



APTİKOM

The 7th International Conference
on Informatics and Computing (ICIC) 2022



ICIC 2022 PROGRAM BOOK

8 - 9 DECEMBER 2022

2022 Seventh International Conference on Informatics and Computing (ICIC)

Bali, Indonesia

(Hybrid Conference)

December 8-9, 2022

ISBN: 979-8-3503-4571-1

2022 Seventh International Conference on Informatics and Computing (ICIC)

Jakarta, Indonesia (Hybrid)

Phone: +6281384175979

Email: contact@icic-aptikom.org

Website: <https://icic-aptikom.org>

December 8-9, 2022

ISBN: 979-8-3503-4571-1

2022 Seventh International Conference on Informatics and Computing (ICIC)

Copyright ©2022 by the Institute of Electrical and Electronics Engineers, Inc. All rights reserved.

Copyright and Reprint Permission

Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law, for private use of patrons, those articles in this volume that carry a code at the bottom of the first page, provided that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

Other copying, reprint, or reproduction requests should be addressed to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331.

ISBN: 979-8-3503-4571-1

Additional copies of this publication are available from

Curran Associates, Inc.

57 Morehouse Lane

Red Hook, NY 12571 USA

+1 845 758 0400

+1 845 758 2633 (FAX)

PREFACE



It is my great pleasure to warmly welcome you to the Seventh International Conference on Informatics and Computing (ICIC 2022) held for the first time, in Hybrid mode. Online participation will be held via the Zoom Meeting platform, while offline event will take place in the land on Bali.

The ICIC is a conference series which is conducted annually by APTIKOM, the Indonesian Association of Higher Education in Informatics and Computing. This year the main theme of the conference is "Driving Digital Transformation Toward Society 5.0 through Smart Technology and Artificial Intelligence", with an intention to bring up more awareness in our society on the importance of Artificial Intelligence in the current era and beyond.

The ICIC conference series as a flagship conference of APTIKOM serves as an arena for academicians and their students, experts and practitioners from the industry to meet, present, and have fruitful discussions on their research works, ideas, and papers in the wide areas of Computing which covers Computer Science, Information Systems, Information Technology, Software Engineering, and Computer Engineering. The conference is set to provide opportunities for participants from both academia and industry to share and exchange knowledge as well as the cutting-edge development in the computing field. It is expected that the ICIC participants will be able to take away new thinking and horizon from this confederal meeting to further their works in the area.

There are 237 papers submission and only 130 papers are accepted which is around 54% acceptance rate. The accepted papers will be presented in one of the 9 regular parallel and tracks sessions and will be published in the conference proceedings volume. The diversity of authors come from 9 different countries.

All accepted papers are submitted to IEEE Xplore. IEEE Conference Number: #56845. Catalog Number: CFP22G52-ART ISBN: 979-8-3503-4571-1

On behalf of the ICIC 2022 organizers, we wish to extend our warm welcome and would like to thank for all Keynote Speakers, Reviewers, Authors, and Committees, for their effort, guidance, contribution and valuable support. We would like to also extend our gratitude to IEEE Indonesia Section for technically co-sponsored this event.

I wish you all a most wonderful, enjoyable, and productive conference in this ICIC 2022. Thank you.
Wa billahi taufiq wal hidayah. Wallahul muwaffiq ila aqwamit tharieq.
Wasalaamu 'alaykum warahmatullahi wabarakaatuh.

Yusuf Durachman
Organizing Chair

TABLE OF CONTENT

FRONT MATTER	ii-iv
PREFACE	v
COMMITTEES	vi-vii
TABLE OF CONTENT	viii-xxi

1	<p>Aw...The Museum is so "Dark": The Effect of Thermal Stimuli for Virtual Reality Experience and Emotion <i>Gabriel Indra Widi Tamtama, Halim Budi Santoso, Nila Armelia Windasari, Jyun-Cheng Wang</i></p>	1-7
2	<p>Optimized Random Forest Classifier Based on Genetic Algorithm for Heart Failure Prediction <i>Maria Ulfah Siregar, Ichsan Setiawan, Najmunda Zia Akmal, Dewi Wardani, Yessi Yunitasari, Ardhi Wijayanto</i></p>	8-13
3	<p>The Estimating of Nutrient Value in Apples Based on Size Employing the Canny Edge Detection Algorithm <i>Anis Fitri Nur Masruriyah, Muhammad Haidar Ijlal, Rahmat Rahmat, Hanny Hikmayanti Handayani, Deden Wahiddin, Ahmad Fauzi</i></p>	14-19
4	<p>Influence of Electronic Word Of Mouth (e-WOM), Hedonic Motivation, and Price Value On Consumer's Purchase Intention Using Social Commerce "TikTok Shop" <i>Mutia Maulida, Yuslena Sari, Siti Rohmah</i></p>	20-26
5	<p>The Influence of The COVID-19 Pandemics in Indonesia On Predicting Economic Sectors <i>Syafrial Fachri Pane, Heriyanto, Aji Gautama Putrada, Nur Alamsyah, Mohamad Nurkamal Fauzan</i></p>	27-32
6	<p>A PSO-GBR Solution for Association Rule Optimization on Supermarket Sales <i>Syafrial Fachri Pane, Aji Gautama Putrada, Nur Alamsyah, Mohamad Nurkamal Fauzan</i></p>	33-38
7	<p>SI-BIME Smart Learning Multimedia Platform for Students: a Solution for the Pandemic-19 in the Regions <i>Dina Fitria Murad, Titan, Taufik Darwis, Hardyansyah</i></p>	39-43

8	<p>Garbage Classification Using CNN Architecture ShuffleNet v2 <i>Eka Setya Wijaya, Andy Mizwar, Achmad Mujaddid Islami, Yuslena Sari, Erika Maulidiya, Irham Maulani Abdul Gani</i></p>	44-47
9	<p>Bankruptcy Prediction using Ensemble Support Vector Machine <i>Nurul Fathanah Mustamin, Jeffry, Supriyadi La Wungo, Firman Aziz, Nurafni Shahnyb, Ampauleng</i></p>	48-51
10	<p>Text Normalization on Code-Mixed Twitter Text using Language Detection <i>Rafi Dwi Rizqullah, Indra Budi</i></p>	52-55
11	<p>Mobile Application Performance Improvement with the Implementation of Code Refactor Based on Code Smells Identification: Dutataniku Agriculture Mobile App Case Study <i>Argo Wibowo, Antonius Rachmat Chrismanto, Maria Nila Anggia Rini, Lukas Chrisantyo</i></p>	56-62
12	<p>Public Sentiment Analysis of Indonesian Tweets About COVID-19 Vaccination Using Different Machine Learning Approaches <i>Valentinus Paramarta, Adele Mailangkay, Hilda Amalia, Desta Chrismas</i></p>	63-67
13	<p>Modeling and Simulation of Long Range (LoRa) Communication System on Smart Grid <i>Ismindari, Syafaruddin, Amil Ahmad Ilham, Ardiaty Arief</i></p>	68-73
14	<p>Validation and Verification of Business Architecture Process Based On The V . Model <i>Widia Febriyani, Firna Muningar Kistianti, Muharman Lubis</i></p>	74-79
15	<p>Fire Detection In Wetland Using YOLOv4 And Deep Learning Architecture <i>Andreyan Rizky Baskara, Yuslena Sari, Auria Andeni Anugerah, Eka Setya Wijaya, Ricardus Anggi Pramunendar</i></p>	80-85
16	<p>Design and Build a Attendance System and Employee Performance Assessment with a Website-Based Profile Matching Method <i>Hata Maulana, Noorlela Marcheta, Asep Taufik Muharram, Kamil Raihan Permana, Alifah Putri Aisyah</i></p>	86-90
17	<p>Comparison of the K-Nearest Neighbor and Decision Tree algorithm to the Sentiment Analysis of Investment Applications Users in Indonesia <i>Doni Purnama Alamsyah, Rizkiansyah, Asti Herliana, Tjia Fie Tjoe</i></p>	91-96

