0.0002334680 | | 36.3177270456 |
| **34** | 0.0002613256 | | 35.8281797958 |
| **35** | 0.0002640026 | | 35.7839175127 |
| **36** | 0.0002601916 | | 35.8470673999 |
| **37** | 0.0002506715 | | 36.0089506930 |
| **38** | 0.0002764976 | | 35.5830860087 |
| **39** | 0.0002806283 | | 35.5186851806 |
| **40** | 0.0003105547 | | 35.0786189201 |
| **41** | 0.0002935967 | | 35.3224885940 |
| **42** | 0.0002938709 | | 35.3184334741 |
| **43** | 0.0002353591 | | 36.2826907307 |
| **44** | 0.0002593386 | | 35.8613291217 |
| **45** | 0.0002774246 | | 35.5685500799 |
| **46** | 0.0003232039 | | 34.9052343077 |
| **47** | 0.0002709975 | | 35.6703476963 |
| **48** | 0.0002684968 | | 35.7106095271 |
| **49** | 0.0002513229 | | 35.9976798034 |
| **50** | 0.0002552840 | | 35.9297636071 |
| **Total** | 0.0127961477 | | 1797.3638465904 |
| **Average** | 0.0002559230 | | 35.9472769318 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_Basketball\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0086244771 | | 20.6426722675 |
| **2** | 0.0083714102 | | 20.7720137527 |
| **3** | 0.0084995582 | | 20.7060364817 |
| **4** | 0.0084308858 | | 20.7412679558 |
| **5** | 0.0081600528 | | 20.8830702982 |
| **6** | 0.0081894646 | | 20.8674449063 |
| **7** | 0.0080502189 | | 20.9419231205 |
| **8** | 0.0084018442 | | 20.7562537388 |
| **9** | 0.0081922561 | | 20.8659647869 |
| **10** | 0.0081526488 | | 20.8870126826 |
| **11** | 0.0083370678 | | 20.7898666625 |
| **12** | 0.0079490950 | | 20.9968231091 |
| **13** | 0.0080654408 | | 20.9337189345 |
| **14** | 0.0071756404 | | 21.4413933494 |
| **15** | 0.0073137986 | | 21.3585700028 |
| **16** | 0.0073524279 | | 21.3356922646 |
| **17** | 0.0075101892 | | 21.2434912249 |
| **18** | 0.0074724767 | | 21.2653543250 |
| **19** | 0.0074456380 | | 21.2809808090 |
| **20** | 0.0072108583 | | 21.4201303641 |
| **21** | 0.0067352390 | | 21.7164698976 |
| **22** | 0.0070016232 | | 21.5480126246 |
| **23** | 0.0066750437 | | 21.7554588544 |
| **24** | 0.0068188778 | | 21.6628709100 |
| **25** | 0.0071118322 | | 21.4801849961 |
| **26** | 0.0072692253 | | 21.3851186988 |
| **27** | 0.0069743309 | | 21.5649744996 |
| **28** | 0.0068702135 | | 21.6302976570 |
| **29** | 0.0072531476 | | 21.3947348300 |
| **30** | 0.0070702433 | | 21.5056563805 |
| **31** | 0.0071141236 | | 21.4787859527 |
| **32** | 0.0072186161 | | 21.4154605396 |
| **33** | 0.0071713389 | | 21.4439975444 |
| **34** | 0.0074999128 | | 21.2494378832 |
| **35** | 0.0069658358 | | 21.5702676767 |
| **36** | 0.0075902505 | | 21.1974388835 |
| **37** | 0.0070045715 | | 21.5461842772 |
| **38** | 0.0069659702 | | 21.5701838653 |
| **39** | 0.0069972699 | | 21.5507137531 |
| **40** | 0.0070271604 | | 21.5322013572 |
| **41** | 0.0073287747 | | 21.3496862773 |
| **42** | 0.0071755458 | | 21.4414505939 |
| **43** | 0.0064286063 | | 21.9188317369 |
| **44** | 0.0068789280 | | 21.6247923767 |
| **45** | 0.0067203945 | | 21.7260523446 |
| **46** | 0.0067291759 | | 21.7203812056 |
| **47** | 0.0067176239 | | 21.7278431486 |
| **48** | 0.0068708754 | | 21.6298792809 |
| **49** | 0.0072231986 | | 21.4127044359 |
| **50** | 0.0070742171 | | 21.5032161539 |
| **Total** | 0.3693876158 | | 1066.3829696724 |
| **Average** | 0.0073877523 | | 21.3276593934 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_BasketballDunk\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0035863828 | | 24.4534336003 |
| **2** | 0.0031734654 | | 24.9846623232 |
| **3** | 0.0032014468 | | 24.9465371619 |
| **4** | 0.0032033773 | | 24.9439190535 |
| **5** | 0.0033221943 | | 24.7857496841 |
| **6** | 0.0033121438 | | 24.7989081175 |
| **7** | 0.0031953568 | | 24.9548063780 |
| **8** | 0.0030688432 | | 25.1302529431 |
| **9** | 0.0030915129 | | 25.0982893045 |
| **10** | 0.0028183916 | | 25.4999866973 |
| **11** | 0.0030442920 | | 25.1651369467 |
| **12** | 0.0030127147 | | 25.2104198947 |
| **13** | 0.0031998245 | | 24.9487384702 |
| **14** | 0.0031558121 | | 25.0088886747 |
