FORENSIC ANALYSIS VIDEO METADATA AUTHENTICITY DETECTION USING EXIFTOOL

By

Suhardjono[1], Popon Handayani [2], Hari Sugiarto[3], Nurul Aisyah[4], Arman Syah Putra[5] *
[1,3]Faculty of Technical Information, Bina Sarana Informatika University, Indonesia
[2]Faculty of Computer, Nusa Mandiri University, Indonesia
[4]Faculty of Economics, Bina Sarana Informatika University, Indonesia
[5]*Faculty of Computer, STMIK Insan Pembangunan, Indonesia
Email: [1]suhardjono@bsi.ac.id, [2]popon.pph@nusamandiri.ac.id
[3]hari.hrs@bsi.ac.id, [4]nurul.nly@bai.ac.id
[5]*armansp892@gmail.com

Abstract
The background of this research is how to detect the authenticity of a video using exit which will be able to determine which video is original and which video is fake. With this forensic analysis, the previous data will be opened and will provide clarity to data seekers. The method used in this study is to use the Exiftool method, by comparing 2 MP4 format videos by turning off the 2 videos, it will be known which video is original and which video has been changed. The problem in this study is how to prove that the video is the original video and has not been converted into another format or there has been a change in color and others, therefore this research will prove through the forensic data contained in the video. The purpose of this study is to prove that there are changes that exist in a video by comparing the two videos, the version has not been changed and the version after it has been changed. With this comparison, it can be proven that something has happened to the video based on existing forensic data.
Keyword: *Forensik, Metadata, Video, Exiftool*

INTRODUCTION

The rapid development of technology in this modern era also opens opportunities for new types of crime, one of which is cybercrime. Cybercrime is a criminal activity carried out using computer network information system technology whose purpose is to gain profits at the expense of other parties.

Cybercrime has various forms and forms, one of which is the dissemination of hoax information through manipulated videos. Video manipulation or video editing is very easy to do using video editing software that is currently widely available such as Adobe after Effects which allows users to edit or insert images into videos. This is what criminals take advantage of by inserting false information into videos with the aim of causing disputes or deceiving someone.

Hash is an algorithm that can convert a message into a series of random characters with a fixed size. Hash is a cryptographic technique whose function is to encrypt or secure data with an encoding method. The most commonly used hash algorithm is MD5 with a 128-bit hash value.

The purpose of developing this journal is to analyze the authenticity of a video not only through metadata analysis techniques but also using hash analysis techniques contained in videos. Analysis of the hash contained in the video will use the Forevid tool which is expected to facilitate the detection of the authenticity of a video.

Basically cybercrime includes all crimes related to information systems, cybercrime is an action or incident related to computer technology. Where one person benefits at the expense of another, cryptography is a technique

----

....

of securing information and communication through the use of codes so that only the person intended for the information can understand and process it.

MD5 is a development of the previous message digest algorithm MD4, MD5 designed by Ronald Rivest in 1991, he wrote that this algorithm takes as input a message of arbitrary length and produces a 128-bit 'fingerprint' or 'message digest' output. From input it is thought that it is computationally impossible to generate two messages that have the same message digest, or to generate any message that has a predefined target message digest. The MD5 algorithm is intended for digital signature applications, where large files must be 'compressed' in a secure manner before being encrypted with a private (secret) key under a public key cryptosystem such as RSA.

RESEARCH METHOD

The old research method is to use several methods to explain in detail the steps used to conduct aresearch and explain the flow of the system used, namely Exiftool.

The research method developed was started by preparing two videos in mp4 format that had been edited and an original video that had not gone through the editing process. Then the two videos are compared with their hash values using the md5 method. The comparison is done using the forensic video tool Forevid where if the hash comparison result is Hash is valid, it means the video is an original video without any editing process, on the other hand if the hash comparison result is hash is invalid then the video has gone through the editing process and is not an original video.
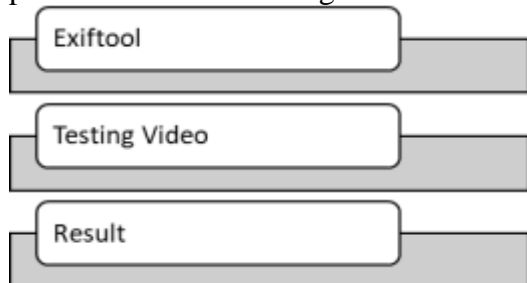

