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# Proceedings of the 2018 International Conference on Industrial Enterprise and System Engineering (IcoIESE 2018)

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## Proceedings Article

### DESIGN OF DECISION SUPPORT SYSTEM APPLICATION FOR DETERMINING SCHOLARSHIP GRANTEE USING ANALYTICAL HIERARCHY PROCESS AND FACTOR RATING

Afrin Fauzya Rizana, Rayinda Pramuditya Soesanto

Scholarship refers to a program provided by organization that is given to students to relieve the tuition fee. There are several criteria and requirements that have to be fulfilled to get the scholarship. In practice, all the requirements will be checked manually for each applicant to determine who deserves...

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## Proceedings Article

## DESIGN OF GEOGRAPHIC-BASED DECISION SUPPORT SYSTEM FOR ROAD REPAIRMENT WITH GDSS METHOD: CASE STUDY IN BANDUNG DISTRICT

Dicky Faisal Dramar, Farid Wira Darmawan, Audira Zuraida, Rayinda Pramuditya Soesanto, Ika Arum Puspita

In an effort to make road improvements effective and efficient in Bandung Regency, the Public Works Service performed road repairs based on the most damaged areas. In the implementation there is a problem of limited information possessed by the Office of Public Works Bandung Regency so that road improvements...

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### Proceedings Article

## THE PROPOSED OF VENDOR SELECTION IN GOODS PROCUREMENT USING FUZZY ANALYTICAL HIERARCHY PROCESS (FAHP) METHOD AT PT. PERTAMINA HULU ENERGI OFFSHORE NORTH WEST JAVA (PHE ONWJ)

Kristoforus Maximinus Krisnabayu Tandra Widyatama, Ika Arum Puspita, Mumu Natapriatna

Along with the change of strategic system in the government that changed the scheme of contracts for oil and gas product from Cost Recovery to Gross Split in the oil and gas company like Pertamina Hulu Energi Offshore North West Java (PHE ONWJ), the company is required to be more effective and efficient...

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### Proceedings Article

## Information System Planning for Emerging Start-Up Company: A Case from Software House

## Company: A Case from Software House

Rayinda Pramuditya Soesanto, Wawan Tripiawan, Afrin Fauzya Rizana, Amelia Kurniawati, Fadillah Ramadhan

The use of IS believed to bring positive impact on the productivity and competitiveness of the organization. Most organizations in all sectors of industries, commerce, and government become fundamentally dependent on the use of information system especially startup companies. Start-up companies are considered...

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### Proceedings Article

## Flash-aware Clustered Index for Mobile Databases

Wojciech Macyna, Michal Kukowski

Flash memory become the very popular storage technology. Recently, it may be treated as a main storage memory in mobile devices, PDA and personal computers. However, the architecture based on flash memory has some limitations. They suffer from poor write performance, as the flash blocks must be erased...

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## Latent Dirichlet Allocation Modeling for CPS Patent Topic Discovery

Usharani Hareesh Govindarajan, Amy J.C. Trappey, Gopal Kumar

Industry 4.0 is an organized framework to infuse the latest technology in the manufacturing sector. The inclusion of next-generation technologies such as Cyber-Physical Systems (CPS), cloud computing, big data and artificial intelligence approaches increases productivity and manufacturing output in today's...



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### Proceedings Article

## Self-Adaptive Cybersecurity System

Aradea Aradea, Iping Supriana, Kridanto Surendro, Husni Mubarok, Irfan Darmawan

Complexity of cyberspace environment nowadays, arouse security vulnerabilities for all owned assets. Appropriate way out or solution for every obstacle in a case like this is a must for ICT role. However, user trust for ICT usage raises concerns. Cyberspace environment is caused by rapid increase in...

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### Proceedings Article

## Self-Adaptive Load Balancing System for Grid Computing

Irfan Darmawan, Aradea Aradea

Load balancing is a necessary way of a computer network infrastructure services, with the aim of balancing of computing resources to achieve optimal load processing time. When this has been many methods that can be used for load balancing techniques, namely by adjusting the load on the computing resources...

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## A Comparison of Naïve Bayes and Bayesian Network on The Classification of Hijaiyah Pronunciation with Punctuation

## Letters

Adiwijaya Adiwijaya, Annisa Riyani, Mohamad Syahrul Mubarak

Arabic is a unique language because it really concerns in makhraj (the way of sound is made) that differentiate letters and words. The difference in pronouncing letters and words make the meaning of those words different,

because pronunciation in Qur'an letters really concern in harakat (the length of...

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### Proceedings Article

## Model Tree with Modified L1 Loss Function for Predicting Missing Attendance Data of Faculties

Mohammad Arif Rasyidi, Rachmadita Andreswari

The problem of missing attendance data in our university often arises due to the negligence of faculties. In this study, we address the problem by directly predicting the work duration of faculties. The nature of the problem require us to not only make accurate predictions, but also minimize the rate...

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### Proceedings Article

## Web Application Design Using Single Page Application To Increase Website Performance on Rumantara

Ilham Farobi, Soni Fajar Surya Gumilang, Muhammad Azani Hasibuan

One of the travelers needs when going to some places is a place to stay for a while and put their things. More importantly, a place that fits their needs and budget. This matter makes most of the travelers difficult to find a place to stay because of most of them is hotels with unneeded amenities that...