| **15** | 0.0031839235 | | 24.9703738228 |
| **16** | 0.0034091791 | | 24.6735018329 |
| **17** | 0.0031982170 | | 24.9509206824 |
| **18** | 0.0032319629 | | 24.9053362866 |
| **19** | 0.0033463670 | | 24.7542642482 |
| **20** | 0.0032071680 | | 24.9387829229 |
| **21** | 0.0033657566 | | 24.7291729047 |
| **22** | 0.0035454416 | | 24.5032966505 |
| **23** | 0.0033985884 | | 24.6870142710 |
| **24** | 0.0034149348 | | 24.6661758023 |
| **25** | 0.0034321295 | | 24.6443633772 |
| **26** | 0.0033655781 | | 24.7294033002 |
| **27** | 0.0036163325 | | 24.4173165037 |
| **28** | 0.0035773211 | | 24.4644207719 |
| **29** | 0.0035218266 | | 24.5323202972 |
| **30** | 0.0035644558 | | 24.4800676078 |
| **31** | 0.0037438418 | | 24.2668250590 |
| **32** | 0.0032128475 | | 24.9310988950 |
| **33** | 0.0034541719 | | 24.6165604817 |
| **34** | 0.0033223129 | | 24.7855947198 |
| **35** | 0.0031405589 | | 25.0299306367 |
| **36** | 0.0032480171 | | 24.8838169894 |
| **37** | 0.0032636677 | | 24.8629406843 |
| **38** | 0.0029102905 | | 25.3606365637 |
| **39** | 0.0029864900 | | 25.2483893921 |
| **40** | 0.0029885152 | | 25.2454453563 |
| **41** | 0.0028636073 | | 25.4308654220 |
| **42** | 0.0029290925 | | 25.3326691174 |
| **43** | 0.0025002620 | | 26.0201448221 |
| **44** | 0.0034085187 | | 24.6743432002 |
| **45** | 0.0030086866 | | 25.2162305357 |
| **46** | 0.0027571952 | | 25.5953248371 |
| **47** | 0.0038592813 | | 24.1349356646 |
| **48** | 0.0033413083 | | 24.7608345081 |
| **49** | 0.0034838166 | | 24.5794471735 |
| **50** | 0.0034254645 | | 24.6528052919 |
| **Total** | 0.1626128871 | | 1244.6052998827 |
| **Average** | 0.0032522577 | | 24.8921059977 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_BenchPress\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0032872910 | | 24.8316184762 |
| **2** | 0.0030897282 | | 25.1007972666 |
| **3** | 0.0026606575 | | 25.7501102870 |
| **4** | 0.0027314776 | | 25.6360235504 |
| **5** | 0.0028775953 | | 25.4097028615 |
| **6** | 0.0028709610 | | 25.4197271383 |
| **7** | 0.0025938884 | | 25.8604871834 |
| **8** | 0.0025450836 | | 25.9429794384 |
| **9** | 0.0034816185 | | 24.5821881679 |
| **10** | 0.0033629202 | | 24.7328343237 |
| **11** | 0.0034746908 | | 24.5908383262 |
| **12** | 0.0040663763 | | 23.9079243304 |
| **13** | 0.0047440655 | | 23.2384932186 |
| **14** | 0.0036103046 | | 24.4245615565 |
| **15** | 0.0042790246 | | 23.6865521399 |
| **16** | 0.0045138233 | | 23.4545544833 |
| **17** | 0.0045983574 | | 23.3739727666 |
| **18** | 0.0037059788 | | 24.3109706897 |
| **19** | 0.0032917717 | | 24.8257028914 |
| **20** | 0.0031534045 | | 25.0122032066 |
| **21** | 0.0031843393 | | 24.9698066459 |
| **22** | 0.0031692668 | | 24.9904119494 |
| **23** | 0.0030142667 | | 25.2081831731 |
| **24** | 0.0029578118 | | 25.2902945803 |
| **25** | 0.0031305931 | | 25.0437338076 |
| **26** | 0.0027060352 | | 25.6766655754 |
| **27** | 0.0027912899 | | 25.5419504935 |
| **28** | 0.0028828454 | | 25.4017864614 |
| **29** | 0.0028256655 | | 25.4887924432 |
| **30** | 0.0028372793 | | 25.4709791579 |
| **31** | 0.0030718791 | | 25.1259588485 |
| **32** | 0.0026765142 | | 25.7243044146 |
| **33** | 0.0025432449 | | 25.9461182585 |
| **34** | 0.0025956793 | | 25.8574895857 |
| **35** | 0.0025774200 | | 25.8881480423 |
| **36** | 0.0026769852 | | 25.7235402758 |
| **37** | 0.0026473962 | | 25.7718105330 |
| **38** | 0.0025466291 | | 25.9403430243 |
| **39** | 0.0024282343 | | 26.1470941660 |
| **40** | 0.0024107027 | | 26.1785634910 |
| **41** | 0.0021800832 | | 26.6152692226 |
| **42** | 0.0020979617 | | 26.7820244003 |
| **43** | 0.0026182477 | | 25.8198926556 |
| **44** | 0.0027442191 | | 25.6158121667 |
| **45** | 0.0030678371 | | 25.1316770627 |
| **46** | 0.0027701886 | | 25.5749065978 |
| **47** | 0.0035039087 | | 24.5544722030 |
| **48** | 0.0036355931 | | 24.3942472377 |
| **49** | 0.0046036765 | | 23.3689519829 |