Figure 1. Hipotesis Model

RESULT AND DISCUSSION

From the research results obtained hash comparison results from the two videos, namely videos that have not been edited and videos that have been edited. In unedited videos, the hash comparison results show that the hash is valid, which means that the video is really the original video without any editing process, while the edited video shows the result that the hash is invalid which indicates that the video has been edited. The following is the result of hash comparison of the original video and the video that has undergone the editing process.
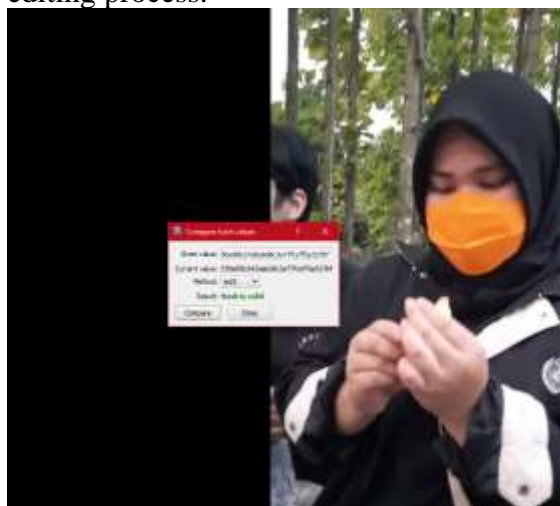

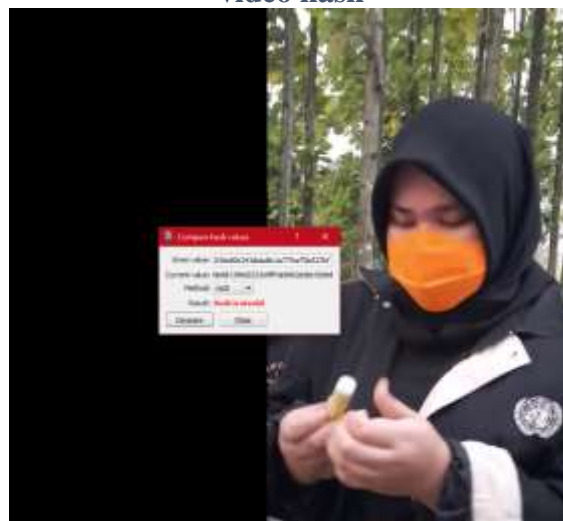**Figure 1. Comparison result of the original video hash**

Figure 2. The video hash comparison result has been edited

The following is a flowchart, use case, and activity diagram of the video authenticity

....

....

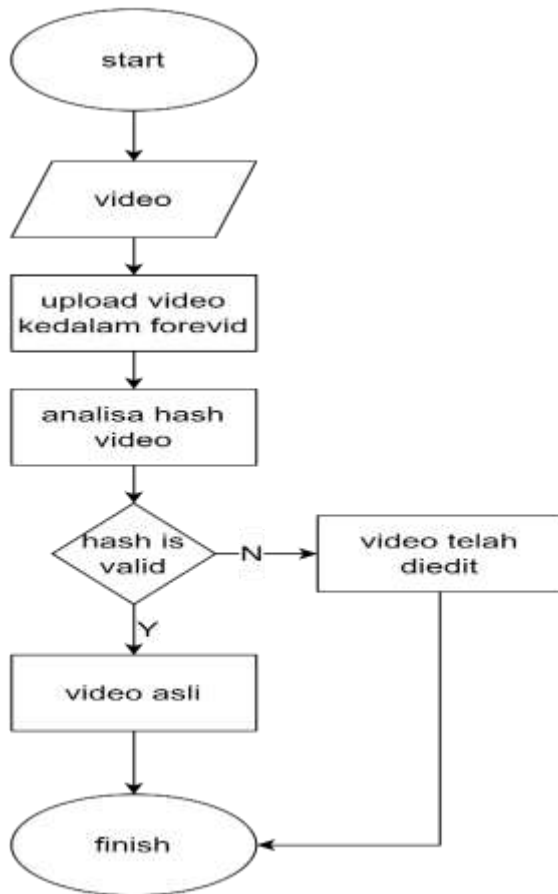analysis research process using hash analysis techniques.

