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Title:	MEASURING PROCESS INNOVATION ON DOUBLE-FLANKED CONCEPTUAL MODEL FOR KNOWLEDGE SHARING ON ONLINE LEARNING ENVIRONMENT
Author:	S.M.F.D SYED MUSTAPHA, BIJU THERUVIL SAYED, ROSHAYU MOHAMAD
Abstract:	There are various innovation models that were discussed in the literature and the adoption is based on the organizational needs for their business contexts, vision and applications. These innovation models require effective innovation process framework to be followed. SECI Model has been chosen as knowledge creation model to facilitate innovation through knowledge sharing and creation. While literature has shown that SECI model has been applied in various fields such as management, manufacturing, education and business, very few has considered it as innovation tool for online learning environment. Knowledge creation requires community who has enculturated with knowledge sharing as part of the practices. For this purpose, Community of Practice (CoP) has been chosen as the essentialities for the prospective innovative community and consequently to make implementation of SECI model a success. Community with CoP values are postulated to provide the right organizational setting for innovation. It is suggested that both SECI Model and CoP are integrated as new a conceptual model being regarded as double flank strategy that synergizes to prepare the right community setting and to facilitate innovation through knowledge creation. Subsequently, this paper proposed the methods and approaches in measuring innovativeness in online learning environment based on the double flank conceptual model called DFCMI.
Keywords:	Knowledge Management, SECI Model, Community of Practice, Online Learning, Measuring Innovation
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

[Full Text](#)

Title:	QUESTION ANSWERING SYSTEM SUPPORTING VECTOR MACHINE METHOD FOR HADITH DOMAIN
Author:	NABEEL NEAMAH, SAIDAH SAAD
Abstract:	Retrieving accurate answers based on users query is the main issue of question answering systems. Challenges such as analyse the need of users query and extract accurate answers from large corpus increase the difficulty of developing effective question answering system. This work aims to enhance the accuracy of question answering system for hadiths using useful methods. Pre-processing methods like tokenization and stop-word removal is used to identify the main concepts of users query. Answering processing methods and techniques like N-gram, WordNet, CS, and LCS are used to update and enrich the extracted concepts of users query based on the formal representation of hadiths answers or documents. Support Vector Machine (SVM) and Name Entity Recognition (NER) methods are conducted to classify Hadiths documents based on relevant subjects and questions types in order to reduce the searching scope of answers documents. Documents in Hadith corpus are classified according to proposed question types, and related subjects as four main classes which are: when for pray, where for pray, when for fasting, and where for fasting. The SVM classification of documents is accomplished supporting NER methods to identify the places (where) and time (when) features that included in the documents. The proposed question answering system is tested using 132 Hadiths documents about Fasting and Pray that are selected from Al-Bukhari source. The findings revealed that the average answers accuracy using CS technique is 67%, the average answers accuracy using LCS technique is 66%, the average answers accuracy using combination of CS and LCS techniques is 70%, and the average answers accuracy using CS, LCS, and SVM is 80%. SVM enhance the system accuracy up to 10% more than using other methods without classification processes. The main contribution of this research is using SVM method to reduce searching scope of Hadiths documents based on various subjects and question types beside effective analysis of query need using NLP methods. SVM provides more accurate answers than extracting answers using only similarity techniques such as CS and LCS.
Keywords:	Question Answering System, Hadiths, Pre-processing, Answers Processing, SVM, NER.
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

manuscript before submitting it for review, we will edit the necessary information at our side. Submissions to JATIT should be full research / review papers (properly indicated below main title).