18	Investigation of Netizen Sentiment Analysis Toward The Controversy of Information and Electronic Transaction Law <i>Fahdi Saidi Lubis, Muharman Lubis, Lukmanul Hakim</i>	97-103
19	A Systematic Literature Review Enhanced Felder Silverman Learning Style Models (FSLSM) <i>Supangat, Mohd Zainuri Bin Saringat</i>	104-110
20	Prediction of Automobiles Prices Using Exploratory Data Analysis Based on Improved Machine Learning Techniques <i>Fadhil Muhammad Basysyar, Ferisanti, Maryam Wulandari, Indah Sucitra, Dian Ade Kurnia, Solikin Solikin</i>	111-116
21	A Systematic Literature Review of Barriers and Drivers E-Government in Developing Countries: TOE Framework Perspective <i>Dony Martinus Sihotang, Bambang Aria Yudhistira, Solikin Solikin, Widijanto Satyo Nugroho, Wahyu Catur Wibowo, Dana I. Sensuse, Achmad Nizar Hidayanto</i>	117-122
22	User Experience Analysis Using Usability Testing on Library and Knowledge Center BINUS University with SmartPLS <i>Dyaz Aerlangga, Rifky Muhammad Arsy, Gunawan Sunardy, Teguh Prasandy</i>	123-127
23	Acceptance Rate Analysis of Internal Management Operational Application on Pt. Sigma Cipta Caraka Using Technology Acceptance Model (TAM) <i>Fatimah Azzahra Ashari, Muhammad Qamra Zahran Muharam, Junia Himmayati, Teguh Prasandy</i>	128-131
24	Examining User Acceptance of MOOCs: The Role of Openness, Task Technology Fit, and Self-Efficacy <i>Bernardinus Harnadi, Albertus Dwiyooga Widianoro, FX. Hendra Prasetya</i>	132-137
25	Follicle Detection Model on Ovarian Ultrasound Image <i>Sri Hartati, Aina Musdholifah, Putu Desiana Wulaning Ayu</i>	138-145
26	Sentiment Analysis of "Hepatitis of Unknown Origin" on Social Media using Machine Learning <i>Nova Agustina, Harya Gusdevi, Diyah Wijayati, Iis Ismawati, Candra Nur Ihsan</i>	146-151
27	Online Learning and Students' Ethical Behavior During Covid-19: For Better or for Worse? <i>Febri Tri Intan Azhana, Rosita Widjojo, Doni Purnama Alamsyah, Khusnul Khotimah, Muchamad Rizky Zakaria</i>	152-156

28	ISO 15489 Attributes Prioritization in Electronic Document Management System of the First Level Healthcare Facilities <i>Intan Dzikria, Luvia Friska Narulita, Agus Hermanto, Geri Kusnanto</i>	157-162
29	Vanishing Point Detection using Angle-based Hough Transform and RANSAC <i>Dea Angelia Kamil, Wahyono, Agus Harjoko</i>	163-167
30	Classification and Sentiment Analysis on Tweets of the Ministry of Health Republic of Indonesia <i>Apriandy Angdresey, Indah Yessi Kairupan, Kenshin Geraldly Emor</i>	168-173
31	An Electricity Consumption Monitoring and Prediction System Based on The Internet of Things <i>Apriandy Angdresey, Lanny Sitanayah, Zefanya Marieke Philia Rumpesak</i>	174-179
32	Conditional Random Field for Crime News Information Extraction with Enhancement of SMOTE <i>Viny Christanti M., Veronika, Dali S. Naga</i>	180-185
33	The Implementation of Real-ESRGAN as An Anticipation to Reduce CER Value in Plate Number Extraction Results Employing EasyOCR <i>Geo Septian, Deden Wahiddin, Hilda Yulia Novita, Hanny Hikmayanti Handayani, Ayu Ratna Juwita, Anis Fitri Nur Masruriyah</i>	186-190
34	Learner Action Patterns in the Problem-Solving Process Related to Program Code Composition Based on Tracking System Activities <i>Aulia Akhrian Syahidi, Ahmad Afif Supianto, Tsukasa Hirashima, Yutaka Watanobe</i>	191-197
35	Mobile Device Positioning by Using Dynamic Weighted Centroid Model <i>Rifki Kosasih, Ahmad Sabri</i>	198-201
36	Multiclass Intent Classification for Chatbot Based on Machine Learning Algorithm <i>W. M. Amir Fazamin W. Hamzah, Mohd Kamir Yusof, Ismahafezi Ismail, Mokhairi Makhtar, Hasnah Nawang, Azwa Abdul Aziz</i>	202-207
37	IoT-Agri: IoT-based Environment Control and Monitoring System for Agriculture <i>Adimas Ketut Nalendra, Dona Wahyudi, M. Mujiono, M. Nur Fuad, Ni'ma Kholila</i>	208-213

38	<p>Analysis of Design Implementation Guidelines for Data Governance Management Based on DAMA-DMBOKv2</p> <p><i>Fadhil Rozi Hendrawan, Tien Fabrianti Kusumasari, Rokhman Fauzi</i></p>	214-219
39	<p>Implementation of Modified Linear Congruent Methods in Randomizing Exam Questions to Optimize the Learning Environment</p> <p><i>Maxrizal, Sujono, Baiq Desy Aniska Prayanti, Syafrul Irawadi</i></p>	220-223
40	<p>Enterprise Architecture Planning based on One Data in Indonesian Higher Education</p> <p><i>Hery Dian Septama, Muhamad Komarudin, Puput Budi Wintoro, Mahendra Pratama, Titin Yulianti, Bambang Sundari</i></p>	224-229
41	<p>Spelling Correction Using the Levenshtein Distance and Nazief and Adriani Algorithm for Keyword Search Process Indonesian Qur'an Translation</p> <p><i>Muhammad Iskandar Yahya, Arini, Victor Amrizal, Iik Muhamad Malik Matin, Dewi Khairani</i></p>	230-235
42	<p>A Study on Text Feature Selection Using Ant Colony and Grey Wolf Optimization</p> <p><i>Joan Angelina Widians, Retantyo Wardoyo, Sri Hartati</i></p>	236-242
43	<p>Improvising Low Contrast Malaria Images Using Contrast Enhancement Techniques on Various Color Models</p> <p><i>Doni Setyawan, Retantyo Wardoyo, Moh Edi Wibowo, E. Elsa Herdiana Murhandarwati</i></p>	243-248
44	<p>Comparison of Smoothing Methods to Remove Artifacts in Emotion Recognition based on Electroencephalogram Signals</p> <p><i>I Made Agus Wirawan, Retantyo Wardoyo, Danang Lelono, Sri Kusrohmaniah</i></p>	249-256
45	<p>New Approach of Covid-19 Prevention by Implemented Combination of Decision Support System Algorithm</p> <p><i>Eddy Soeryanto Soegoto, Yeffry Handoko Putra, Rahma Wahdiniwaty, Zuriani Ahmad Zukarnain, Noorihan Abdul Rahman</i></p>	257-263
46	<p>An experimental study on binary optimization using quantum annealing in D-Wave</p> <p><i>Nongmeikapam Brajabidhu Singh, Gopal Krishna, Arnab Roy, Joseph L Pachuau, Anish Kumar Saha</i></p>	264-268

47	Oil Well Monitoring System Based on IoT Technology and Machine Learning <i>Evizal Abdul Kadir, Muslim Abdurrahman, Sharul Kamal Abdul Rahim, Agus Arsad, Sri Listia Rosa, Apri Siswanto</i>	269-274
48	Gamification using Octalysis Framework in Knowledge Management System for Vocational High Schools during the Covid-19 Pandemic <i>Mgs. Afriyan Firdaus, Dwi Rosa Indah, Yoppy Sazaki, Eka Prasetyo Ariefin, Muhammad Fachri Nuriza, Muhammad Rafly</i>	275-282
49	Classification of Chili Plant Condition based on Color and Texture Features <i>Deffa Rahadiyan, Sri Hartati, Wahyono, Andri Prima Nugroho</i>	283-289
50	Face Recognition System Using Feature Extraction Method of 2-D Gabor Wavelet Filter Bank and Distance-Based Similarity Measures <i>R. Rizal Isnanto, Ajub Ajulian Zahra, Andre Lukito Kurniawan, Ike Pertiwi Windasari</i>	290-293
51	Design of Blind Community Assistance Devices with Indoor Positioning System Technology <i>Bong Cen Choi, David Habsara Hareva, Samuel Lukas</i>	294-299
52	The Follower-Influencer Experience Affecting the Intention to Follow Recommendation: PAD Perspective <i>Dedi I. Inan, Achmad Nizar Hidayanto, Ratna Juita, Adam Maulana, Dinda Mutiara Qur'ani Putri, Muhammad Fariz Farhan, Siti Kaamiliaa Hasnaa, Marlinda Sanglise</i>	300-305
53	Adaptive Cooling System for Comfortable Learning <i>David Habsara Hareva, Andre Andre, Benny Hardjono, Calandra Alencia Haryani, Irene Astuti Lazarusli</i>	306-310
54	Motivation and Drivers for Online Fashion Rental: Study by Social Networking Sites in Indonesia <i>Margareth Setiawan, Sandy Setiawan, Aris Darisman, Rosyidah Rahmah</i>	311-316
55	UT Metaverse: Beyond Universitas Terbuka Governance Transformation and Open Challenges <i>Antares Firman, Ali Muktiyanto, Dedi I. Inan, Ratna Juita, Ghassan Beydoun, Daryono</i>	317-322
	Analysis of Face Data Augmentation in Various Poses for Face Recognition Model	