| **50** | 0.0039935020 | | 23.9864609753 |
| **Total** | 0.1558283148 | | 1257.3219317347 |
| **Average** | 0.0031165663 | | 25.1464386347 |

# PROCESSING TIME

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_ApplyEyeMakeup\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 0.5494401455 | | 0.5332367420 |
| **2** | 0.5388383865 | | 0.5316572189 |
| **3** | 0.5379788876 | | 0.5304949284 |
| **4** | 0.5383455753 | | 0.5304684639 |
| **5** | 0.5376119614 | | 0.5303657055 |
| **6** | 0.5373976231 | | 0.5301733017 |
| **7** | 0.5370316505 | | 0.5308189392 |
| **8** | 0.5369586945 | | 0.5305967331 |
| **9** | 0.5383081436 | | 0.5303373337 |
| **10** | 0.5376453400 | | 0.5320475101 |
| **11** | 0.5371758938 | | 0.5306873322 |
| **12** | 0.5377511978 | | 0.5308942795 |
| **13** | 0.5369818211 | | 0.5320765972 |
| **14** | 0.5402770042 | | 0.5313739777 |
| **15** | 0.5437221527 | | 0.5298883915 |
| **16** | 0.5457284451 | | 0.5310590267 |
| **17** | 0.5405788422 | | 0.5302956104 |
| **18** | 0.5410025120 | | 0.5373206139 |
| **19** | 0.5377647877 | | 0.5608308315 |
| **20** | 0.5386271477 | | 0.5596115589 |
| **21** | 0.5434136391 | | 0.5603353977 |
| **22** | 0.5444869995 | | 0.5603120327 |
| **23** | 0.5439012051 | | 0.5452370644 |
| **24** | 0.5439529419 | | 0.5300748348 |
| **25** | 0.5449185371 | | 0.5311119556 |
| **26** | 0.5437223911 | | 0.5295519829 |
| **27** | 0.5443227291 | | 0.5305991173 |
| **28** | 0.5439541340 | | 0.5307323933 |
| **29** | 0.5445373058 | | 0.5303752422 |
| **30** | 0.5442152023 | | 0.5297133923 |
| **31** | 0.5436179638 | | 0.5306074619 |
| **32** | 0.5457851887 | | 0.5296034813 |
| **33** | 0.5450990200 | | 0.5302226543 |
| **34** | 0.5438208580 | | 0.5303421021 |
| **35** | 0.5438416004 | | 0.5314416885 |
| **36** | 0.5472912788 | | 0.5307092667 |
| **37** | 0.5429697037 | | 0.5307114124 |
| **38** | 0.5428891182 | | 0.5306189060 |
| **39** | 0.5432798862 | | 0.5309336185 |
| **40** | 0.5445411205 | | 0.5296947956 |
| **41** | 0.5426726341 | | 0.5304524899 |
| **42** | 0.5433971882 | | 0.5337016582 |
| **43** | 0.5428924561 | | 0.5288796425 |
| **44** | 0.5428256989 | | 0.5302805901 |
| **45** | 0.5430610180 | | 0.5297544003 |
| **46** | 0.5427150726 | | 0.5306708813 |
| **47** | 0.5427963734 | | 0.5300097466 |
| **48** | 0.5437002182 | | 0.5303359032 |
| **49** | 0.5420503616 | | 0.5298485756 |
| **50** | 0.5430061817 | | 0.5296304226 |
| **Total** | 27.1028442383 | | 26.6707282066 |
| **Average** | 0.5420568848 | | 0.5334145641 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_ApplyLipstick\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 0.5624759197 | | 0.5323505402 |
| **2** | 0.5379030704 | | 0.5303556919 |
| **3** | 0.5383324623 | | 0.5297052860 |
| **4** | 0.5383014679 | | 0.5297660828 |
| **5** | 0.5374107361 | | 0.5305831432 |
| **6** | 0.5378983021 | | 0.5349206924 |
| **7** | 0.5372822285 | | 0.5313928127 |
| **8** | 0.5379254818 | | 0.5302333832 |
| **9** | 0.5387163162 | | 0.5292789936 |
| **10** | 0.5373525620 | | 0.5294675827 |
| **11** | 0.5372359753 | | 0.5300257206 |
| **12** | 0.5379021168 | | 0.5288627148 |
| **13** | 0.5394999981 | | 0.5284726620 |
| **14** | 0.5399413109 | | 0.5291528702 |
| **15** | 0.5407350063 | | 0.5301580429 |
| **16** | 0.5464310646 | | 0.5302956104 |
| **17** | 0.5403602123 | | 0.5299611092 |
| **18** | 0.5405664444 | | 0.5315001011 |
| **19** | 0.5371308327 | | 0.5299396515 |
| **20** | 0.5385184288 | | 0.5298650265 |
| **21** | 0.5441493988 | | 0.5299477577 |
| **22** | 0.5450294018 | | 0.5297715664 |
| **23** | 0.5438539982 | | 0.5294537544 |
| **24** | 0.5444345474 | | 0.5287735462 |
| **25** | 0.5451099873 | | 0.5287947655 |
| **26** | 0.5438015461 | | 0.5293562412 |
| **27** | 0.5443308353 | | 0.5301289558 |
| **28** | 0.5454506874 | | 0.5288476944 |
| **29** | 0.5440270901 | | 0.5295433998 |
| **30** | 0.5437984467 | | 0.5293745995 |
| **31** | 0.5478513241 | | 0.5288178921 |
| **32** | 0.5444405079 | | 0.5295999050 |