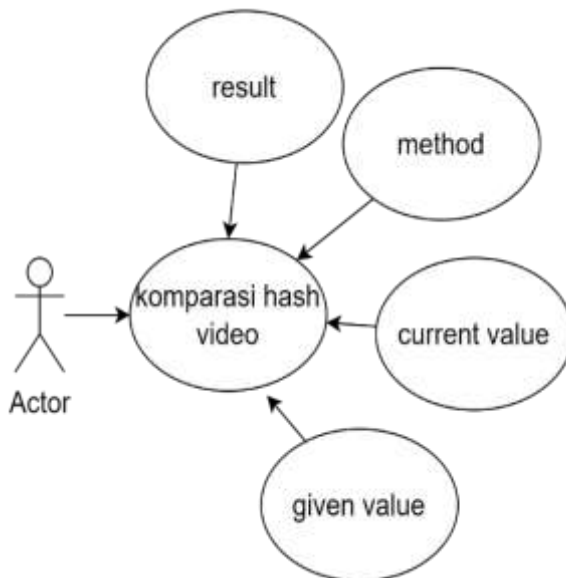**Figure 2. Hash analysis flowchart**

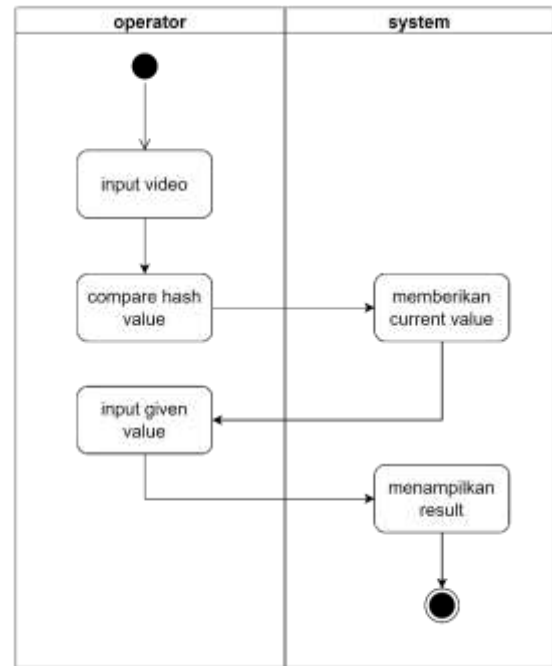Figure 4. Video hash comparison use case

Figure 5. Activity hash comparison diagram

CONCLUSION

The purpose of developing this journal is to obtain another method of detecting video authenticity other than through metadata, namely by comparing the hashes contained in the video using the md5 method and using the forevid tool. The result is that this method is successful in detecting the authenticity of the video from the hash comparison results obtained from 2 videos, one of which is a video that has been edited or faked.

REFERENCES

[1] A. B. Givan, R. Amalia, N. Riesmiyantiningtias, A. B. Kusuma and A. S. Putra, "Implementation of the Balanced Scorecard as a measuring tool for company performance(Case Study at PT. ARS Maju Sentosa)," *International Journal of Educational Research & Social Sciences* , vol. 3, no. 2, pp. 1049-1058, 2022.

[2] A. N. Balqis, . L. Ramadhana, R. Wirawan and . I. N. Isnainiyah, "Bid-Fish: An android application for online fish auction based on case study from Muara Angke, Indonesia," *IOP*

....

conference series: materials science and engineering, vol. 508, no. 1, p. 012128, 2019.

[3] H. W. Arman Syah Putra, ""Intelligent Traffic Monitoring System (ITMS) for Smart City Based on IoT Monitoring"," *1st 2018 Indonesian Association for Pattern Recognition International Conference, INAPR 2018 - Proce vol,* 2019.

[4] A. Damuri, N. Isnain, R. A. Priyatama, Y. I. Chandra and A. S. Putra, "E-Learning Proposal System in Public Secondary School Learning," *International Journal of Educational Research & Social Sciences (IJERSC),* vol. 2, p. 270–275, 2021.

[5] N. K. Dewi, I. Mulyana, A. S. Putra and F. R. Radita, "Konsep Robot Penjaga Toko Di Kombinasikan Dengan Pengendalian Virtual Reality (VR) Jarak Jauh," *IKRA-ITH INFORMATIKA: Jurnal Komputer dan Informatika,* vol. 5, no. 1, pp. 33-38, 2020.