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## Web-Based Food Delivery Management System

Soni Fajar Surya Gumilang, Nia Ambarsari, Mei Dina Isti Nurmala

The process of ordering a meal in an organization still using a conventional system or in other words, the civitas organization must come to the cafeteria to order the desired menu. The conventional system uses paper for order recording process. So the problem happens repetitively, such as redundancy...

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## Application of Risk IT Based on ISO 31000 Standards Process Capability Assessment Model (Case Study: Andalas University)

Mohammad Hafiz Hersyah, Kridanto Surendro

The fact given that capability function is to aim executed things works properly and effectively in organization business process could not executed well without considering risk management aspects. Risk management overlay every event possibilities that able to either to hinder or accelerate organization...

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## Information System Strategy and Application Governance in The Government of Bandung Regency

Soni Fajar Surya Gumilang, Heru Nugroho

Utilization of information system for support of the government process improve the efficiency, effectiveness, transparency and accountability of governance. This statement is in line with Presidential Decree No. 3 of 2003 which confirms that the use of technology in government will improve the...

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### High Security Adaptive BCH Code Discrete Wavelet Transform Copyright Protection

Irma Safitri, Rizki R. Ginanjar, Yosa Yunawan

In this research, we analyzed the audio watermarking system with combining adaptive wavelet with SVD in various BCH Codes. The host audio signal is embedded with a watermark signal in the form of an image signal accompanied by several attacks on the watermarking system. The results showed that ODG and...

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#### Proceedings Article

### Copyright Protection High Robustness Arnold Transform Wavelet Method

Bruguiera A. F. Agradriya, Irma Safitri, Ledy Novamizanti, Muhammad Ainul Yaqin

Audio watermarking is a technique of information insertion into an audio signal without altering the significant origin of the audio host. Audio watermarking is usually used to protect the copyright of a work in the form of songs, recording of state and other secrets to avoid irresponsible persons. Audio...

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## Extending the UTAUT Model to Understand the Citizens' Acceptance and Use of Electronic Government in Developing Country: A Structural Equation Modeling Approach

Deden Witarsyah Jacob, Irfan Darmawan

The rapid development of information and communication technologies had a positive impact on the government to provide better and efficient services to the community. Despite some criticisms of electronic government services (e-gov) but so far, its utilization has continued to improve. The citizens need...

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### Proceedings Article

## Cost-Based Storage of the R-tree Aggregated Values over Flash Memory

Wojciech Macyna, Krzysztof Majcher

The flash memory due to its shock - resistance, power economy and non-volatile nature is considered as a very popular storage device. It is widely used in mobile phones, sensor networks and hand-held devices. What attracts the attention is the data storage in the flash memory. Database vendors try to...

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### Proceedings Article

## Face Recognition Using Local Binary Pattern (LBP) and Local

## Enhancement (LE) Methods At Night Period

Abdurrahman Fi Zhilali'l, Muhammad Nasrun, Casi Setianingsih

Face recognition is a technique that is widely used in the field of identification of a person or in the field of security. This technique basically

determine the similarity on each face of a person who will be identified with the face already stored in a storage (database). In this paper the facial...

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## Development of Project Document Management System Based on Data Governance With DAMA International Framework

Hanung Nindito Prasetyo, Regina Nathania Djepapu, Ferra Arik Tridalestari, Irman Hariman

Information will continue to grow in an organization, Various forms of information formed such as file documents, archives, policies, procedures, and so forth. In the current era of information technology, document management becomes an absolute thing for the organization. All business processes, activities...

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### Proceedings Article

## On the Relationship of Travel Time and Energy Efficiency of Industrial Robots

Kai Eggers, Zygimantas Ziaukas, Jens Kotlarski, Tobias Ortmaier

This paper presents an approach to quantify the energy saving potential with regard to travel time of industrial robot motions. In order to minimize the

influence of the exemplary considered trajectories and, thus, provide general results, the evaluation is done on a large set of automatically generated...

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## Localized Island Model Genetic Algorithm in Population Diversity Preservation

Alfian Akbar Gozali, Shigeru Fujimura

Premature convergence in island model is a consequence of the selection in migration mechanism. It is a process of migrating several individuals (usually the best one) from a source into destination island to keep its diversity. The main reason is the similar characteristic of relocated individual because...

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## Privacy Protection and Role of Technology: Citizen Perception on Electronic Voting Initiative

Muharman Lubis, Tien Fabrianti Kusumasari

This study seek to identify factors that might increase the likelihood of acceptance of electronic voting in which bring satisfaction from citizen to meet their expectation in having better voting experience than before in relation to privacy protection. For the purpose of this study, the researcher...

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## PROPOSAL OF MAINTENANCE POLICY ON BARMAC FK6800

## THE EFFECT OF MAINTENANCE POLICY ON DYEING MACHINE IN PT XYZ USING RELIABILITY-CENTERED MAINTENANCE AND RISK-BASED MAINTENANCE METHOD

Irsalina Maharani, Fransiskus Tatas Dwi Atmaji, Nopendri Nopendri

XYZ is a company that is engaged in the textile industry since 1974. XYZ has some different kinds of yarns which through several production processes in 24 hours a day to fulfill the market demands. Therefore, all machines have to be in the best condition as it can be. These machine should be maintained...