56	<i>T. M. Syahril Nur Alamsyah, Taufik Fuadi Abidin, Ridha Ferdhiana, M. Dirhamsyah, Muhammad Chaidir</i>	323-328
	Utilization of Linguistic Data for Learner Assessment on e-Learning: Instrument and Processing	
57	<i>Wenty Dwi Yuniarti, Sri Hartati, Sigit Priyanta, Herman Dwi Surjono</i>	329-333
	Grading Problem-Solving for Clustering Students' Score Using Dynamic Programming Procedure in The Context of Dynamic Time Warping	
58	<i>Mochamad Nizar Palefi Ma'ady, Tabina Shafa Nabila Syahda, Muhammad Nasrullah, Anindya Salwa Salsabila, Uily Asfari, Hawwin Mardhiana</i>	334-338
	The 7-Phases Preprocessing Based On Extractive Text Summarization	
59	<i>Adhika Pramita Widyassari, Edy Noersasongko, Abdul Syukur, Affandy</i>	339-344
	Dual Cluster Head Selection Based on LEACH and Differential Search Algorithm to Extend Network Lifetime in Wireless Sensor Network	
60	<i>Kun Nursyaiful Priyo Pamungkas, Supeno Djanali, Radityo Anggoro, Paliling, Puhriani Burhan, Feriyadi</i>	345-351
	The Evaluation on Acceptance of the Use of Social Media in the Implementation of Blended Learning in Private Higher Education in Indonesia	
61	<i>Fahmi Yusuf, A'ang Subiyakto, Titik Khawa</i>	352-358
	Blockchain-Based Multiple Server Database System Prototype on BMKG Automatic Weather Station (AWS) Center Architecture	
62	<i>Handi Sutriyan, Agung Sunaryadi, Marzuki Sinambela</i>	359-364
	Low Cloud Type Classification System Using Convolutional Neural Network Algorithm	
63	<i>Muhammad Naufal Fikriansyah, Hapsoro Agung Nugroho, Marzuki Sinambela</i>	365-370
	Dynamic Pricing Analytic of Airbnb Amsterdam Using K-Means Clustering	
64	<i>Fitrianingsih, Dewi Agushinta Rahayu, Figa Rizfa Zazila</i>	371-377
	Systematic Literature Review of Text Feature Extraction	
65	<i>Agus Mulyanto, Sri Hartati, Retantyo Wardoyo</i>	378-383

66	<p>Food Vloggers: Mapping the Relationships between Personal Relevance, Customer Engagement, and Repurchase Decision</p> <p><i>Arif Murti Rozamuri, Johan Setiawan, Christian Haposan Pangaribuan, Hidayanti, Tri Wismiarsi, Maria Wahyuni</i></p>	384-389
67	<p>Model Implementation of Application Programming Interface for E-Government Data Integration</p> <p><i>Agus Sifaunajah, Tholib Hariono, Moh. Anshori Aris Widya, Primaadi Airlangga, Sujono, Siti Sufaidah</i></p>	390-395
68	<p>A Time-Window Approach to Recommending Emerging and On-the-rise Items</p> <p><i>Tubagus Mohammad Akhriza, Indah Dwi Mumpuni</i></p>	396-403
69	<p>Topic Modeling on Covid-19 Vaccination in Indonesia Using LDA Model</p> <p><i>Nurul Mutiah, Dian Prawira, Ibnur Rusi</i></p>	404-409
70	<p>Prediction of Work From Home Post COVID-19 using Classification Model</p> <p><i>Risanti Galuh, Johan Setiawan</i></p>	410-415
71	<p>Automatic Determination of Seeded Region Growing Parameters in Watershed Regions to Segmentation of Tuna</p> <p><i>Wanvy Arifha Saputra, Agus Zainal Arifin, Nuruddin Wiranda, Edi Yohanes, Zainal Abidin, Bambang Suriansyah</i></p>	416-423
72	<p>GeoJSON Implementation for Demographic and Geographic Data Integration Using RESTful Web Services</p> <p><i>Alam Rahmatulloh, Bambang Tri Handoko, Rahmi Nur Shofa, Irfan Darmawan</i></p>	424-429
73	<p>Android-based Matrix Learning Media to Increase Student Interest in Learning</p> <p><i>Isna Wardiah, Rahimi Fitri, Reza Fauzan, Seberan, Fuad Sholihin</i></p>	430-435
74	<p>M-Government Adoption in Indonesia: Self-Determination Theory</p> <p><i>Dedi I. Inan, Achmad Nizar Hidayanto, Ratna Juita, Antares Firman, Ali Muktiyanto, Hermawan Wibisana Arifin, Muhammad Rizky Darmawan, Nabilla Yuli Shafira, Cassie Michelle</i></p>	436-441
75	<p>Games for Scrum Team Collaboration in the Global Software Development Environment: A Literature Review</p> <p><i>Anita Hidayati, Iklima Ermis Ismail, Ade Rahma Yuly, Henry Edison</i></p>	442-446

	Digital Transformation Impact Analysis towards Transition in the Role of Information Technology for Organization in New Digital Bank	
76	<i>Yosua Pangihutan Sagala, Muhammad Akmal Juniawan, Vina Ardelia Effendy, Rahmawati Putrianasari, Vien Aulia Rahmatika, Muhammad Rifki Shihab, Benny Ranti</i>	447-452
	Analysis of Critical Success Factors in Information Technology Projects: A National Shipping Company Case Study	
77	<i>Ivan Eka Aditya, Ardhy Wisdarianto, Teguh Raharjo</i>	453-459
	Rice seed classification using machine learning and deep learning	
78	<i>Budi Dwi Satoto, Devie Rosa Anamisa, Muhammad Yusuf, M Kautsar Sophan, Siti Oryza Khairunnisa, Budi Irmawati</i>	460-466
	1D Convolutional Neural Network to Detect Ventricular Fibrillation	
79	<i>Sava Savero, David Agustriawan, Muammar Sadrawi</i>	467-471
	Analysis for Data Mobility and Covid-19 Positive Rate with Multilayer Perceptron	
80	<i>Arie Vatesia, Ruvita Faurina, Rizki Zulfahmi</i>	472-477
	Multibranch Convolutional Neural Network For Gender And Age Identification Using Multiclass Classification And FaceNet Model	
81	<i>Haris Setiawan, Mudrik Alaydrus, Abdi Wahab</i>	478-483
	Detecting Online Outlier for Data Streams using Recursive Residual	
82	<i>Yasi Dani, Agus Yodi Gunawan, Sapto Wahyu Indratno</i>	484-490
	Implementation of Adaptive Bit Decision Point to Improve Receiver Performance in Li-Fi System	
83	<i>Juan Salao Biantong, Mudrik Alaydrus, Ahmad Sony Alfathany</i>	491-496
	Adoption Technology at MSMEs: A Conceptual Model with TOE	
84	<i>Evi Triandini, I Gusti Ngurah Satria Wijaya, I Ketut Putu Suniantara, Sugiarto, Djoko Budiyanto Setyohadi</i>	497-501
	Chunk Learning Media for Cognitive Load Optimization on Science Learning	
85	<i>Ng Melissa Angga, Cicilia Caroline Phieranto, Fonny Tejo, Dionisius Yovan, Angelica Angelica, Felicia Sumarsono Putri</i>	502-507
	Topic Modeling for Cyber Threat Intelligence (CTI)	