| **33** | 0.5429286957 | | 0.5294508934 |
| **34** | 0.5444676876 | | 0.5290715694 |
| **35** | 0.5451784134 | | 0.5299406052 |
| **36** | 0.5435783863 | | 0.5300242901 |
| **37** | 0.5454142094 | | 0.5318968296 |
| **38** | 0.5444214344 | | 0.5306639671 |
| **39** | 0.5451893806 | | 0.5309057236 |
| **40** | 0.5436031818 | | 0.5285418034 |
| **41** | 0.5440599918 | | 0.5295500755 |
| **42** | 0.5444395542 | | 0.5288443565 |
| **43** | 0.5452618599 | | 0.5293912888 |
| **44** | 0.5445895195 | | 0.5286374092 |
| **45** | 0.5441761017 | | 0.5298635960 |
| **46** | 0.5440566540 | | 0.5286240578 |
| **47** | 0.5605995655 | | 0.5296308994 |
| **48** | 0.5442523956 | | 0.5291643143 |
| **49** | 0.5439140797 | | 0.5293414593 |
| **50** | 0.5435531139 | | 0.5286002159 |
| **Total** | 27.1518819332 | | 26.4908411503 |
| **Average** | 0.5430376387 | | 0.5298168230 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_Archery\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 0.5417377949 | | 0.5310518742 |
| **2** | 0.5366058350 | | 0.5297920704 |
| **3** | 0.5367431641 | | 0.5295424461 |
| **4** | 0.5374436378 | | 0.5295343399 |
| **5** | 0.5372104645 | | 0.5300903320 |
| **6** | 0.5366299152 | | 0.5342488289 |
| **7** | 0.5366771221 | | 0.5293071270 |
| **8** | 0.5369641781 | | 0.5293300152 |
| **9** | 0.5383436680 | | 0.5291662216 |
| **10** | 0.5370545387 | | 0.5297656059 |
| **11** | 0.5364732742 | | 0.5295855999 |
| **12** | 0.5375220776 | | 0.5296368599 |
| **13** | 0.5375599861 | | 0.5292263031 |
| **14** | 0.5390543938 | | 0.5294060707 |
| **15** | 0.5381739140 | | 0.5299654007 |
| **16** | 0.5453200340 | | 0.5295126438 |
| **17** | 0.5399756432 | | 0.5289916992 |
| **18** | 0.5398998260 | | 0.5299456120 |
| **19** | 0.5378193855 | | 0.5290853977 |
| **20** | 0.5373291969 | | 0.5290400982 |
| **21** | 0.5431363583 | | 0.5297362804 |
| **22** | 0.5433962345 | | 0.5291013718 |
| **23** | 0.5459635258 | | 0.5298299789 |
| **24** | 0.5441420078 | | 0.5310950279 |
| **25** | 0.5425488949 | | 0.5292363167 |
| **26** | 0.5434699059 | | 0.5287024975 |
| **27** | 0.5426478386 | | 0.5292527676 |
| **28** | 0.5449085236 | | 0.5298092365 |
| **29** | 0.5427756310 | | 0.5292441845 |
| **30** | 0.5431215763 | | 0.5298614502 |
| **31** | 0.5433638096 | | 0.5288226604 |
| **32** | 0.5433902740 | | 0.5288825035 |
| **33** | 0.5421223640 | | 0.5296320915 |
| **34** | 0.5430898666 | | 0.5288228989 |
| **35** | 0.5428566933 | | 0.5292613506 |
| **36** | 0.5430555344 | | 0.5282578468 |
| **37** | 0.5443212986 | | 0.5289280415 |
| **38** | 0.5427548885 | | 0.5297880173 |
| **39** | 0.5427567959 | | 0.5293769836 |
| **40** | 0.5432851315 | | 0.5288586617 |
| **41** | 0.5436563492 | | 0.5298833847 |
| **42** | 0.5423116684 | | 0.5291497707 |
| **43** | 0.5428385735 | | 0.5329391956 |
| **44** | 0.5433194637 | | 0.5287592411 |
| **45** | 0.5421879292 | | 0.5286419392 |
| **46** | 0.5420613289 | | 0.5285525322 |
| **47** | 0.5428836346 | | 0.5287418365 |
| **48** | 0.5423257351 | | 0.5290203094 |
| **49** | 0.5416617393 | | 0.5410189629 |
| **50** | 0.5425455570 | | 0.5286705494 |
| **Total** | 27.0574371815 | | 26.4881024361 |
| **Average** | 0.5411487436 | | 0.5297620487 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_BabyCrawling\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 0.5515284538 | | 0.5328428745 |
| **2** | 0.5399971008 | | 0.5295913219 |
| **3** | 0.5387291908 | | 0.5302984715 |
| **4** | 0.5396542549 | | 0.5293338299 |
| **5** | 0.5396165848 | | 0.5296115875 |
| **6** | 0.5388271809 | | 0.5292110443 |
| **7** | 0.5381107330 | | 0.5292952061 |
| **8** | 0.5382082462 | | 0.5294687748 |
| **9** | 0.5371451378 | | 0.5296471119 |
| **10** | 0.5389037132 | | 0.5294070244 |
| **11** | 0.5391643047 | | 0.5311064720 |
| **12** | 0.5393655300 | | 0.5280961990 |
| **13** | 0.5380849838 | | 0.5280561447 |
| **14** | 0.5409066677 | | 0.5279219151 |
| **15** | 0.5397036076 | | 0.5285778046 |