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## Factors That Influence An Academic Institution's Intention To Accept CloudIOT: A Proposed Framework

Ali Mehimed Ahmed Ireda, Mohommed Awadh Ben-Mubarak, Adubhahir Buhari

The combination of Cloud Computing (CC) and Internet of things (IOT) which is known as CloudIOT are two different kinds of technologies that are already part of our lives. The growing usage of CloudIOT in the education sector is changing the Teaching and Learning processes. There is very limited study...

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## MAINTENANCE POLICY of JET DYEING MACHINE USING LIFE CYCLE COST (LCC) AND OVERALL EQUIPMENT EFFECTIVENESS (OEE) IN PT.XYZ

Akbar Perwira Wibowo, Fransiskus Tatas Dwi Atmaji, Endang Budiasih

PT. XYZ is one of the textile companies located in Majalaya, Bandung Region, West Java Province established since 1976. In the production process, one of the important roles is the process of dyeing. The dyeing machine K has the



highest frequency of damage compared to other jet dyeing machine in the

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### Proceedings Article

## OLAP Cube Processing of Production Planning Real-life Event Log: A Case Study

Rachmadita Andreswari, Mohammad Arif Rasyidi

Business process modeling in an application log can be done by using process mining technique. To analyze the process flow in more detail in several dimensions needs cube process. Multidimensional depiction in star schema to perform Online Analytical Processing (OLAP) can be done by drill-down, roll-up,...

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## DESIGN OF AUTOMATION SYSTEM FOR CERAMIC SURFACE QUALITY CONTROL USING ARTIFICIAL NEURAL NETWORK AT BALAI BESAR KERAMIK

Puspita Ayu Lestari, Haris Rachmat, Mohd. Rasidi Ibrahim, Denny Sukma Eka Atmaja

Indonesia's ceramic tiles production is currently ranked between fifth and sixth of the world, that showed ceramic tiles is one of the largest commodities in Indonesia. So, ceramic quality becomes very important to be considered in it used as one of the basic building materials. The existing ceramic...

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**Proceedings Article**

## High Imperceptible Copyright Protection: Adaptive Wavelet for Security

Irma Safitri, Rizki R. Ginanjar, Aliffian S. Laksono

This work extends our previous research in [14]. This work showed the imperceptibility of audio watermarking system with Bose-Chaudhuri-Hocquenghem (BCH) code, Discrete Wavelet Transform (DWT) and Singular Value Decomposition (SVD) methods. Watermarked image is embedded in the audio host signal accompanied...

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## Inventory Control Policy for Farm-Out Parts at Cold Section Module CT 7 Engine with Periodic Review (R, s, S) and (R, S) to Minimize Total Inventory Cost

Pratya Poeri Suryadhini, Ayulia Fitriane Setiawan, Widia Juliani

This paper proposes a policy for parts at maintenance service industry, which is the number of parts not as many as manufacture industry but it may involve in late deliveries. The importance of inventory also occurs in maintenance service industry of aircraft engines and industrial machines such PT...

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## Low Cost Electronic Seal for Tanker Truck in Indonesia

Ahmad Musnansyah, Bernardo Arianto

The amount of loss of petroleum product in transit has always been an

ubiquitous problem in Indonesia. This system using RFID, microcontroller, Raspberry PI and specially designed mechanical sensors aims to answer the safe delivery of petroleum product from depot to the gas stations. The electronic seal...

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### Behavior Proportion According to Merapi Volcano Eruption Evacuations in 2010

Dwi Handayani, Bertha Maya Sopha, Budi Hartono, M. Kusumawan Herliansyah

This paper presents the need of contingency plan for evacuation of Merapi Volcanic eruption by considering the behaviour proportion of people in the slopes of Mount Merapi when facing emergency response phase. The research had used exploratory retrospective view survey with face-to face interview. The...

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### Applying An Overlapped Design Schedule Based Dependency Structure Matrix to Minimize Project Makespan

Chao Ou-Yang, Indy Cesara

Design process scheduling is conducted by optimizing human resources or workers allocation to several tasks in project with several real constraints to achieve the objective, minimizing the project makespan. In real business case, despite the tasks are already allocated to the optimal workers, rework...

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## An Analysis of Core Competencies and Business Performances in Software SMEs : A Conceptual Framework

Atya Nur Aisha, Iman Sudirman, Joko Siswanto, Yassierli Yassierli

To survive in the high competition, the SME need to determine and develop their superior internal capability. The aim of this study is to develop a conceptual model that could use to understand the relationship between core competencies and business performance in accordance with the external environment...

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### Proceedings Article

## Performance Appraisal Design Using 360 Degree Feedback at University X

Deniar Yudithama, Fida Nirmala Nugraha, Devi Pratami

Directorate of Information Systems is a unit that provides information technology services, at University X, that needs to perform at its best most of time. Its employees' performance directly affects the unit performance. One problem in employee assessment due to its high subjectivity. Currently the...