86	<i>Hatma Suryotrisongko, Hari Ginardi, Henning Titi Ciptaningtyas, Saeed Dehqan, Yasuo Musashi</i>	508-514
	LongSpam: Spam Email Detection Using LSTM Algorithm	
87	<i>Nurhadi Wijaya, Yudianingsih, Evrita Lusiana, Sugeng Winardi, Zaidir, Agus Qomaruddin Munir</i>	515-520
	Improving Candle Direction Classification in Forex Market using Support Vector Machine with Hyperparameters Tuning	
88	<i>Raymond Sunardi Oetama, Yaya Heryadi, Lukas Lukas, Wayan Suparta</i>	521-526
	Energy Efficiency in Buildings Using Multivariate Extreme Gradient Boosting	
89	<i>Triando Hamonangan Saragih, Rahmat Ramadhani, Muhammad Itqan Mazdadi, Muhammad Haekal</i>	527-531
	LSTM and ARIMA for Forecasting COVID-19 Positive and Mortality Cases in DKI Jakarta and West Java	
90	<i>Syafrial Fachri Pane, Adiwijaya, Mahmud Dwi Sulistiyo, Alfian Akbar Gozali</i>	532-537
	Sentiment Analysis on Cryptocurrency Based on Tweets and Retweets Using Support Vector Machines and Chi-Square	
91	<i>Isabella Donita Hasan, Raymond Sunardi Oetama, Aldo Lionel Saonard</i>	538-543
	Augmented Reality English Education Based iOS with MobileNetV2 Image Recognition Model	
92	<i>Doni Purnama Alamsyah, Yudi Ramdhani, Agus Tiyansyah Syam, Ahmad Setiadi</i>	544-548
	Sentiment Classification of Visitors in Yogyakarta Palace using Support Vector Machine	
93	<i>Cahaya Damarjati, Fadia Rani, Slamet Riyadi, Gan Kok Beng</i>	549-553
	The Comparison of Sentiment Analysis Algorithm for Fake Review Detection of The Leading Online Stores in Indonesia	
94	<i>Pius Hans Christian, Ririn Ikana Desanti</i>	554-557
	Hate Speech Detection in Code-Mixed Indonesian Social Media: Exploiting Multilingual Languages Resources	
95	<i>Endang Wahyu Pamungkas, Azizah Fatmawati, Yusuf Sulisty Nugroho, Dedi Gunawan, Endah Sudarmilah</i>	558-562
	Semantic Segmentation of Landsat Satellite Imagery	
96	<i>Herlawati Herlawati, Rahmadya Trias Handayanto, Prima Dina Atika, Sugiyatno Sugiyatno, Rasim Rasim, Mugiarto Mugiarto, Andy Achmad Hendharsetiawan, Jaja Jaja, Santi Purwanti</i>	563-568

97	DeepRec: Efficient Product Recommendation Model for E-Commerce using CNN <i>Hamzah, Erizal, Mohammad Diqi</i>	569-574
98	Comparison of Convolutional Neural Network Models to Detect Covid-19 on CT-Scan Images <i>Slamet Riyadi, Suci Rahmadina M. Rasyid, Cahya Damarjati</i>	575-579
99	Data Pipeline Framework for AIS Data Processing <i>Ni Kadek Bumi Krismentari, I Made Oka Widyantara, Ngurah Indra ER, I Made Dwi Putra Asana, I Putu Noven Hartawan, I Gede Sudiantara</i>	580-585
100	User Experience Evaluation of IT Support Mobile Application Using System Usability Scale (SUS) and Retrospective Think Aloud (RTA) <i>Immanuel Revelino Murmanto, Sunardi, Ratih Muthiah Kamilia, Ganis Maulia Yusuf, Rizki Kurniawan</i>	586-593
101	Development of Portal Signer for Digital Products by Using Iterative Model at PT RST <i>Manogunawan Resqi Gultom, Riyanthi Angrainy Sianturi, Rince Septriana Parhusip, Ova Ferdinan Marbun, Yohanssen Pratama</i>	594-602
102	Portable Monitoring Systems for Rivers Waste Based on Internet of Things <i>Henderi Henderi, Mumammad Hudzaifah Nasrullah, Laura Belani Nudiyah, Po Abas Sunarya, Sofa Sofiana, Didik Setiyadi</i>	603-607
103	Monitoring Indoor Air Quality for Thermal Comfort using Internet of Things <i>Rahmi Andarini, Moeljono Widjaja</i>	608-613
104	Adopting Haar Cascade Algorithm on Mask Detection System Based on Distance <i>Jemakmun, Rudi Suhirja, Darius Antoni, Hadi Syaputra</i>	614-618
105	Impact of Leadership in Transitioning IT Roles from Turnaround to Strategic: Case Study of PT. XYZ <i>Paulus Donny Junianto</i>	619-624
106	Usability Evaluation on Educational Chatbot using the System Usability Scale (SUS) <i>Arief Hidayat, Agung Nugroho, Safa'ah Nurfa'izin</i>	625-629

107	Real Time Web-based Facemask Detection <i>Geraldo Pan, Suryasari, Haditya Setiawan, Aminuddin Rizal</i>	630-634
108	Interaction Design of Indonesian Anti Hoax Chatbot using User Centered Design <i>Ryan Daniel, Ayu Purwarianti, Dessi Puji Lestari</i>	635-640
109	Mobile Augmented Reality for Japanese Vocabulary and Hiragana Letters Learning with Mnemonic Method <i>Riri Safitri, Resnia Trya Muslima, Sandra Herlina</i>	641-647
110	Analysis of Discussion Tendency on Twitter using Text Classification <i>Reyvan Rizky Irsandi, Ayu Purwarianti</i>	648-654
111	Usability Improvement Through User Interface Design With Human Centered Design (HCD) Method On Junior High School Websites <i>Saepul Aripriyanto, Muhamad Azhari, Riana Munawarohman, Siti Ummi Masruroh, Dewi Khairani, Husni Teja Sukmana</i>	655-661
112	Educational Question Classification with Pre-trained Language Models <i>Said Al Faraby, Adiwijaya, Ade Romadhony</i>	662-667
113	Evaluation of Enterprise Resource Planning (ERP) and Open-source ERP Modification for Performance Improvement <i>Ananda, Jansen Wiratama</i>	668-676
114	Adaptivo: A Personalized Adaptive E-Learning System based on Learning Styles and Prior Knowledge <i>M.A.M Rishard, S.L Jayasekara, E.M.P.U Ekanayake, K.M.J.S Wickramathilake, Shyam Reyal, Kalpani Manathunga, Jagath Wickramarathne</i>	677-685
115	Data Balance Optimization of Fraud Classification for E-Commerce Transaction <i>Aida Fitriyani, Wowon Priatna, Tyastuti Sri Lestari, Dwipa Handayani, TB Ai Munandar, Amri</i>	686-689
116	YoBagi's User Experience Evaluation using User Experience Questionnaire <i>Fransiskus Panca Juniawan, Dwi Yuny Sylfania, Rendy Rian Chrisna Putra, Henderi Henderi</i>	690-693
	A Floor Cleaning Based-Robotic Combines A Microcontroller And A Smartphone	