| **16** | 0.5474574566 | | 0.5285534859 |
| **17** | 0.5406985283 | | 0.5279984474 |
| **18** | 0.5406584740 | | 0.5276718140 |
| **19** | 0.5406501293 | | 0.5282790661 |
| **20** | 0.5369584560 | | 0.5279693604 |
| **21** | 0.5438327789 | | 0.5279498100 |
| **22** | 0.5459342003 | | 0.5284476280 |
| **23** | 0.5448524952 | | 0.5284097195 |
| **24** | 0.5444953442 | | 0.5278966427 |
| **25** | 0.5482380390 | | 0.5294940472 |
| **26** | 0.5474216938 | | 0.5287504196 |
| **27** | 0.5426015854 | | 0.5284657478 |
| **28** | 0.5431618690 | | 0.5284454823 |
| **29** | 0.5429031849 | | 0.5283641815 |
| **30** | 0.5437982082 | | 0.5311756134 |
| **31** | 0.5431132317 | | 0.5283987522 |
| **32** | 0.5434467793 | | 0.5279643536 |
| **33** | 0.5444943905 | | 0.5277159214 |
| **34** | 0.5427286625 | | 0.5282046795 |
| **35** | 0.5429515839 | | 0.5284187794 |
| **36** | 0.5437030792 | | 0.5300073624 |
| **37** | 0.5435473919 | | 0.5295677185 |
| **38** | 0.5431914330 | | 0.5287055969 |
| **39** | 0.5437240601 | | 0.5284397602 |
| **40** | 0.5433757305 | | 0.5280430317 |
| **41** | 0.5431361198 | | 0.5281610489 |
| **42** | 0.5428848267 | | 0.5285668373 |
| **43** | 0.5439488888 | | 0.5280971527 |
| **44** | 0.5433423519 | | 0.5275571346 |
| **45** | 0.5435414314 | | 0.5281653404 |
| **46** | 0.5425283909 | | 0.5278301239 |
| **47** | 0.5429785252 | | 0.5280594826 |
| **48** | 0.5431585312 | | 0.5286612511 |
| **49** | 0.5430610180 | | 0.5287611485 |
| **50** | 0.5442287922 | | 0.5282683372 |
| **Total** | 27.1186933517 | | 26.4379310608 |
| **Average** | 0.5423738670 | | 0.5287586212 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_BalanceBeam\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 0.5451860428 | | 0.5405261517 |
| **2** | 0.5387818813 | | 0.5314202309 |
| **3** | 0.5390074253 | | 0.5316956043 |
| **4** | 0.5390973091 | | 0.5285029411 |
| **5** | 0.5372874737 | | 0.5281274319 |
| **6** | 0.5375933647 | | 0.5284440517 |
| **7** | 0.5381145477 | | 0.5345468521 |
| **8** | 0.5382692814 | | 0.5281901360 |
| **9** | 0.5393266678 | | 0.5285277367 |
| **10** | 0.5382804871 | | 0.5285577774 |
| **11** | 0.5374884605 | | 0.5281679630 |
| **12** | 0.5384855270 | | 0.5282640457 |
| **13** | 0.5387725830 | | 0.5280206203 |
| **14** | 0.5406949520 | | 0.5285668373 |
| **15** | 0.5383479595 | | 0.5289764404 |
| **16** | 0.5455551147 | | 0.5280942917 |
| **17** | 0.5395591259 | | 0.5282065868 |
| **18** | 0.5417594910 | | 0.5325684547 |
| **19** | 0.5393538475 | | 0.5280745029 |
| **20** | 0.5376057625 | | 0.5281901360 |
| **21** | 0.5449433327 | | 0.5286152363 |
| **22** | 0.5440285206 | | 0.5278389454 |
| **23** | 0.5439305305 | | 0.5283100605 |
| **24** | 0.5447659492 | | 0.5279378891 |
| **25** | 0.5450322628 | | 0.5298006535 |
| **26** | 0.5441069603 | | 0.5300033092 |
| **27** | 0.5444359779 | | 0.5300829411 |
| **28** | 0.5439589024 | | 0.5285553932 |
| **29** | 0.5447020531 | | 0.5294137001 |
| **30** | 0.5445423126 | | 0.5291991234 |
| **31** | 0.5480043888 | | 0.5281701088 |
| **32** | 0.5452690125 | | 0.5283958912 |
| **33** | 0.5454473495 | | 0.5288648605 |
| **34** | 0.5455925465 | | 0.5290141106 |
| **35** | 0.5444114208 | | 0.5289678574 |
| **36** | 0.5447781086 | | 0.5318472385 |
| **37** | 0.5448198318 | | 0.5278451443 |
| **38** | 0.5446326733 | | 0.5457448959 |
| **39** | 0.5445117950 | | 0.5289182663 |
| **40** | 0.5446834564 | | 0.5279927254 |
| **41** | 0.5449235439 | | 0.5289139748 |
| **42** | 0.5456426144 | | 0.5287611485 |
| **43** | 0.5452604294 | | 0.5281589031 |
| **44** | 0.5440239906 | | 0.5273673534 |
| **45** | 0.5446999073 | | 0.5295083523 |
| **46** | 0.5443186760 | | 0.5297491550 |
| **47** | 0.5454139709 | | 0.5294198990 |
| **48** | 0.5456118584 | | 0.5289394855 |
| **49** | 0.5453543663 | | 0.5291810036 |
| **50** | 0.5443243980 | | 0.5285451412 |
| **Total** | 27.1347384453 | | 26.4797315598 |