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## Clustering of User Query in Search Engine on Indonesian E-Commerce by used AD-OPTICS Algorithms

Ranita Windriani, Ibnu Asror, Dana Sulistyو Kusumo

The development of e-commerce in Indonesia is increasing now make e-

THE DEVELOPMENT OF E-COMMERCE IN INDONESIA IS INCREASING, NOW MAKE E-commerce as the land of very large data. The data is also used not only a content in e-commerce, but with the existence of Web Mining, the data is processed in such a way that will generate new information to be utilized in system...

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Mohammad Tubishat, Norisma Idris

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### Analysis on Opinion Mining Using Combining Lexicon-Based Method and Multinomial Naïve Bayes

Geriska Isabelle, Warih Maharani, Ibnu Asror

Opinion mining is the analysis of the opinion by looking at the sentiment, behavior, or emotions contained in a product. Some of the opinion mining methods are using the lexicon-based and supervised learning. Lexicon-based method has a low recall, while supervised learning has good accuracy but requires...

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## Group-Centered Framework Towards a Positive Design of Digital Collaboration in Global Settings

Irawan Nurhas, Jan Pawlowski, Stefan Geisler, Maria Kovtunenکو, Bayu Rima Aditya

globally distributed groups require collaborative systems to support their work. Besides being able to support the teamwork, these systems also should promote well-being and maximize the human potential that leads to an engaging system and joyful experience. Designing such system is a significant challenge...

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## Optimizing Woven Fabric Defect Detection using Image Processing and Fuzzy Logic Method at PT. Buana Intan Gemilang

Ratna Safitri, Tatang Mulyana

The development of textile industry which 3rd position in the largest export values in Indonesia prove that the quality of textile must be one of factors that should be considered for all of textile companies. Buana Intan Gemilang is one of the companies that produce woven fabric. This company's produce...

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### Proceedings Article

## Tool Design for Tea Cutting Machine to Reduce MSDs Using Ergonomic Function Deployment : A Research at PTPN 8

## Ciater

Mira Rahayu, Muhamad Adhi Guna Dwyantoro

The process of picking the tea leaves is done in three different ways, the first one is using the farmer hands, the second is using a scissors, and the third is

using a cutting machine. When the farmer using the tea leaf cutting machine, the fatigue level is increasing compared with using the other tools...

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## Measuring project performance using Earned Value Management (EVM) in XYZ software development project

Olivia Permata Ariputri, Ika Arum Puspita, Wawan Tripiawan

The project of the research is a project-based service that develops customized reporting platform for the X multi finance company. It observed at the project execution stage and focusing on the monitor and control established in the project. The percentage of the problem occur based on the interviewees...

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### Proceedings Article

## DETERMINING THE SUITABLE MATERIAL HANDLING EQUIPMENT IN PT. XYZ.

Zhafran Ega, Judi Alhilman, Fransiskus Tatas Dwi Atmaji

Selection of appropriate material handling equipment for specific conditions is found to be a multi-criteria decision-making problem. The selection procedure is found to be unstructured, characterized by subject knowledge and requiring the application of an effective and efficient multi-criteria

## decision-making...

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## Investigation on Simulation of Wind and Solar Power Hybrid Systems through Human Machine Interface by InTouch Wonderware Software

Tatang Mulyana, Hari Setiawan, Rasidi Ibrahim

Human Machine Interface (HMI) serves as a bridge for operators to understand the processes that occur in a production system. Without the HMI, operators have difficulty in monitoring and controlling the production system. It serves to facilitate the operator in monitoring the plant, plant control, plant...

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## Fishery Supply Chains in Indonesia: Improvement Opportunities on The Downstream Side

Niniet Indah Arvitrida, Dian Rahmawati, Dwi Lastomo, Rindawati, Kusnadi

This paper investigates improvement opportunities for fishery supply chains in Indonesia. A downstream perspective is taken, and Surabaya is employed as a case study. This research applies desk study and exploratory work to obtain existing landscape of the fisheries supply chains. This landscape is used...

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## Proceedings Article

# Design and Marketing Performance Analysis on Unit Business Government and Enterprise Service Unit at Telkom XYZ Area by Using Balanced Scorecard for Marketing

Fauziyyah Fauziyyah, Endang Chumaidiyah, Sari Wulandari

Measuring the performance of marketing division still rarely to be encountered, due to the limited measurement tool. Evaluation of marketing performance is usually associated only with the number of 'sales' both in volume and revenue, for instance the BGES unit at Telkom XYZ area. Thus, it cannot be...

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## Proceedings Article

# Development of Inventory Control Application for Pharmaceutical Product Using ABC-VED Cycle Counting Method to Increase Inventory Record Accuracy

Fadhilah Amin Fathoni, Ari Yanuar Ridwan, Budi Santosa

A good inventory control system is needed in the organization to reduce costs and stay competitive. One of the inventory control strategy is stock-taking. This research aims to develop a new stock-taking policy for a pharmaceutical company using ABC-VED Cycle Counting. Proposed stock-taking policy using...