117	<i>Jafar Shadiq, Rita Wahyuni Arifin, Bayu Aji Prayoga, Sumardiono S., Ari Nurul Alfian, Solikin Solikin</i>	694-698
	Implementation of Internship Decision Support System Using Simple Multi Attribute Rating Technique (SMART)	
118	<i>Pajri Aprilio, SY Yuliani</i>	699-705
	Implementation of One Data-based Lecturer Profile Information System for Key Performance Indicator Monitoring	
119	<i>Hery Dian Septama, Muhamad Komarudin, Puput Budi Wintoro, Mahendra Pratama, Titin Yulianti, Wahyu Eko Sulistiono</i>	706-712
	Travel Budget Prediction for Determining Tourism Objects Using Simple Additive Weighting (SAW) Algorithm	
120	<i>H Hartatik, Nurul Firdaus, Rudi Hartono, Berliana Kusuma Riasti, Agus Purbayu, Fiddin Yusufida A'la</i>	713-718
	Optimization Analysis of Neural Network Algorithms Using Bagging Techniques on Classification of Date Fruit Types	
121	<i>Rully Pramudita, Solikin Solikin, Nadya Safitri</i>	719-723
	Machine Learning Model Based on REST API for Predicting Tenders Winner	
122	<i>Mardi Yudhi Putra, Rachmad Nur Hayat, Ahmad Chusyairi, Dwi Ismiyana Putri, Solikin Solikin</i>	724-728
	IoT-Based Smart Bin Using Smell, Weight, And Height Sensors	
123	<i>Abraham Bulyan Zebua, Muhammad Fahrul Azmi Husni, Muhammad Naufal, Andri Andri, Syanti Irviantina</i>	729-733
	The role of management technology and innovation strategy in business strategy based on a user perspective	
124	<i>Nina Kurnia Hikmawati, Yusuf Durachman, Husni Teja Sukmana, Herlino Nanang</i>	734-738
	Implementation of Discrete Cosine Transform and Permutation-Substitution Scheme Based on Henon Chaotic Map for Images	
125	<i>Irpan Adiputra Pardosi</i>	739-743
	E-Archive Document Clustering Information System Using K-Means Algorithm	
126	<i>Aida Fitriyani, Dwipa Handayani, Achmad Noeman, Asep Ramdhani Mahbub, Ratna Salkiawati, Ahmad Fathurrozi</i>	744-748
	Usability Testing Analysis of Company Website System In Indonesia	

127	<i>Rangga Firdaus, Nina Kurnia Hikmawati, Yusuf Durachman, Herlino Nanang, Dewi Khairani, Muhammad Syauqi Hazimi</i>	749-754
	Towards Tourism Management Platform for Culinary Tourism Management and Merchandise E-Catalogs	
128	<i>Nurul Firdaus, Salsabila Fithriyah, Hartatik, Agus Purbayu, Fiddin Yusufida A'la, Berliana Kusuma Riasti</i>	755-760
	The Influence of Blended Learning with Flipped Classroom Model on Motivation in Learning Geography	
129	<i>Nur Azizah, Jakiatin Nisa, Syairul Bahar, Andri Noor Ardiansyah, Abd. Rozak</i>	761-764
	Design and Implementation of Free Ambulance Service System in Bandar Lampung City Based on Android Mobile Application	
130	<i>Gigih Forda Nama, Candra Kurnia Nugraha, Hery Dian Septama</i>	765-771
	AUTHOR INDEX	772-783



UNIVERSITAS BHAYANGKARA JAKARTA RAYA
FAKULTAS ILMU KOMPUTER

Kampus I: Jl. Harsono RM No. 67, Ragunan, Pasar Minggu, Jakarta Selatan 12550
Telepon: (021) 27808121 – 27808882
Kampus II: Jl. Raya Perjuangan, Marga Mulya, Bekasi Utara, Jawa Barat, 17142
Telepon: (021) 88955882, Fax.: (021) 88955871
Web: fasilkom.ubharajaya.ac.id, E-mail: fasilkom@ubharajaya.ac.id

SURAT TUGAS

Nomor: ST/1326/XII/2022/FASILKOM-UBJ

1. Dasar: Kalender Akademik Ubhara Jaya Tahun Akademik 2022/2023.
2. Dalam rangka mewujudkan Tri Dharma Perguruan Tinggi untuk Dosen di Universitas Bhayangkara Jakarta Raya maka dihimbau untuk melakukan Penelitian.
3. Sehubungan dengan hal tersebut di atas, maka Dekan Fakultas Ilmu Komputer Universitas Bhayangkara Jakarta Raya menugaskan:

NO.	NAMA	NIDN	JABATAN	KETERANGAN
1.	Aida Fitriyani, S.Kom., M.M.S.I.	0302078508	Dosen Tetap Prodi Informatika	Sebagai Penulis Pertama
2.	Dwipa Handayani, S.Kom., M.M.S.I.	0317078008	Dosen Tetap Prodi Informatika	Sebagai Penulis Kedua
3.	Achmad Noe'man, S.Kom., M.Kom.	0328048402	Dosen Tetap Prodi Informatika	Sebagai Penulis Ketiga
4.	Asep Ramdhani Mahbub, S.Kom., M.Kom.	0329087703	Dosen Tetap Prodi Informatika	Sebagai Penulis Keempat
5.	Ratna Salkiawati, S.T., M.Kom.	0310038006	Dosen Tetap Prodi Informatika	Sebagai Penulis Kelima
6.	Ahmad Fathurrozi, S.E., M.M.S.I.	0327117402	Dosen Tetap Prodi Informatika	Sebagai Penulis Keenam

Membuat Artikel Ilmiah dengan judul "**E-Archive Document Clustering Information System Using K-Means Algorithm**" pada Prociding 2022 Seventh International Conference on Informatics and Computing (ICIC), 13 Januari 2023, DOI: 10.1109/ICIC56845.2022.10007028.

4. Demikian penugasan ini agar dapat dilaksanakan dengan penuh rasa tanggung jawab.

Jakarta, 06 Desember 2022
DEKAN FAKULTAS ILMU KOMPUTER

Dr. Dra. Tyastuti Sri Lestari, M.M.
NIP. 1408206

E-Archive Document Clustering Information System Using K-Means Algorithm

Aida Fitriyani

Faculty of Computer Science
Universitas Bhayangkara Jakarta Raya
Jakarta, Indonesia 17121
aida.fitriyani@dsn.ubharajaya.ac.id

Dwipa Handayani

Faculty of Computer Science
Universitas Bhayangkara Jakarta Raya
Jakarta, Indonesia 17121
dwipa.handayani@dsn.ubharajaya.ac.id

Achmad Noeman

Faculty of Computer Science
Universitas Bhayangkara Jakarta Raya
Jakarta, Indonesia 17121
achmad.noeman@dsn.ubharajaya.ac.id

Asep Ramdhani Mahbub

Faculty of Computer Science
Universitas Bhayangkara Jakarta Raya
Jakarta, Indonesia 17121
asep.ramdhani@dsn.ubharajaya.ac.id

Ratna Salkiawati

Faculty of Computer Science
Universitas Bhayangkara Jakarta Raya
Jakarta, Indonesia 17121
ratna.salkiawati@dsn.ubharajaya.ac.id

Ahmad Fathurrozi

Faculty of Computer Science
Universitas Bhayangkara Jakarta Raya
Jakarta, Indonesia 17121
ahmad.fathurrozi@dsn.ubharajaya.ac.id

Abstract— Archiving is an important activity in a company, because the archive is a form of decision making as physical evidence owned by the company. Records management system in a company or organization must be managed properly. Currently, the archive management system is still manual which has the risk of documents being easily damaged and lost either due to natural disasters or unwanted accidents. Therefore, it is necessary to manage archives that can use a computerized system to facilitate users and avoid data loss with various factors. The research method uses the K-Means Clustering algorithm to facilitate the process of grouping archives, and the prototype is the method that will be used for software development. The function of this application is to simplify the process of archiving and searching for archived data. Management carried out by the system includes archive storage, archive destruction, and archive file reports.

Keywords— Archives, K-Means Algorithm, Clustering

I. INTRODUCTION

Archives are the beginning of information in an organization, company and all of its stakeholders, this is because the archive is part of the evidence that will be responsible for its authenticity for all activities that have been carried out in the organization and one form of decision making as physical evidence owned by the company [1].

The importance of archives that act as decision making to be made into physical evidence, therefore archives that have been stored in an organization must be managed properly. Archiving is an activity to store data to be used as evidence of correct information and according to needs without any confusion or ambiguity in processing information [1].

The existence of the archive has its own very important place for all users, be it a company or organization, but that does not mean separating themselves from the company or organization [2]. At this time the archive management system is still manual which has the risk of documents being easily damaged and lost either due to natural disasters or unwanted accidents. Therefore, archive management is needed that can use a computerized system to facilitate users and avoid data loss with various factors.

The k-means clustering algorithm in data grouping is based on the distance between a large number of data to

the cluster centroid point obtained through an iterative process quickly and efficiently, [3].

Prototype is a process of the initial stages in the design of a structured system by going through the stages in the manufacturing process, with the aim of developing the model into the final result of the final system. The stages that must be passed in the prototype method include: gathering requirements, designing and evaluating prototypes [6].