| **Average** | 0.5426947689 | | 0.5295946312 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_BandMarching\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 0.5458366871 | | 0.5318520069 |
| **2** | 0.5414028168 | | 0.5294911861 |
| **3** | 0.5404226780 | | 0.5299842358 |
| **4** | 0.5413141251 | | 0.5302166939 |
| **5** | 0.5409688950 | | 0.5299530029 |
| **6** | 0.5387783051 | | 0.5301389694 |
| **7** | 0.5402388573 | | 0.5304551125 |
| **8** | 0.5406298637 | | 0.5296127796 |
| **9** | 0.5399534702 | | 0.5332641602 |
| **10** | 0.5412011147 | | 0.5296840668 |
| **11** | 0.5408463478 | | 0.5307104588 |
| **12** | 0.5409920216 | | 0.5299620628 |
| **13** | 0.5405757427 | | 0.5294251442 |
| **14** | 0.5426967144 | | 0.5294322968 |
| **15** | 0.5396599770 | | 0.5300309658 |
| **16** | 0.5482311249 | | 0.5295047760 |
| **17** | 0.5409862995 | | 0.5293292999 |
| **18** | 0.5413477421 | | 0.5291817188 |
| **19** | 0.5387048721 | | 0.5289204121 |
| **20** | 0.5397336483 | | 0.5290098190 |
| **21** | 0.5458395481 | | 0.5287463665 |
| **22** | 0.5466580391 | | 0.5293576717 |
| **23** | 0.5457701683 | | 0.5289549828 |
| **24** | 0.5467078686 | | 0.5290117264 |
| **25** | 0.5463430882 | | 0.5307004452 |
| **26** | 0.5452778339 | | 0.5290155411 |
| **27** | 0.5446493626 | | 0.5296108723 |
| **28** | 0.5443654060 | | 0.5298347473 |
| **29** | 0.5447862148 | | 0.5307433605 |
| **30** | 0.5441617966 | | 0.5317125320 |
| **31** | 0.5451133251 | | 0.5299172401 |
| **32** | 0.5450279713 | | 0.5295076370 |
| **33** | 0.5440294743 | | 0.5299193859 |
| **34** | 0.5446486473 | | 0.5285923481 |
| **35** | 0.5450658798 | | 0.5291001797 |
| **36** | 0.5445406437 | | 0.5294551849 |
| **37** | 0.5449767113 | | 0.5290358067 |
| **38** | 0.5445022583 | | 0.5299358368 |
| **39** | 0.5446348190 | | 0.5293717384 |
| **40** | 0.5451564789 | | 0.5296025276 |
| **41** | 0.5490310192 | | 0.5293982029 |
| **42** | 0.5448496342 | | 0.5289669037 |
| **43** | 0.5661809444 | | 0.5295736790 |
| **44** | 0.5467977524 | | 0.5292887688 |
| **45** | 0.5442063808 | | 0.5294737816 |
| **46** | 0.5441608429 | | 0.5291759968 |
| **47** | 0.5443804264 | | 0.5298788548 |
| **48** | 0.5451071262 | | 0.5289590359 |
| **49** | 0.5446922779 | | 0.5305814743 |
| **50** | 0.5436327457 | | 0.5296909809 |
| **Total** | 27.1998159885 | | 26.4872729778 |
| **Average** | 0.5439963198 | | 0.5297454596 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_BaseballPitch\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 0.5452246666 | | 0.5383470058 |
| **2** | 0.5367169380 | | 0.5299754143 |
| **3** | 0.5374755859 | | 0.5280582905 |
| **4** | 0.5374245644 | | 0.5277237892 |
| **5** | 0.5375432968 | | 0.5297522545 |
| **6** | 0.5373635292 | | 0.5305309296 |
| **7** | 0.5368690491 | | 0.5339670181 |
| **8** | 0.5369758606 | | 0.5304651260 |
| **9** | 0.5369448662 | | 0.5291526318 |
| **10** | 0.5372486115 | | 0.5286710262 |
| **11** | 0.5378859043 | | 0.5303816795 |
| **12** | 0.5377070904 | | 0.5325803757 |
| **13** | 0.5375237465 | | 0.5296385288 |
| **14** | 0.5400872231 | | 0.5291249752 |
| **15** | 0.5389456749 | | 0.5306665897 |
| **16** | 0.5457792282 | | 0.5296571255 |
| **17** | 0.5397872925 | | 0.5290718079 |
| **18** | 0.5398089886 | | 0.5295827389 |
| **19** | 0.5365397930 | | 0.5286216736 |
| **20** | 0.5383148193 | | 0.5292088985 |
| **21** | 0.5434961319 | | 0.5294973850 |
| **22** | 0.5436115265 | | 0.5292005539 |
| **23** | 0.5435171127 | | 0.5298652649 |
| **24** | 0.5439152718 | | 0.5276868343 |
| **25** | 0.5434386730 | | 0.5300495625 |
| **26** | 0.5473361015 | | 0.5288221836 |
| **27** | 0.5432991982 | | 0.5296797752 |
| **28** | 0.5434944630 | | 0.5313086510 |
| **29** | 0.5434575081 | | 0.5284740925 |
| **30** | 0.5437009335 | | 0.5301048756 |
| **31** | 0.5439043045 | | 0.5326621532 |
| **32** | 0.5430724621 | | 0.5284423828 |
| **33** | 0.5433068275 | | 0.5303864479 |
| **34** | 0.5432481766 | | 0.5284042358 |
| **35** | 0.5428814888 | | 0.5298361778 |
| **36** | 0.5436174870 | | 0.5287864208 |