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## Proceedings Article

# Deduplication for Data Profiling using Open Source Platform

Margo Gunatama, Tien Fabrianti, Muhammad Azani Hasibuan

Many companies still yet to know the importance of data quality for the company's improvement. Many companies in Indonesia, especially BUM and Government companies have only single application with single database, which cause a problem related to duplication of data between columns, tables and applications...

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### Web Services to Overcome Interoperability in Fingerprint-based Attendance System

Alam Rahmatulloh, Rohmat Gunawan, Irfan Darmawan

The fingerprint-based attendance management process generally consists of recording, management, and reporting. The method of recording attendance data is done with the help of fingerprint attendance machine. Even though the computer connection is running online, the administrator still needs to process...

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### Comparison of Web Scraping Techniques : Regular Expression, HTML DOM and Xpath

Rohmat Gunawan, Alam Rahmatulloh, Irfan Darmawan, Firman Firdaus

Data collection is the initial stage of research. There are various data sources on the internet that can be used in the research process. The process of taking data or information from sites on the internet is called web scraping. Some methods of web scraping include Regular Expression (Regex), HTML...

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**Proceedings Article**

## Data Mining Approach to Classify Tumour Morphology using Naïve Bayes Algorithm

Shahmirul Hafizullah Imanuddin, Irfan Darmawan, Rahmat Fauzi

Tumours are a very sickly disease and recorded as the second killer disease in the world. This is because until now tumour still not found a drug that can really cure it. In Indonesia itself has many people who have suffered from tumours. Ignorance makes people reluctant to observe the early symptoms...

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**Proceedings Article**

## OPERATIONAL RISK ANALYSIS FOR BARCODING PROJECT IN PT. XYZ WITH ENTERPRISE RISK MANAGEMENT METHOD

Amanda Putri Kusumawardhani, Endang Chumaidiyah, Rita Zulbetti

PT. XYZ is running the Bacoding Project to facilitate the process of recording raw material data in the production process. This Barcoding Project certainly has operational risks that may occur, therefore by using the Enterprise Risk Management approach (ERM) that is a process, effected by an entity's...

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**Proceedings Article**

## Measuring Schedule Performance of Fiber to The Home Project Using Earned Value Management

Reynaldy Prayogi, Devi Pratami, Ika Arum Puspita, Ageak Raporte Bermano

Fiber to the home (FTTH) is the current project that awarded by XYZ company to vendors. This project experience several months delay against the baseline

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Rafif Prayogi, Ari Yanuar Ridwan, Budi Santosa

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Muhammad Miftah Nur Huda, Endang Chumaidiyah, Farda Hasun

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Muhammad Hanif Ramadhan, Haris Rachmat, Denny Sukma Eka Atmaja, Rasidi Ibrahim

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Made Andriani, Atya Aisha, Melianna Pranita, Joko Siswanto, Kadarsah Suryadi

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Resha Akbar, Luciana Andrawina

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**Abstract**— Business process modeling in an application log can be done by using process mining technique. To analyze the process flow in more detail in several dimensions needs cube process. The multidimensional depiction in star schema to perform Online Analytical Processing (OLAP) can be done by drill-down, roll-up, slice, and dice method. This research was conducted to analyze log characteristic in the production planning module by performing the cube process. The analysis was done by performing process cube on a set of log module of production planning. In this study the dimensions used in process cube are event class, timestamp and activity. Data that had been processed with the cube was modeled by using Heuristic miner algorithm. The results obtained from this study are those for the three parts of data that have been processed with the cube, the best measurement value for fitness was obtained by female of 1 while the best precision in male is at 0.56, and the value of each structure is at 1 for each data. The result of measurement also shows that the number of transitions and places in a process model influences the measurement of conformance value. Overall, the existence of the cube process performed has influenced the process model and the resulting measurement.

**Keywords**—process mining, OLAP, heuristic miner, production planning

## I. INTRODUCTION

Identifying the process recorded on an application can be done by modeling logs that have been stored therein. There are many popular applications that have logs to learn and analyze. One of them is the application of Enterprise Resource Planning (ERP). This application is a type of application that is widely used in large companies in the world. Based on the research results conducted by Gartner in 2017 [1], it is obtained the result that SAP is at the top position of ERP application provider company. There are several modules in SAP application, one of which is the production planning. This module is an important module in SAP application that serves to handle the whole business process related to the production conducted by the enterprise. Therefore, in this research, a business process modeling on production planning module of SAP application was performed.

Business process modeling in an application can be done by using process mining technique. To analyze the process flow in more detail in several dimensions, a cube process needs to be done. The cube process is a way of modeling a process using several different dimensions [2]. Cube is a method previously known and widely used in data warehouse. In the data warehouse, multidimensional cube is a representation of a star schema [3]. The multidimensional depiction of the star schema allows users to perform data analysis by online. This technique is called Online Analytical Processing (OLAP). There are several analyzes that can be done, for example, drill-down, roll-up, slice, and dice [4].