[6] B. Givan, . R. Wirawan, D. Andriawan, N. Aisyah, A. and A. S. Putra, "Effect of Ease And Trustworthiness To Use E-Commerce for Purchasing Goods Online," *International Journal of Educational Research & Social Sciences (IJERSC),* vol. 2, no. 2, p. 277–282, 2021.

[7] B. Givan, R. Amalia, A. I. Sari, S. H. Winarno and A. S. Putra, "Effective Use of E-Money through Online Shopping in E-Commerce," *International Journal of Educational Research & Social Sciences,* vol. 2, no. 6, pp. 1692-1697, 2021.

[8] T. A. Kurniawan, P. Handayani, P. M. Akhirianto, A. S. Putra and N. Aisyah, "Application Of 5G Internet System To Improve The Economy," *International Journal Of Science, Technology & Management ,* vol. 3, no. 1, pp. 275-283, 2022.

[9] E. Nurniati, D. P. Irianto, . A. . S. Putra, . D. Susanti, Z. Zikriah, N. Nurhayati and N. Aisyah, "Effective Use Of Learning Applications For English Subjects In Elementary School," *International Journal of Educational Research & Social Sciences,* vol. 3, no. 1, pp. 39-45, 2022.

[10] M. k. karmila, T. Iriani, R. S. Sumali, E. . Y. Kustini, R. Julistiana and A. S. Putra, "THE INFLUENCE OF TYPICAL WEST JAVA SOUVENIRS ON THE LEVEL OF DOMESTIC TOURIST VISITS IN THE CITY OF BANDUNG, WEST JAVA," *Journal of Innovation Research and Knowledge,* vol. 1, no. 11, pp. 1475-1482 , 2022.

[11] R. Wirawan, N. Aisyah, A. Rahman, B. S. Rahmawati, A. Medikano, A. Sebayang and A. S. Putra, "Perancangan Aplikasi Website Menggunakan Macromedia Dreamweaver Mx Untuk Budi Daya Anggrek (Studi Kasus Toko Anggrek Berseri)," *TEKINFO,* vol. 22, no. 2, pp. 77-86, 2021.

[12] A. Wirara, B. Hardiawan and M. Salman, "Identifikasi BuktiDigital pada Akuisisi Perangkat Mobile dari Aplikasi Pesan Instan "WhatsApp"," *eknoin Vol. 26, No. 1, Maret2020: ,* pp. 66-74, 2020.

[13] S. H. Winarno, L. Elvira, J. Latumahina, S. Sabil, R. R. Cindrakasih and A. S. Putra, "HUMAN RESOURCES DEVELOPMENT IN INCREASING COMPANY DEVELOPMENT (CASE STUDY PT. PARS MAXY PERKASA)," *Journal of Innovation Research and Knowledge,* vol. 1, no. 11, pp. 1529-1533, 2022.

[14] S. H. Winarno, L. Elvira, J. Latumahina, S. Sabil, R. R. Cindrakasih and A. S. Putra, "Competition and Globalization of Business to Further Develop Creativity and Innovation for the Advancement of the Company(Case Study at PT. Top Drink World)," *International Journal of Educational Research & Social Sciences,* vol. 3, no. 2, pp. 1069-1066, 2022.

....

[15] V. Valentino, H. S. Setiawan, . A. Saputra, Y. Haryanto and A. S. Putra, "Decision Support System for Thesis Session Pass Recommendation Using AHP (Analytic Hierarchy Process) Method," *Journal International Journal of Educational Research & Social Sciences,* pp. 215-221, 2021.

[16] . V. H. Valentino, H. S. Setiawan, M. T. Habibie, R. Ningsih, D. Katarina and A. S. Putra, "Online And Offline Learning ComparisonIn The New Normal Era," *International Journal of Educational Research & Social Sciences (IJERSC),* vol. 2, no. 2, p. 449–455, 2021.

[17] D. Susanti, E. A. S. Putra, N. Z. and N. Aisyah, "IMPROVING STUDENTS' SPEAKING SKILLS MOTIVATION USING YOUTUBE VIDEO AND," *Journal of Educational and Language Research,* vol. 1, no. 9, pp. 1303-1310, 2022.

[18] R. N. Suryanto, ""Dampak Positif Dan Negatif Permainan Game Online Dikalangan Pelajar"," *Jom Fisip Volume 2 No. 2 ,* 2015.

[19] P. Sukamto, A. S. Putra, N. Aisyah and R. Toufiq, "Forensic Digital Analysis for CCTV Video Recording," *International Journal of Science, Technology & Management,* vol. 3, no. 1, pp. 284-291, 2022.