| **37** | 0.5439233780 | | 0.5298826694 |
| **38** | 0.5433216095 | | 0.5297336578 |
| **39** | 0.5444869995 | | 0.5287902355 |
| **40** | 0.5432679653 | | 0.5282373428 |
| **41** | 0.5435569286 | | 0.5285968781 |
| **42** | 0.5434327126 | | 0.5295898914 |
| **43** | 0.5433883667 | | 0.5284106731 |
| **44** | 0.5435118675 | | 0.5279488564 |
| **45** | 0.5442807674 | | 0.5285072327 |
| **46** | 0.5432682037 | | 0.5288219452 |
| **47** | 0.5432155132 | | 0.5298829079 |
| **48** | 0.5429151058 | | 0.5297276974 |
| **49** | 0.5431795120 | | 0.5284781456 |
| **50** | 0.5429718494 | | 0.5277457237 |
| **Total** | 27.0801851749 | | 26.4827387333 |
| **Average** | 0.5416037035 | | 0.5296547747 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_Basketball\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 0.5415649414 | | 0.5320527554 |
| **2** | 0.5381095409 | | 0.5295472145 |
| **3** | 0.5381269455 | | 0.5286056995 |
| **4** | 0.5378649235 | | 0.5294816494 |
| **5** | 0.5372211933 | | 0.5284709930 |
| **6** | 0.5372991562 | | 0.5296058655 |
| **7** | 0.5372068882 | | 0.5293719769 |
| **8** | 0.5383946896 | | 0.5290243626 |
| **9** | 0.5440881252 | | 0.5288617611 |
| **10** | 0.5383563042 | | 0.5293982029 |
| **11** | 0.5385720730 | | 0.5285596848 |
| **12** | 0.5376341343 | | 0.5284755230 |
| **13** | 0.5383162498 | | 0.5288026333 |
| **14** | 0.5402395725 | | 0.5296888351 |
| **15** | 0.5391533375 | | 0.5289840698 |
| **16** | 0.5448858738 | | 0.5364575386 |
| **17** | 0.5416786671 | | 0.5294706821 |
| **18** | 0.5409204960 | | 0.5302679539 |
| **19** | 0.5375576019 | | 0.5298585892 |
| **20** | 0.5395267010 | | 0.5294570923 |
| **21** | 0.5442721844 | | 0.5290522575 |
| **22** | 0.5450706482 | | 0.5286617279 |
| **23** | 0.5451302528 | | 0.5291333199 |
| **24** | 0.5435476303 | | 0.5307078362 |
| **25** | 0.5433299541 | | 0.5322966576 |
| **26** | 0.5434505939 | | 0.5289959908 |
| **27** | 0.5443997383 | | 0.5291342735 |
| **28** | 0.5428886414 | | 0.5293860435 |
| **29** | 0.5440225601 | | 0.5279886723 |
| **30** | 0.5430471897 | | 0.5424599648 |
| **31** | 0.5437788963 | | 0.5285260677 |
| **32** | 0.5440471172 | | 0.5295162201 |
| **33** | 0.5439133644 | | 0.5426921844 |
| **34** | 0.5447387695 | | 0.5292630196 |
| **35** | 0.5442090034 | | 0.5289673805 |
| **36** | 0.5439674854 | | 0.5288228989 |
| **37** | 0.5443165302 | | 0.5291912556 |
| **38** | 0.5449674129 | | 0.5290479660 |
| **39** | 0.5446584225 | | 0.5285162926 |
| **40** | 0.5451323986 | | 0.5283031464 |
| **41** | 0.5440933704 | | 0.5284004211 |
| **42** | 0.5434463024 | | 0.5285696983 |
| **43** | 0.5442738533 | | 0.5299131870 |
| **44** | 0.5458099842 | | 0.5321955681 |
| **45** | 0.5439810753 | | 0.5288996696 |
| **46** | 0.5440788269 | | 0.5287473202 |
| **47** | 0.5443320274 | | 0.5285775661 |
| **48** | 0.5444300175 | | 0.5284187794 |
| **49** | 0.5447752476 | | 0.5281767845 |
| **50** | 0.5431253910 | | 0.5282788277 |
| **Total** | 27.1119523048 | | 26.4952840805 |
| **Average** | 0.5422390461 | | 0.5299056816 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_BasketballDunk\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 0.5997462273 | | 0.5318930149 |
| **2** | 0.5406212807 | | 0.5296845436 |
| **3** | 0.5386316776 | | 0.5338275433 |
| **4** | 0.5396325588 | | 0.5306503773 |
| **5** | 0.5391466618 | | 0.5292711258 |
| **6** | 0.5401787758 | | 0.5302500725 |
| **7** | 0.5385448933 | | 0.5297462940 |
| **8** | 0.5397875309 | | 0.5292003155 |
| **9** | 0.5383956432 | | 0.5293636322 |
| **10** | 0.5379960537 | | 0.5294232368 |
| **11** | 0.5397729874 | | 0.5297122002 |
| **12** | 0.5397949219 | | 0.5294632912 |
| **13** | 0.5391979218 | | 0.5299284458 |
| **14** | 0.5411367416 | | 0.5297608376 |
| **15** | 0.5399279594 | | 0.5291709900 |
| **16** | 0.5483720303 | | 0.5294079781 |
| **17** | 0.5423004627 | | 0.5304710865 |
| **18** | 0.5403864384 | | 0.5306835175 |
| **19** | 0.5413320065 | | 0.5324113369 |