Clustering is a technique of grouping data by separating data with identical elements. In the IT world this classification method is carried out for grouping certain data in large quantities [7].

Therefore, with a web-based E-Archive information system, the archiving process will be easier in grouping using the K-Means Clusterization algorithm technique, so it is hoped that it can help and simplify the grouping process in the archiving system. The K-Means method uses a working method by grouping data (clusters) based on predetermined characteristics [7].

II. METHODOLOGY

K-Means can be defined as a grouping of data that is unsupervised learning which functions to group data into data clusters [9]. The steps in implementing the K-Means Clustering algorithm [3]:

1. Determination of the number of clusters k
2. Determination of the value of the center that is used as a basis later. Done at random or self-chosen.
3. Data allocation which is seen from the proximity of the data to the central value with the data placement formula based on the following:

$$D_i = \sqrt{((X_i - K)^2 + (Y_i - S)^2)}$$

Symbols :

D_i : Distance i to centroid

i : number of data objects

X, Y : The coordinates of the data object, the X coordinates of the data object variable 1, the Y coordinates of the data object variable 2, and so on if there are more than 2 sample variables as follows:

TABLE II. ARCHIVE DOCUMENT DATA

No	Department	No	Date
1	PPIC	MTO Platform, Ladder and Handrail IKPT R.1	15-Jun-21
2	PPIC	JBT-00032-MTO Jembatan A50-N R.0 & PR 173951	15-Jun-21
3	Engineering	Cutting plan jembatan A-50N R.0	15-Jun-21
4	Engineering	Terlampir cutting plan jembatan B-60 2 UNIT R.0	15-Jun-21
5	Marketing	SPK No S-JBT-00034-VI-2021 Jembatan PT. Triwira Bangun Sejahtera	14-Jun-21
6	Marketing	Desain Drawing Ladder Platform Dearator	15-Jun-21
7	Marketing	Desain Drawing Ladder Platform Transfer Air Receiver	15-Jun-21
8	PPIC	JBT-00033-MTO Jembatan B-60 2 UNIT R.0 & PR 173947	15-Jun-21
9	Engineering	Report list JPO Manggarai R.2	14-Jun-21
10	Engineering	Cutting plan tambahan pipe support jpo	16-Jun-21
11	PPIC	MTO Palu-3 Wika R. 2	14-Jun-21
12	PPIC	MTO Palu-3 Wika R. 3	16-Jun-21
13	Marketing	SPK S-JBT-00036-VI-2021 Jembatan AG20S PT. Wiratama Globalindo Ja	16-Jun-21
14	Marketing	Desain Drawing Ladder Platform Instrument	16-Jun-21
15	Engineering	JBT-00031-Report List Jembatan C-24.4	16-Jun-21
16	Engineering	JBT-00031-Welded Beam Jembatan C-24.4 R.0	7-Jun-21
17	Engineering	Welded jembatan C.24 R.1	8-Jun-21
18	Marketing	SPK S-KUM-00027-VI-2021 JPO Manggarai Pipe Support PT NCK	16-Jun-21
19	PPIC	MTO conveyor TLS-5 R.18	16-Jun-21
20	PPIC	MTO Incenerator R.5	16-Jun-21
21	PPIC	JBT-00031-MTO Jembatan C-24.4 R.0	8-Jun-21
22	PPIC	JBT-00031-MTO Jembatan C-24.4 R.1	16-Jun-21
23	Engineering	KUM-00015-Report List Limestone - Palu3 R.0	17-Jun-21
24	Marketing	Design Drawing Buchket Wheel Structure	17-Jun-21
25	Marketing	Design Drawing Buchket Wheel Structure	18-Jun-21
26	Engineering	report Palet Pipe Sleeve.	15-Jun-21
27	Marketing	SPK No S-JBT-00037-VI-2021 PT. Wiratama Globalindo Jaya	21-Jun-21
28	Engineering	KUM-00015-Report List Fire Station & Fire Pump Shelter-Palu3 R.1	21-Jun-21
29	Engineering	Cutting Plan Limestone -Palu3 R.0	17-Jun-21
30	Engineering	KUM-00015-Report List Fire Station & Fire Pump Shelter-Palu3 R.0	14-Jun-21
31	Engineering	KUM-00015-Report List Workshop & Warehouse-Palu3 R.1	21-Jun-21
32	PPIC	MTO Linkset Jembatan B-60	22-Jun-21
33	PPIC	MTO Jembatan AG-20S	22-Jun-21
34	Marketing	Design Drawing Buchket Wheel Structure	22-Jun-21
35	Marketing	Design Drawing Continuous Ship Unloader Shop Drawing and Document	22-Jun-21
36	Marketing	SPK No C-KUM-00028-VI-2021 PT. Nindya Karya (persero) Tbk	23-Jun-21
37	Marketing	SPK No S-JBT-00038-VI-2021 PT. Wiratama Globalindo Jaya	23-Jun-21
38	Marketing	SPK No S-JBT-00039-VI-2021 PT.	23-Jun-21

$$(X_i - K)^2 + (Y_i - S)^2 + (Z_i - T)^2 + \dots$$

K, S : Centroid coordinates, K Central coordinates for object variable X, S for object Y.

4. The search for a new central value by calculating the average of the data that has been in the cluster at stage 3. At the cluster or grouping stage to determine which data belongs to which grouping, the provisions for grouping are given, namely:
 - a. The input requirements for cluster 1 are obtained from the formula: If $D_i \leq D_y$ And $D_i \leq D_z$
If the conditions are met then it is included in the cluster group 1
 - b. The requirements for entering cluster 2 can be seen in the formula: If $(D_y \leq D_i$ And $D_y \leq D_z)$
if the conditions are met then it is included in the cluster group 2
 - c. The requirements for entering cluster 3 can be seen in the formula: If $(D_z \leq D_y$ And $D_z \leq D_i)$
If the conditions are met then it is included in the cluster group 3.

Where:

i, y, z = number of data objects

D_i = distance of object I with centroid cluster 1

D_y = distance of object I with centroid cluster 2

D_z = distance of object I with centroid cluster 3

Calculation of the new centroid value based on the example in the table below

$$\text{Centroid 1} = (\text{data 1} + \text{data 2} + \text{data 7}) / 3$$

$$\text{Centroi 2} = (\text{data 2} + \text{data 4}) / 2$$

$$\text{Centroid 3} = (\text{data 5} + \text{data 6}) / 2$$

Do the 3rd step again using the latest main value (which was calculated in Step 4). Do this until the new main value with the previous one is the same or does not change, then clustering can be stopped.

TABLE I. CLUSTER DATA COLLECTION

Data	Cluster 1	Cluster 2	Cluster 3
1	x		
2		x	
3	x		
4		x	
5			x
6			x
7	x		

K-Means Algorithm is used to group archiving data owned by companies or organizations. The K-Means formula will be applied to grouping files based on the specified specifications. The application of the k-means clustering method is a calculation for analyzing the data obtained in the implementation of the system. In the application of this method, the author will use archived data within 1 month, here are the data documents that are archived:

No	Department	No	Date
		Wiratama Globalindo Jaya	
39	Engineering	JBT-00035-Cutting Plan Linkset Jembatan B-60 R.0	23-Jun-21
40	Engineering	JBT-00036-Cutting Plan Jembatan AG-20S R.0	23-Jun-21
41	PPIC	MTO Palu-3 Wika R. 4	24-Jun-21
42	Marketing	SPK S-JBT-00042-VI-2021 Jembatan BG25 PT. Wiratama Globalindo Jay	24-Jun-21
43	Marketing	Desain Drawing Ladder Platform Service Air Server	24-Jun-21
44	Marketing	Desain Drawing Ladder Platform Ammonia Tank	24-Jun-21
45	Marketing	Desain Drawing Ladder Platform Condensate Holding Storage Tank	24-Jun-21
46	Marketing	SPK S-PJL-00057-VI-2021 PT. Wiratama Globalindo Jaya	24-Jun-21
47	Marketing	SPK S-JBT-00041-VI-2021 PT. Wiratama Globalindo Jaya	24-Jun-21
48	Marketing	SPK S-JBT-00043-VI-2021 PT. Wiratama Globalindo Jaya	24-Jun-21
49	Marketing	SPK S-PJL-00059-VI-2021 PT. Wiratama Globalindo Jaya	25-Jun-21
50	Engineering	KUM-00018-Report List Reclaimer-L15-Bucket R.0	3-Jun-21
51	Engineering	KUM-00018-Report List Reclaimer-L16-Central Transfer and Stockyard C	3-Jun-21
52	Engineering	KUM-00018-Report List Reclaimer-Tripper and Upper R.4	3-Jun-21
53	Engineering	KUM-00018-Report List Reclaimer-Tripper Tail R.0	3-Jun-21
54	Engineering	KUM-00018-Report List Reclaimer-Tripper and Upper R.3	2-Jun-21
55	PPIC	MTO Reclaimer R.6	10-Jun-21
56	PPIC	MTO Reclaimer R.7	16-Jun-21
57	PPIC	MTO Reclaimer R.8	18-Jun-21
58	PPIC	MTO Reclaimer R.9	25-Jun-21
59	Marketing	Design Drawing Continuous Ship Unloader Shop Drawing and Document	26-Jun-21
60	Marketing	R.1 SPK No S-JBT-00037-VI-2021 PT. Wiratama Globalindo Jaya	23-Jun-21
61	Marketing	R.2 SPK No S-JBT-00037-VI-2021 PT. Wiratama Globalindo Jaya	28-Jun-21
62	Marketing	SPK S-KUM-00029-VI-2021 PT WIJAYA KARYA Add Palu 3	28-Jun-21
63	Marketing	SPK No S-JBT-00040-VI-2021 PT. Wiratama Globalindo Jaya	28-Jun-21
64	Engineering	KUM-00024-Report List Anchor Plate IKPT R.1	7-Jun-21
65	Engineering	KUM-00025-Report List Anchor Plate R.1	7-Jun-21
66	Engineering	KUM-00025-Report List Anchor Plate R.2	28-Jun-21
67	Engineering	report list coal crushing R.5	4-Jun-21
68	PPIC	MTO Jembatan CG-12 R.0	29-Jun-21
69	PPIC	MTO Jembatan BG-12 R.0	29-Jun-21
70	PPIC	MTO Platform, Ladder and Handrail IKPT R.2	29-Jun-21
71	Marketing	SPK S-PJL-00056-VI-2021 PT WGJ Pekerjaan Kolom SPBU	24-Jun-21
72	PPIC	MTO RDMP RU-V R.6	30-Jun-21
73	PPIC	MTO Platform, Ladder and Handrail IKPT R.3	30-Jun-21

No	Department	No	Date
74	PPIC	MTO Add. Local Platform R.3	30-Jun-21
75	PPIC	MTO Jembatan CG-30 R.0	29-Jun-21
76	PPIC	MTO Jembatan CG-30 R.1	30-Jun-21
77	PPIC	MTO Jembatan CG-12 R.1	30-Jun-21
78	PPIC	MTO Jembatan BG-12 R.1	30-Jun-21

1. Pre-processing stage, at this stage the data will be pre-processed to get the data needed to perform calculations. The data obtained is the date of the archive, the number of records and the number of departments.

TABLE III. PRE PROCESSING

No	Archive Date	Number of Archives	Number of Departments
1	2-Jun-21	1	1
2	3-Jun-21	4	1
3	4-Jun-21	1	1
4	7-Jun-21	3	1
5	8-Jun-21	2	2
6	10-Jun-21	1	1
7	14-Jun-21	4	3
8	15-Jun-21	8	3
9	16-Jun-21	10	3
10	17-Jun-21	3	2
11	18-Jun-21	2	2
12	21-Jun-21	3	3
13	22-Jun-21	4	1
14	23-Jun-21	6	3
15	24-Jun-21	9	2
16	25-Jun-21	2	2
17	26-Jun-21	1	1
18	28-Jun-21	4	3
19	29-Jun-21	4	1
20	30-Jun-21	6	1

2. The stages in determining the centroid randomly, so here will be a calculation to identify the nearest centroid of an object. Three sample samples for the calculation process in determining the centroid value. The following is sample data:

TABLE IV. CLUSTER CENTER

Amount	Central Cluster	Clusters (Random)	
C1	3-Jun-21	4	1
C2	16-Jun-21	10	3
C3	30-Jun-21	6	1

At this stage, the data will be calculated in centroids, to determine the distance in each cluster. The following is a table for calculating the closest distance to each cluster

$$d(x,y) = \sqrt{\sum_{i=1}^n (y_i - x_i)^2}$$

a. C1

$$\begin{aligned} d(b_1,c_1) &= (x_1-c_1)^2 + (y_1-c_1)^2 = \sqrt{(1-4)^2 + (1-1)^2} \\ &= \sqrt{(3)^2 + 0} \\ &= \sqrt{9} \\ &= 3 \end{aligned}$$

b. C2

$$\begin{aligned} d(b_1,c_2) &= (x_1-c_2)^2 + (y_1-c_2)^2 = \sqrt{(1-10)^2 + (1-3)^2} \\ &= \sqrt{(-9)^2 + (-2)^2} \\ &= \sqrt{81+4} \\ &= \sqrt{85} \\ &= 9.2195446 \end{aligned}$$

c. C3

$$\begin{aligned} d(b_1,c_3) &= (x_1-c_3)^2 + (y_1-c_3)^2 = \sqrt{(1-6)^2 + (1-1)^2} \\ &= \sqrt{(-5)^2 + 0} \\ &= \sqrt{25} \\ &= 5 \end{aligned}$$

TABLE V. CLUSTER RESULTS

Archive Center	C1	C2	C3
Date	3-Jun-21	16-Jun-21	30-Jun-21
2-Jun-21		3	5
3-Jun-21	0		2
4-Jun-21	3		5
7-Jun-21	1		3
8-Jun-21	2.236067977	8.062257748	4.123105626
10-Jun-21	3		5
14-Jun-21	2	6	2.828427125
15-Jun-21	4.472135955	2	2.828427125
16-Jun-21	6.32455532	0	4.472135955
17-Jun-21	1.414213562	7.071067812	3.16227766
18-Jun-21	2.236067977	8.062257748	4.123105626
21-Jun-21	2.236067977	7	3.605551275
22-Jun-21	0	6.32455532	2
23-Jun-21	2.828427125	4	2
24-Jun-21	5.099019514	1.414213562	3.16227766
25-Jun-21	2.236067977	8.062257748	4.123105626
26-Jun-21	3	9.219544457	5
28-Jun-21	2	6	2.828427125
29-Jun-21	0	6.32455532	2
30-Jun-21	2	4.472135955	0

4. The stage in this step determines the grouping of the clusters by determining the value of the closest distance from each cluster. There are values such as $d(b1,c1)$ and $d(b1,c2) > d(b1,c2)$ then the closest distance will be C2. The following is a table of each grouping against each cluster:

TABLE VI. RESULTS OF CLUSTER GROUPING

Archive Center	Shortest Distance
Date	
2-Jun-21	C1
3-Jun-21	C1
4-Jun-21	C1
7-Jun-21	C1
8-Jun-21	C1
10-Jun-21	C1
14-Jun-21	C1
15-Jun-21	C2
16-Jun-21	C2
17-Jun-21	C1
18-Jun-21	C1
21-Jun-21	C1
22-Jun-21	C1
23-Jun-21	C3
24-Jun-21	C2
25-Jun-21	C1
26-Jun-21	C1
28-Jun-21	C1
29-Jun-21	C1
30-Jun-21	C3

4. The stage in this step will create a new cluster to get the smallest data, the calculation is done by using a way to find the minimum value and the value of the square of the smallest value. The following is the formula for finding the minimum distance value in the cluster:

$$d_{euclidean}(x, y) = \sum_{i=1} (x_i - y_i)^2$$

a. $\min(C1, C2, C3)$

$$\min(3:9.2129544457:5) = 3$$

5. The steps in the next step are to determine the ratio between the tween cluster variation (BVC) and within cluster variation (WCV) quantities.

$$\begin{aligned} \text{BCV} &= \text{cluster 1 to cluster 2} + \text{cluster 1 to cluster 3} + \text{cluster 2 to cluster 3} \\ \text{BCV value} &= d(m1,m2) + d(m1,m3) + d(m2,m3) \\ &= 6.32455532+2+4.472135955 \\ &= 12.79669128 \end{aligned}$$