[20] S. Suhardjono, A. S. Putra, N. Aisyah and V. Valentino, "ANALYSIS OF NIST METHODS ON FACEBOOK MESSENGER FOR FORENSIC EVIDENCE," *Journal of Innovation Research and Knowledge,* vol. 1, no. 8, pp. 695-702, 2022.

[21] H. Sugiarto, I. Sumadikarta, M. Ryansyah, M. H. Fakhriza and A. S. Putra, "Application Design" Test Job Application" On Android OS Using The AHP Algorithm," *International Journal of Educational Research & Social Sciences,* vol. 2, no. 5, pp. 1173-1180, 2021.

[22] M. Subani, I. Ramadhan, S. and A. S. Putra, "Perkembangan Internet of Think (IOT) dan Instalasi Komputer Terhadap Perkembangan Kota Pintar di Ibukota Dki Jakarta," *IKRA-ITH INFORMATIKA: Jurnal Komputer dan Informatika,* vol. 5, no. 1, pp. 88-93, 2020.

[23] M. Siahaan, V. Valentino, E. P. Ningrum, J. Jamaludin , R. Ridwan, D. Pramestari, A. Medikano, A. Herwanto and A. S. Putra, "Blockchain Concept in Jakarta Smart Transportation Payment," *International Conference on Global Optimization and Its Applications 2021,* vol. 1, no. 1, pp. 46-46, 2022.

[24] A. Saputra, A. Fahrudin, A. S. Putra, N. Aisyah and V. Valentino, "The Effectiveness of Learning Basic Mathematics through Dice Games for 5-6 Years Old at TKIT Al-Muslim," *International Journal of Educational Research & Social Sciences,* vol. 2, no. 6, pp. 1698-1703, 2021.

[25] M. H. Riandi, H. Respati and S. Hidayatullah, "Conceptual Model of User Satisfaction as Mediator of E-Learning Services and System Quality on Students' Individual Performance," *International Journal of Research in Engineering, Science and Management,* vol. 4, no. 1, pp. 60-65, 2021.

[26] I. Ramadhan, A. Kurniawan and A. S. Putra, "Penentuan Pola Penindakan Pelanggaran Lalu Lintas di DKI Jakarta Menggunakan Metode Analytic Network Process (ANP)," *IKRA-ITH INFORMATIKA: Jurnal Komputer dan Informatika,* vol. 5, no. 1, pp. 51-57, 2020.

[27] A. S. Putra, M. T. Herawaty and N. Aisyah, "The Effectiveness Of Using E-Money On The Smart Transportation Payment System In The City Of Jakarta," *International Journal of Educational Research & Social Sciences,* vol. 3, no. 1, pp. 360-366, 2022.

[28] A. S. Putra, "Konsep Kota Pintar Dalam

....

Penerapan Sistem Pembayaran Menggunakan Kode QR Pada Pemesanan Tiket Elektronik," *TEKINFO Jurnal Ilmiah Teknik Informatika,* vol. 21, pp. 1-15, 2020.

[29] A. . S. Putra, . M. T. Herawaty and N. Aisyah, "The Effectiveness Of Using E-Money On The Smart Transportation Payment System In The City Of Jakarta," *International Journal of Educational Research & Social Sciences,* vol. 3, no. 1, pp. 360-366, 2022.

[30] A. S. Putra, "Teknologi Informasi (IT) Sebagai Alat Syiar Budaya Islam Di Bumi Nusantara Indonesia," *Seminar Nasional Universitas Indraprasta (SINASIS),* pp. 200-215, 2020.

[31] A. S. Putra, "Peran Sosial Media Sebagai Media Dakwah Di Zaman Pandemic Virus Corona Atau Covid 19 Di Indonesia," *Panangkaran: Jurnal Penelitian Agama dan Masyarakat,* pp. 1-12, 2021.

[32] A. S. Putra, "PENTING NYA KESADARAN HUKUM RAKYAT INDONESIA DI BIDANG TEKNOLOGI INFORMASI DI TINJAU DARI KEBERADAAN CYBERCRIME," *Seminar Nasional Inovasi dan Teknologi (SNIT) BSI,* pp. 36-50, 2012.

[33] A. S. Putra and . H. Kusuma, "Pengembangan Sistem Career Center untuk Departemen Konseling dan Pengembangan Karir di Institut Teknologi Budi Utomo," *Jurnal Khatulistiwa Informatika,* pp. 133-143, 2015.