| **20** | 0.5405421257 | | 0.5289154053 |
| **21** | 0.5470404625 | | 0.5292632580 |
| **22** | 0.5472872257 | | 0.5296018124 |
| **23** | 0.5470824242 | | 0.5289885998 |
| **24** | 0.5476422310 | | 0.5294957161 |
| **25** | 0.5473556519 | | 0.5291943550 |
| **26** | 0.5467021465 | | 0.5291337967 |
| **27** | 0.5482668877 | | 0.5300099850 |
| **28** | 0.5474529266 | | 0.5296857357 |
| **29** | 0.5484073162 | | 0.5287845135 |
| **30** | 0.5463922024 | | 0.5296983719 |
| **31** | 0.5475554466 | | 0.5285198689 |
| **32** | 0.5504529476 | | 0.5290312767 |
| **33** | 0.5451552868 | | 0.5292921066 |
| **34** | 0.5453262329 | | 0.5292987823 |
| **35** | 0.5453860760 | | 0.5294094086 |
| **36** | 0.5456357002 | | 0.5304329395 |
| **37** | 0.5462145805 | | 0.5292105675 |
| **38** | 0.5453796387 | | 0.5316658020 |
| **39** | 0.5466272831 | | 0.5289299488 |
| **40** | 0.5459041595 | | 0.5291016102 |
| **41** | 0.5458962917 | | 0.5292847157 |
| **42** | 0.5464434624 | | 0.5292887688 |
| **43** | 0.5464460850 | | 0.5293295383 |
| **44** | 0.5452566147 | | 0.5293955803 |
| **45** | 0.5453460217 | | 0.5285966396 |
| **46** | 0.5453970432 | | 0.5296618938 |
| **47** | 0.5457587242 | | 0.5291945934 |
| **48** | 0.5457420349 | | 0.5286777020 |
| **49** | 0.5451133251 | | 0.5289394855 |
| **50** | 0.5454084873 | | 0.5288240910 |
| **Total** | 27.2595198154 | | 26.4831767082 |
| **Average** | 0.5451903963 | | 0.5296635342 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **3D Chaotic Map-Cosine Transformation Based Approach to Video Encryption and Decryption (Dua et al., 2022)** | |
| **Video Stream** | | **v\_BenchPress\_g01\_c01** | |
| **Resolution** | | **240p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 0.5425536633 | | 0.5331616402 |
| **2** | 0.5385298729 | | 0.5308828354 |
| **3** | 0.5388538837 | | 0.5292870998 |
| **4** | 0.5383143425 | | 0.5312831402 |
| **5** | 0.5387034416 | | 0.5312125683 |
| **6** | 0.5380542278 | | 0.5306479931 |
| **7** | 0.5374681950 | | 0.5306396484 |
| **8** | 0.5381665230 | | 0.5299124718 |
| **9** | 0.5390253067 | | 0.5311696529 |
| **10** | 0.5397570133 | | 0.5293147564 |
| **11** | 0.5392937660 | | 0.5297541618 |
| **12** | 0.5380358696 | | 0.5295639038 |
| **13** | 0.5391526222 | | 0.5300524235 |
| **14** | 0.5412561893 | | 0.5304253101 |
| **15** | 0.5395720005 | | 0.5301735401 |
| **16** | 0.5478205681 | | 0.5337707996 |
| **17** | 0.5402631760 | | 0.5302224159 |
| **18** | 0.5436065197 | | 0.5297236443 |
| **19** | 0.5370860100 | | 0.5297420025 |
| **20** | 0.5380234718 | | 0.5364921093 |
| **21** | 0.5442819595 | | 0.5313773155 |
| **22** | 0.5448904037 | | 0.5296816826 |
| **23** | 0.5439600945 | | 0.5293092728 |
| **24** | 0.5458364487 | | 0.5298902988 |
| **25** | 0.5448839664 | | 0.5303153992 |
| **26** | 0.5449159145 | | 0.5308654308 |
| **27** | 0.5455541611 | | 0.5309863091 |
| **28** | 0.5467758179 | | 0.5301723480 |
| **29** | 0.5460009575 | | 0.5298731327 |
| **30** | 0.5470416546 | | 0.5304024220 |
| **31** | 0.5468392372 | | 0.5300867558 |
| **32** | 0.5449795723 | | 0.5299155712 |
| **33** | 0.5445942879 | | 0.5300068855 |
| **34** | 0.5439260006 | | 0.5295884609 |
| **35** | 0.5455856323 | | 0.5294959545 |
| **36** | 0.5436294079 | | 0.5302181244 |
| **37** | 0.5459425449 | | 0.5299515724 |
| **38** | 0.5440695286 | | 0.5297348499 |
| **39** | 0.5466954708 | | 0.5298137665 |
| **40** | 0.5455029011 | | 0.5296032429 |
| **41** | 0.5437724590 | | 0.5298078060 |
| **42** | 0.5454137325 | | 0.5294146538 |
| **43** | 0.5451085567 | | 0.5304384232 |
| **44** | 0.5439531803 | | 0.5293550491 |
| **45** | 0.5445442200 | | 0.5303099155 |
| **46** | 0.5449414253 | | 0.5292694569 |
| **47** | 0.5453691483 | | 0.5296158791 |
| **48** | 0.5459170341 | | 0.5300812721 |
| **49** | 0.5449702740 | | 0.5311059952 |
| **50** | 0.5452241898 | | 0.5294408798 |
| **Total** | 27.1486568451 | | 26.5175602436 |
| **Average** | 0.5429731369 | | 0.5303512049 |