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Title:	A NOVEL ALGORITHM FOR BIG DATA CLASSIFICATION BASED ON LION OPTIMIZATION
Author:	NAVNEET, NASIB SINGH GILL
Abstract:	This paper develops a novel big data classification algorithm based on a nature inspired meta-heuristic algorithm (lion optimization algorithm). Lion optimization algorithm is an optimization algorithm based on the hunting and social behaviour of the lion. The developed algorithm uses the K-mean clustering to generate the pride and nomad. Then the hunting and migration behaviour of the lion is repeated to change pride and optimize the process. The proposed calculation is dissected by adding the proposed calculation to the WEKA library on the Intel i5 @ 2.67 GHz utilizing the Eclipse IDE. The calculation is examined on the datasets having 400 occasions with 25 qualities and 32561 examples with 15 properties. The algorithm has been analyzed on different datasets using Tp rate, Fp rate, accuracy, recall and f-measure as parameters. The result analysis shows the optimization of the algorithm.
Keywords:	Big Data, Lion Optimization Algorithm, Classification, Accuracy, Meta-Heuristic, Nature Inspired Algorithm
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	KEY EXCHANGE AUTHENTICATION PROTOCOL FOR NFS ENABLED HDFS CLIENT
Author:	NAWAB MUHAMMAD FASEEH QURESHI, DONG RYEOL SHIN, ISMA FARAH SIDDIQUI
Abstract:	By virtue of its built-in processing capabilities for large datasets, Hadoop ecosystem has been utilized to solve many critical problems. The ecosystem consists of three components; client, Namenode and Datanode, where client is a user component that requests cluster operations through Namenode and processes data blocks at Datanode enabled with Hadoop Distributed File System (HDFS). Recently, HDFS has launched an add-on to connect a client through Network File System (NFS) that can upload and download set of data blocks over Hadoop cluster. In this way, a client is not considered as part of the HDFS and could perform read and write operations through a contrast file system. This HDFS NFS gateway has raised many security concerns, most particularly; no reliable authentication support of upload and download of data blocks, no local and remote client efficient connectivity, and HDFS mounting durability issues through untrusted connectivity. To stabilize the NFS gateway strategy, we present in this paper a Key Exchange Authentication Protocol (KEAP) between NFS enabled client and HDFS NFS gateway. The proposed approach provides cryptographic assurance of authentication between clients and gateway. The protocol empowers local and remote client to reduce the problem of session lagging over server instances. Moreover, KEAP-NFS enabled client increases durability through stabilized session and increases ordered writes through HDFS trusted authorization. The experimental evaluation depicts that KEAP-NFS enabled client increases local and remote client I/O stability, increases durability of HDFS mount, and manages ordered and unordered writes over HDFS Hadoop cluster.
Keywords:	Hadoop, HDFS, NFS Gateway, Security, Reliability.
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	ARBANTENOTONAN: A LEARNING MEDIA BASE ON AUGMENTED REALITY TRADITIONAL BALINESE BIRTHDAY CEREMONY EQUIPMENT
Author:	A.A.K. OKA SUDANA, I WAYAN MEI SUJANA, NI KADEK DWI RUSJAYANTHI
Abstract:	Yadnya ceremony is a important thing in Bali. This yadnya ceremony is worth to be preserved through ICT. It is due to its meaning, function and specified purposes which are influenced by the exotic culture and local values of Bali itself. Otonan ceremony is an important implementation of manusia yadnya which is the part of yadnya itself. It is a ceremony that is held in order to celebrate ones birth date based on Balinese Wuku Calender. It is being held once every 210 days or once in 6 month on purpose to purify ones body physically and spiritually. The production of Banten Otonan has been significantly being forgotten by the young generation due to the limited information as well as the difficulties that ones may face during the process. The process of making Banten Otonan and Sampian are wrapped in form of Augmented Reality based educative application on android based smartphone. It is expected to be able to help users in recognizing, realizing and understanding the whole process of making Banten Otonan and Sampian. This application is using 3-dimensional animation model as well as 3D animation video. The result that is obtained by this application can give us the information in form of multimedia of how to make Banten Otonan and Sampian.

Keywords:	Augmented Reality, Banten Otonan, Balinese Birthday Ceremony, Hindu Religion
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	MINIMIZING THE CHANNEL SWITCHING EVENTS FOR QOS-BASED ROUTING IN COGNITIVE RADIO AD-HOC NETWORK
Author:	TAUQEER SAFDAR, HALABI HASBULLAH, TANZILA SABA, AMJAD REHMAN

Abstract: Wireless network connectivity systems have very short capacity to adhere the changes due to spectrum mobility and user interference to maintain the Quality of Service (QoS) parameters during end-to-end routing in Cognitive Radio Ad-Hoc Network (CRAHN). The reconfiguration of the network layer parameters in secondary users is challenging and demanding in case of sudden arrival of primary user on its licensed channel and spectrum mobility. Whenever, secondary user senses the primary user activity called as user interference, secondary user has to switch to any other available channel to continue its transmission. This channel switching increases due to the user interference and spectrum mobility which degrades the average data rate. Hence, it will effect directly on the QoS-based end-to-end routing in CRAHN. The addition of reinforcement learning techniques in network management can reduce the channel switching events and user interference by improving the QoS-based routing. This paper presents an algorithm for channel selection in cross-layer approach to minimize the number of channel switching events for QoS-based routing in CRAHN. The methodology is based on the previous network state observation of the primary user for its channel selection and secondary user will explore it for future routing decisions. It can be implemented using a learning agent in a cross-layer approach and modifying some existing routing parameters of Ad-Hoc On-Demand Distance Vector (AODV) routing protocol. This methodology is also very useful as the existing routing protocol can be modified for Cognitive Radio Ad-Hoc Network (CRAHN). We provide a self-contained learning method based on reinforcement-learning techniques which can be used for developing QoS-based routing protocols for CRAHN. We simulated the proposed algorithm using Cognitive Radio Cognitive Network (CRCN) simulator based on NS-2. The results are evaluated and compared with another routing protocol for CRAHN on the basis of some QoS parameters for the proposed algorithm. The results are evaluated and compared with the existing AODV routing protocol on the basis of some QoS parameters for the proposed algorithm. The proposed methodology can provide the basic use of Artificial Intelligence in routing protocols for CRAHN.