[34] A. S. Putra, "Penerapan Konsep Kota Pintar dengan Cara Penerapan ERP (Electronic Road Price) di Jalan Ibu Kota DKI Jakarta. Jurnal Informatika Universitas Pamulang, 5(1), 13-18.," *Jurnal Informatika Universitas Pamulang, 5(1), 13-18.,* pp. 13-18, 2020.

[35] A. S. Putra and . R. R. Fatrilia, "Paradigma Belajar Mengaji Secara Online Pada Masa Pandemic Coronavirus Disease 2019 (Covid-19)," *MATAAZIR: Jurnal Administrasi dan Manajemen Pendidikan,* pp. 49-61, 2020.

[36] A. S. Putra and L. H. S. W. Harco , "Intelligent Traffic Monitoring System (ITMS) for Smart City Based on IoT Monitoring," *Indonesian Association for Pattern Recognition International Conference (INAPR) IEEE,* pp. 161-165, 2018.

[37] A. S. Putra, L. H. S. W. Harco , S. A. Bahtiar , T. Agung , . S. Wayan and H. K. Chu-, "Gamification in the e-Learning Process for children with Attention Deficit Hyperactivity Disorder (ADHD)," *Indonesian Association for Pattern Recognition International Conference (INAPR) IEEE,* pp. 182-185, 2018.

[38] A. S. Putra, L. H. S. W. Harco , L. G. Ford , . S. Benfano and A. Edi , "A Proposed surveillance model in an Intelligent Transportation System (ITS)," *Indonesian Association for Pattern Recognition International Conference (INAPR) IEEE,* pp. 156-160, 2018.

[39] A. S. Putra, ""Penggabungan Wilayah Kota Bekasi Dan Kota Tangerang Ke Wilayang Ibu Kota DKI Jakarta Berdasarkan Undang-Undang Nomor 23 Pasal 32 Tahun 2019 Dapat Membantu Mengwujudkan DKI Jakarta Menjadi Kota Pintar"," *Jurnal IPSIKOM VOL 7 No. 2,* 2019.

[40] A. S. Putra, H. L. H. S. Warnars, B. S. Abbas, A. Trisetyarso, W. Suparta and C.-. Ho Kang, ""Gamification in the e-Learning Process for children with Attention Deficit Hyperactivity Disorder (ADHD)"," *1st 2018 Indonesian Association for Pattern Recognit INAPR,* pp. 182-185, 2019.

[41] A. S. Putra, " "Smart City : konsep Kota pintar di DKI Jakarta"," *Jurnal TEKINFO, Vol 20, No 2, Hal 1-111, ISSN 1411-3635,* 2019.

[42] A. S. Putra, " "Smart City : Ganjil Genap

Solusi Atau Masalah Di DKI Jakarta","" *Jurnal IKRA-ITH Informatika Vol 3 No 3, ISSN 25804316 , ,* 2019.

[43] W. E. Pangesti, R. Suryadithia, M. Faisal, B. A. Wahid and A. S. Putra, "Collaborative Filtering Based Recommender Systems For Marketplace Applications," *International Journal of Educational Research & Social Sciences,* vol. 2, no. 5, pp. 1201-1209, 2021.

[44] D. Novitasari, A. Masduki , P. AGUS , I. Joni , S. Didi , . S. Nelson and S. P. Arman , "Peran Social Support terhadap Work Conflict, Kepuasan dan Kinerja," *JPIM (JURNAL PENELITIAN ILMU MANAJEMEN),* pp. 187-202, 2020.

[45] A. Medikano, H. Ludiya, R. Wirawan, P. M. Akhirianto, S. Rachmawati, A. Sebayang, D. Efriyenty, R. Riko, I. Svinarky, B. J. Tama and A. . S. Putra, "Smart Transportation for Jakarta Smart City Residents," *International Conference on Global Optimization and Its Applications 2021,* vol. 1, no. 1, pp. 21-21, 2021.

[46] E. K. Laksanawati and S. P. Arman, "ANALISA STUDI CONFORMITY OF PRODUCTION (COP) UNTUK DITERAPKAN DI BALAI PENGUJIAN LAIK JALAN DAN SERTIFIKASI KENDARAAN BERMOTOR (BPLJSKB) BEKASI," *Prosiding Seminar Nasional Aplikasi Sains & Teknologi (SNAST),* pp. 207-214, 2014.