Meanwhile, to find out the WCV, that is by squaring the calculation results in each cluster.

$$\begin{aligned} \text{WCV} &= \min(C1,C2,C3) \\ &= \min(3:9.2129544457:5) \\ &= (3)^2 = 9 \end{aligned}$$

TABLE VII. WCV CALCULATION RESULTS

3	9
0	0
3	9
1	1
2.236067977	5
3	9
2	4
2	4
0	0
1.414213562	2
2.236067977	5
2.236067977	5
0	0
2	4
1.414213562	2
2.236067977	5
3	9
2	4
0	0
0	0
WCV	77

7. At this stage is to add up the BCV and WCV to find the ratio. The ratio is the result of the calculation conclusion from the data that has been processed. The ratio is BCV/WCV
 $R = 12.79669128/77$ $R = 0.166190796$

After the results of the ratio are known, in the calculation process to find the average value of the data that has been grouped, it is known that the average data of the departments that often carry out the archive process is as shown in the table below:

$$\text{Department} = \frac{1+4+1+3+2+1+4+3+2+3+4+2+1+4+4}{20}$$

TABLE VIII. RESULTS OF THE AVERAGE SCORE

	C1	C2	C3		
2-Jun-21	1	1			
3-Jun-21	4	1			
4-Jun-21	1	1			
7-Jun-21	3	1			
8-Jun-21	2	2			
10-Jun-21	1	1			
14-Jun-21	4	3			
15-Jun-21		1	1		
16-Jun-21		1	1		
17-Jun-21	3	2			
18-Jun-21	2	2			
21-Jun-21	3	3			
22-Jun-21	4	1			
23-Jun-21				1	1
24-Jun-21		1	1		
25-Jun-21	2	2			
26-Jun-21	1	1			
28-Jun-21	4	3			
29-Jun-21	4	1			
30-Jun-21				1	1
	2.6	1.666666667	1	1	1

III. CONCLUSIONS

The design of this e-archive information system will facilitate the process of digitally storing archives on the other hand, streamlining the use of archives or space. The k-means algorithm method helps the process of grouping (clustering) archive documents to be done faster. It is hoped that in the future there will be regular maintenance or maintenance of system applications as well as backing up data to avoid damage to the database.

REFERENCES

- [1] Almahdhi, G. F. S., & Pahlevi, T. (2020). Management of Electronic Filing Systems as a Determinant of Employee Work Productivity in Solokuro District, Lamongan Regency. *Journal of Office Administration Education (JPAP) (Pengelolaan Sistem Kerasipan Elektronik Sebagai Determinan Produktivitas Kerja Pegawai di Kecamatan Solokuro Kabupaten Lamongan. Jurnal Pendidikan Administrasi Perkantoran)*, 8(2), 295–304. <https://journal.unesa.ac.id/index.php/jpap/article/view/8425/4085>
- [2] Bahrudin, R. M., Ridwan, M., & Darmojo, H. S. (2019). Application of the Helpdesk Ticketing System in Handling Complaints on the Use of Web-Based Information Systems (Penerapan Helpdesk Ticketing System Dalam Penanganan Keluhan Penggunaan Sistem Informasi Berbasis Web). *Jutis*, 7(1), 71–82.
- [3] Eric Fammaldo and Lukman Hakim. (2018). Application of the K-Means Clustering Algorithm for Grouping the Level of Family Welfare for the Smart Indonesia Card Program. *Scientific Journal of Applied Information Technology (Penerapan Algoritma K-Means Clustering Untuk Pengelompokan Tingkat Kesejahteraan Keluarga Untuk Program Kartu Indonesia Pintar. Jurnal Ilmiah Teknologi Informasi Terapan)*, V(1), 24–32. <http://journal.widyatama.ac.id/index.php/jitter/article/view/249/213>
- [4] Firmansyah, Y., Maulana, R., & Fatim, N. (2020). Website-Based Citizen Complaint Information System (Sistem Informasi Pengaduan Warga Berbasis Website) (Case Study: Kelurahan Siantan Tengah, North Pontianak). *Scholar's Journal*, XIX(April), 397–404. <https://jurnal.dcc.ac.id/index.php/JC/article/view/328>
- [5] Irawan, M. D., & Simargolang, S. A. (2018). Implementation of E-Archive in the Informatics Engineering Study Program. *Journal of Information Technology (Implementasi E-Arsip Pada Program Studi Teknik Informatika. Jurnal Teknologi Informasi)*, 2(1), 67. <https://doi.org/10.36294/jurti.v2i1.411>
- [6] Noeman, A., & Handayani, D. (2019). Design of Information System Document Monitoring Sampling Product with Prototype Method (Perancangan Sistem Informasi Document Monitoring Sampling Product Dengan Metode Prototype). *Facts Exacta*, 12(3), 219–229. <https://doi.org/10.30998/factorexacta.v12i3.4678>
- [7] Rahayu, S. B., & Aisyah, S. (2018). Analysis of Archives Handling in the General and Protocol Section at the East Jakarta Mayor's Office (Analisis Penanganan Arsip Pada Bagian Umum Dan Protokol Di Kantor Walikota Jakarta Timur), 2(1), 33–44.
- [8] Sepriya, N., & Damayanti, F. (2020). Management Analysis of "Filing System (Correspondence) in Improving Communication Effectiveness at PT Dirgantara Indonesia." (Analisis Pengelolaan "Filing System (Tata Persuratan) Dalam Meningkatkan Efektivitas Komunikasi di PT Dirgantara Indonesia) *Journal of Secretary & Business Administration (JSAB)*, 4(2), 157. <https://doi.org/10.31104/jsab.v4i2.193>
- [9] Sugiono, Nurdiani, S., Linawati, S., Safitri, R. A., & Saputra, E. P. (2019). Grouping Student Behavior in E-Learning Lectures with K-Means Clustering. *Journal of Scientific Studies, Bhayangkara University (Pengelompokan Perilaku Mahasiswa Pada Perkuliahan E-Learning dengan K-Means Clustering. Jurnal Kajian Ilmiah Universitas Bhayangkara Jakarta Raya)*, Greater Jakarta, 19(2), 126–133. <https://jurnal.ubharajaya.ac.id/index.php/kajian-sains/article/view/410/pdf>.
- [10] Tousalwa, C. C., & Nanulaita, D. T. (2020). Archive Destruction at the Amahusu Village Office (Pemusnahan Arsip Pada Kantor Desa Amahusu), Nusanawe District, Ambon City. 03(02), 259–268.
- [11] Wisswani, N. W., Ngurah, I. G., Catur, B., Winetra, I. W. C., Elektro, J. T., Bali, P. N., Jimbaran, K. B., South, K., & Tuban, K. P. (2019). Record Center Archives of Decree (Sk) For Universities (Record Center Arsip Surat Keputusan (Sk) Untuk Universitas). 11(1), 1–8. <https://jurnal.polibatam.ac.id/index.php/JI/article/view/1166/689>
- [12] Sinaga, A.K. Jain, "Data clustering: 50 years beyond k-means," *Pattern Recognition Letters*, vol. 31, pp. 651–666, 2010.
- [13] M. Alhawarat and M. Hegazi, "Revisiting k-means and topic modeling, a comparison study to cluster arabic documents," *IEEE Access*, vol. 6, pp. 42740–42749, 2018
- [14] Y. Meng, J. Liang, F. Cao, Y. He, "A new distance with derivative information for functional k-means clustering algorithm," *Information Sciences*, vol. 463–464, pp. 166–185, 2018
- [15] J. Zhu, Z. Jiang, G.D. Evangelidis, C. Zhang, S. Panga, Z. Li, "Efficient registration of multi-view point sets by k-means clustering," *Information Sciences*, vol. 488, pp. 205–218, 2019
- [16] J. Wu, J. Chen, H.Xiong, M. Sie, "External validation measures for k-means clustering: a data distribution perspective," *Expert Syst. Appl.*, vol. 36, pp. 6050–6061, 2009
- [17] Z. Lv, T. Liu, C. Shi, J.A. Benediktsson, H. Du, "Novel land cover change detection method based on k-means clustering and adaptive majority voting using bitemporal remote sensing images," *IEEE Access*, vol.7, pp. 34425–34437, 2019