Referring to the previous research [2], this study was conducted to analyze the log characteristics in the production planning module by performing the cube process first. The analysis was done by slicing a set of log module production planning. Data that has been processed with cube will be modeled by using algorithm that is compatible with the mining process techniques. Based on the research [5] it is stated that the most appropriate and robust algorithm for real-life event logs is the Heuristic miner algorithm. In addition, it is mentioned in [6] that the Heuristic miner algorithm has a high performance, good handling of control-flow and short modeling time. The expected result is to know the different characteristics of each log sliced so that it will get an analysis of the flow of its business processes.

## II. METHODOLOGY

In performing event log analysis from the production planning process, stages were performed for data processing.

### 2.1 Downloading ERP application logs

This stage is the beginning part of model making process from the application log of ERP production planning module. To download application logs, the important thing to note is the compatibility of activity on the logs with the actual activity running in real life.

### 2.2 Processing logs with OLAP cube

To perform the log processing by using OLAP, the first thing to do is to make star schema from data obtained. Cube is a multidimensional representation of a data to measure value and to perform analysis based on certain criteria [4]

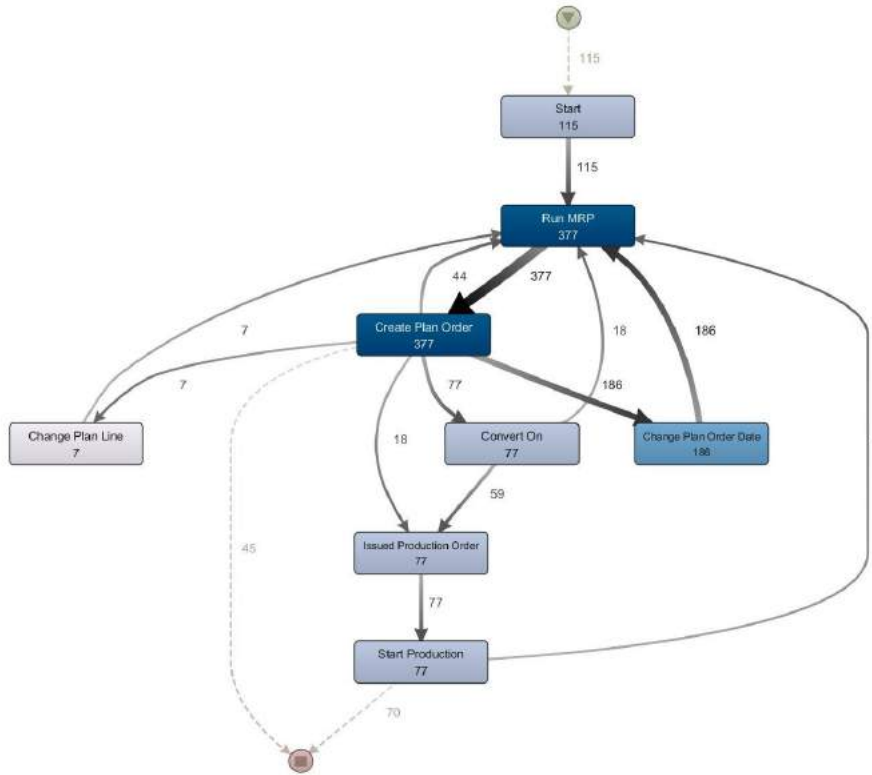
### 2.3 Performing data conversion



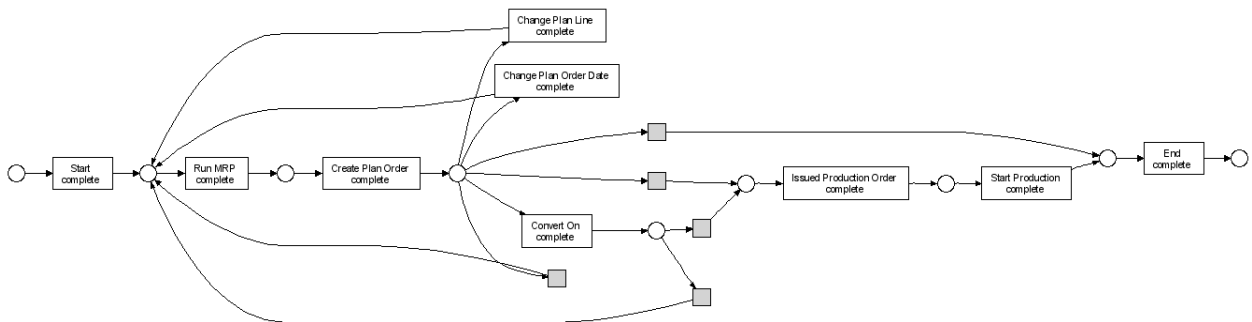
2	Run MRP	1756	377	912	467
3	Create Plan Order	1756	377	912	467
4	Issued Production Order	449	77	243	129
5	Change Plan Order Date	641	186	297	158
6	Change Plan Line	35	7	19	9
7	Convert On	449	77	243	129
8	Start Production	449	77	243	129

**IV. RESULT AND DISCUSSION**

The result of business process modeling of production planning based on cube operation which has been done can be seen in figure 2 - 7 below. Each type (male, female, and kids) is depicted in two types of diagrams, ie. fuzzy net processed from Disco and Heuristic net applications.