[47] D. Katarina, A. Nurrohman, w. and A. S. Putra, "Decision Support System For The Best Student Selection Recommendation Using Ahp (Analytic Hierarchy Process) Method," *International Journal of Educational Research & Social Sciences,* vol. 2, no. 5, pp. 1210-1217, 2021.

[48] R. Hermawan, M. T. Habibie, D. Sutrisno, A. S. Putra and N. Aisyah, "Decision Support System For The Best Employee Selection Recommendation Using Ahp (Analytic Hierarchy Process) Method," *International Journal of*

Educational Research & Social Sciences, vol. 2, no. 5, pp. 1218-1226, 2021.

[49] M. S. Hartawan, A. S. Putra and A. Muktiono, "Smart City Concept for Integrated Citizen Information Smart Card or ICISC in DKI Jakarta," *International Journal of Science, Technology & Management,* pp. 364-370, 2020.

[50] P. K. Dhamarsa, Safrizal, . S. P. Arman and Suyanto, "Perancangan Aplikasi ITBU Career Center Berbasis Website Menggunakan PHP dan MYSQL," *TEKINFO UPI YAI,* pp. 1-105, 2019.

[51] N. K. Dewi and A. S. Putra, "SISTEM PENUNJANG KEPUTUSAN PENERIMAAN KARYAWAN BARU DENGAN ALGORITMA GREEDY," *Jurnal Visualika,* vol. 6, no. 2, pp. 154-160, 2020.

[52] N. K. Dewi and A. S. Putra, "Perkembangan Gamification dan Dampak Game Online terhadap Jiwa Manusia di Kota Pintar DKI Jakarta," *Jurnal Informatika Universitas Pamulang,* vol. 5, no. 3, pp. 315-320, 2020.

[53] N. K. Dewi and A. S. Putra, "Prosiding International Conference of Universitas Pekalongan," *Prosiding International Conference on Education of Suryakancana 2021 (ICONNECTS 2021),* pp. 321-326, 2021.

[54] N. K. Dewi and A. S. Putra, "LAW ENFORCEMENT IN SMART TRANSPORTATION SYSTEMS ON HIGHWAY," *Proceedings International Conference onEducation of Suryakancana 2021,* pp. 321-326, 2021.

[55] N. K. Dewi, . B. H. Irawan, E. Fitry and A. S. Putra, "Konsep Aplikasi E-Dakwah Untuk Generasi Milenial Jakarta," *IKRA-ITH INFORMATIKA: Jurnal Komputer dan Informatika,* vol. 5, no. 2, pp. 26-33, 2020.

[56] N. K. Dewi and A. S. Putra, "Decision

Support System for Head of Warehouse Selection Recommendation Using Analytic Hierarchy Process (AHP) Method," *Prosiding International Conference of Universitas Pekalongan,* pp. 1-12, 2021.

[57] H. W. F. G. B. S. E. A. Arman Syah Putra, " "A Proposed surveillance model in an Intelligent Transportation System (ITS)"," *1st 2018 Indonesian Association for Pattern Recognition International Conference, INAPR,* 2019.

[58] D. N. M. A. A. P. J. I. D. H. S. Y. C. Arman Syah Putra, ""Examine Relationship of Soft Skills, Hard Skills, Innovation and Performance: the Mediation Effect of Organizational Le," *IJSMS,* pp. 27-43, 2020.

[59] A. S. Putra, "Efektifitas Sistem Jalan Underpass untuk Kota Pintar DKI Jakarta," *Jurnal Informatika Universitas Pamulang,* vol. 5, no. 3, pp. 220-227, 2020.

[60] A. S. Putra, "Analisa Dan Perancangan Sistem Pembelian Makanan Di Restoran Pada Masa Pandemic Coronavirus Disease 2019 (Covid-19)," *Jurnal Esensi Komputasi (Jurnal Esensi Sistem Komputer dan Informasi),* vol. 4, no. 2, pp. 10-15, 2020.

[61] A. S. Putra, H. Warnars, F. Gaol, B. Soewito and E. Abdurachman, "A Proposed surveillance model in an Intelligent Transportation System (ITS)," *1st 2018 Indonesian Association for Pattern Recognition International Conference, INAPR 2018 - Proce vol. , 25,* pp. 1-10, January 2019.