**Fig. 2. Male Fuzzy Net**



**Fig. 3. Male Heuristic Net**

Based on the flow of production planning in Figure 2, there are more repetitions on the activity of "Run MRP → Create Plan Order → Change Plan Order Date". The incident shows that in the phase of plan order change in production planning still often occurs. Unlike male, the fuzzy net for female and kids also happens to loop more on the same flow. Different results were obtained on Heuristic net modeling in which the log event for male type had 5 transitions of hidden task and 9 places. Female type had 7 transitions and 10 places while kids had 7 transitions and 11 places. These results show that the model produced for the type of kids is more complicated than the male and female types, so the results of the conformance calculation will show in accordance with the

flow conditions that have been modeled with the Heuristic miner. The conformance calculation for the three models can be seen in Table III. The data shows the statistics and conformance value of each event log. The results obtained from the fitness, precision, and structure values for the three types were that the highest fitness was in the female log event while the highest precision for the male type and for the value of the structure had the same value of 1 for all three types. On the other hand, in the type of kids in which the modeling was more complicated (there were more transitions of hidden task and there were places), the conformance calculation obtained was also lower than the other two types, both for fitness and precision.

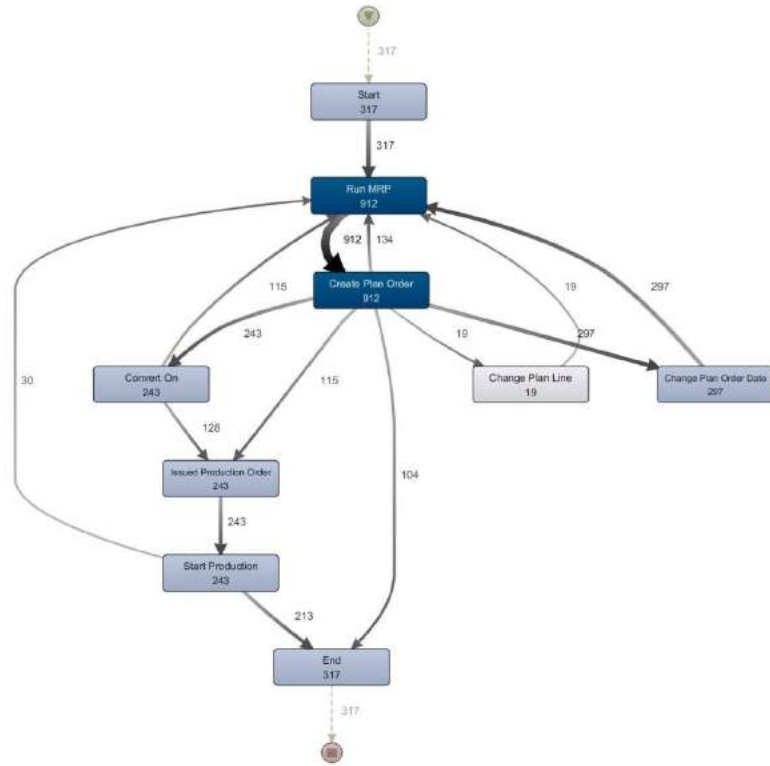


Fig. 4. Female Fuzzy Net

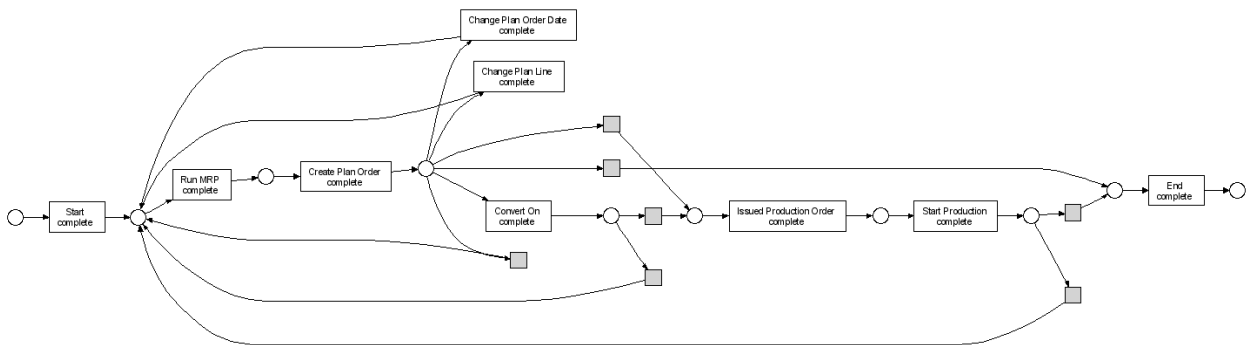


Fig. 5. Female Heuristic Net

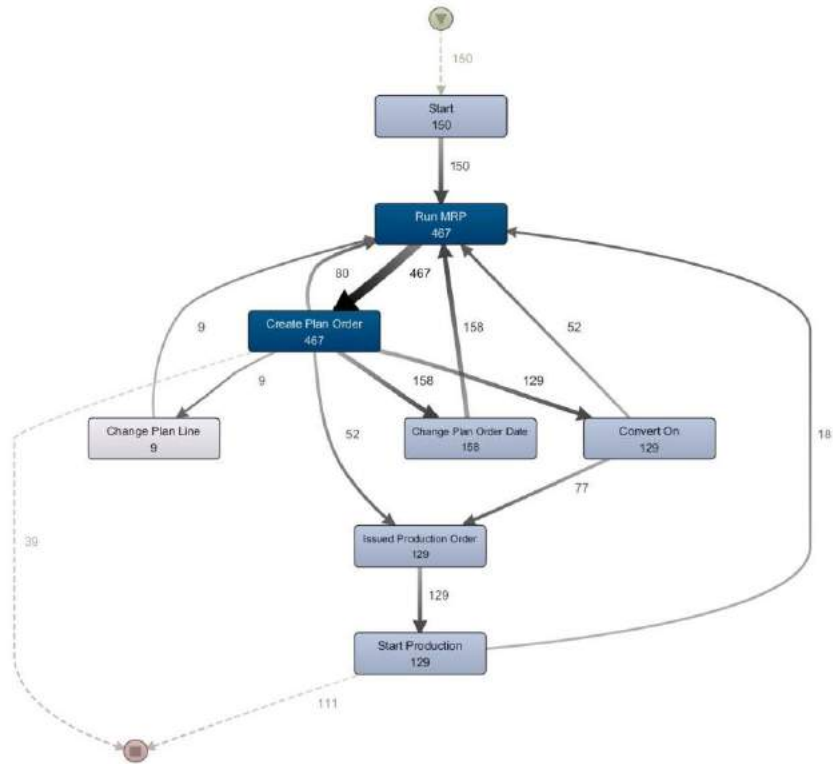


Fig. 6. Kids Fuzzy Net

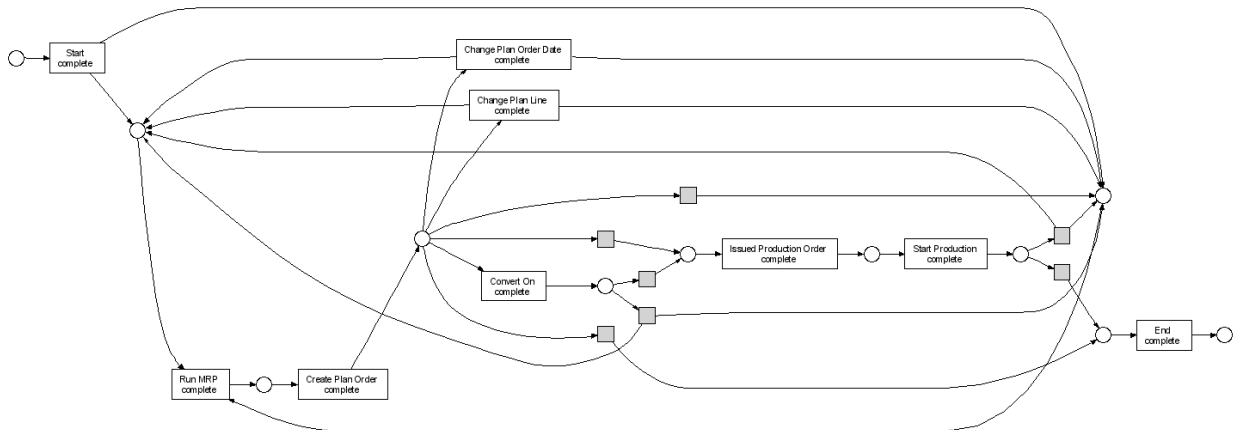


Fig. 7. Kids Heuristic Net

TABLE III. PRODUCTION PLANNING EVENT LOG

	<b>Male</b>	<b>Female</b>	<b>Kids</b>	<b>All</b>
Event	1293	3186	1638	6117
Case	115	317	150	582
Activity	8	8	8	8
Start Date	11 December 2012	15 October 2012	6 December 2012	15 October 2012

	<b>Male</b>	<b>Female</b>	<b>Kids</b>	<b>All</b>
End Date	21 January 2013	26 January 2013	22 January 2013	26 January 2013
Fitness	0.996	1	0.956	1
Adv Behavioral App	0.56	0.495	0.495	0.495
Structure	1	1	1	1



## V. CONCLUSION

In this research, the business process modeling was done by using the cube process for a case in the production planning module. Event logs that had been processed with OLAP cube were then processed with Heuristic miner algorithm. The measurement of modeling result was done by using conformance checking. The result of the measurement is that when it is closer to 1, will more represent the existing event log. The calculation of conformance checking performed shows that the best fitness value obtained by female was at 1, then male at 0.996 and kids at 0.956. On the other hand, for the precision measurement (advanced behavioral appropriateness) the best value was obtained by male type of 0.56, then female and kids values are each of 0.495. The measurement of the structure obtained the result of 1 for all types. The process modeling of kid type also obtained information that there were more places and transitions (in the form of hidden task). Based on the results of measurements, kids had lower value than others so that this indicated the number of transitions and places in a process model influences the measurement of conformance values. This study also confirmed that Heuristic miner algorithm is an algorithm which is capable of modeling the process in a short time with good quality. Overall, the existence of process cube performed has influenced the produced process model and its measurement, but the measurement results were not in line with the number of event logs of each data.

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