Keywords:	Channel Switching; User Interference; Reinforcement Learning; Routing Protocols; QoS.
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	A STUDY OF GENERATING ABSTRACT TEST FOR REQUIREMENTS VALIDATION AMONG REQUIREMENTS ENGINEERS
Author:	NOR AIZA MOKETAR, MASSILA KAMALRUDIN, MOKHTAR MOHD. YUSOF, SAFIAH SIDEK, MARK ROBINSON

Abstract: Requirements testing or requirements-based testing (RBT) is one of the software testing techniques that is found effective to test requirements completeness and accuracy. This technique involves systematic way of test case generation from the model of the requirements specification. This technique has been applied in the requirements analysis phase to detect and eliminate requirements defects before the next stage of software development project. Although this technique is useful, it is tedious and time consuming to manually generate abstract test from the requirements model. However, we argue that the tedious process can be minimised if the requirements engineer have the good ability (skill) to generate abstract test from requirements models for requirements validation. This paper described a study of requirements engineer manually generate abstract tests from requirements model: Essential Use Cases (EUC) model. From the result, we discover that software requirements engineers are not well equipped with the skill and technique to generate abstract tests from requirements model.

Keywords:	Requirements Validation, Requirements-Based Testing, Abstract Tests, Test Requirements, Test Cases
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	FINITE-DIFFERENTIAL SCHEME OF IDENTIFICATION OF OVERALL HEAT EXCHANGE COEFFICIENT
Author:	A. BAIMANKULOV, A. ISMAILOV, T. ZHUASPAYEV

Abstract:	This work studies one-dimensional problem of heat distribution in matter. The measured value of soil temperature and near ground air temperature are set. Iteration method is proposed for defining overall heat exchange coefficient of multilayer material. The method is realized with the aid of finite-differential scheme, which gives solution, converging to the solution of differential problem. The result of numerical solutions of test problems are given.
Keywords:	Heat Emission Coefficient, Finite-Differential Scheme, Iteration, Primal And Conjugate Problems, Functional, Initial Boundary Conditions
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	INVESTIGATION ON BER SENSITIVITY TO DESIGN SNR OF BHATTACHARRYA BOUNDS BASED CONSTRUCTION OF POLAR CODES
Author:	REDA BENKHOUYA, IDRIS CHANA, YOUSSEF HADI
Abstract:	Advanced coding has been widely used to accomplish the high-performance requirements of wireless communications. While adhering to the perspective on energy-spectral efficiency, channel coding is still promising. To deal with such challenge, research initiatives on the linear block error correcting codes have gained accelerating momentum. In this paper we introduce polar codes which have proven to meet the typical use cases of the next generation mobile standard. Such work is motivated by the suitability of polar codes for the coming wireless era. Hence, we investigate the performance of polar codes in terms of bit error rate (BER) for several codeword lengths and code rates. We first perform a discrete search to find the best design signal to noise ratio (SNR) at two different code rates, while varying the blocklength. We find in our extensive simulations that the BER becomes more sensitive to design SNR as long as we increase the blocklength and code rate. Finally, we note that increasing blocklength achieves an SNR gain, while increasing code rate changes the operational SNR domain. This trade-off sorted out must be taken into consideration while designing polar codes for high-throughput application.
Keywords:	Polar Codes, Battacharrya Parameter, Successive Cancellation Decoding, Design SNR, BER
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	LINKING SOFTWARE ENGINEERING PARADIGMS TO ISLAMIC VALUES
Author:	BURHAN UL ISLAM KHAN, BISMA RASOOL, M. MUEEN UL ISLAM MATTOO, AJAZ AHMAD HURRAH, BINYAMIN ADENIYI AJAYI, RASHIDAH F. OLANREWaju
Abstract:	In general, Muslims all over the world have an innate tendency to hold fast to Islams teachings as narrated in the Quran and Hadith. The present study is an investigation on the utilization of this adherence for improving the standards of ethical behavior of Muslim IT professionals, particularly software engineers. The principal point of this paper is to develop the importance of ethics among software engineers in order to make them realize the impact of various immoral practices in their field e.g., property violations, general software upgrading, design methodology, software privacy, etc. The moral values put forward in code-of-conduct have been scrutinized from Islamic point of view by studying the same in light of verses in the Quran and Hadith of our beloved Prophet Muhammad (P.B.U.H.). It is high time for software engineers and developers to accept the dire need of a paradigm shift in software engineering that integrates divine revelation with reason. The paper, therefore, has an Islamic but global approach towards software engineering paradigms.
Keywords:	Code of Ethics, Ethical Issues, Information Ethics, Islamic Ethics, Software Engineering Ethics
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	IMPLEMENTATION OF ASSOCIATION RULE METHOD AND TOPSIS METHOD TO DECISION SUPPORT SYSTEM FOR DETERMINING EPIDEMIC DENGUE BASED ON RISK FACTORS ASSOCIATION
Author:	ERMATITA, FATMALINA FEBRY
Abstract:	Endemic prevention of harmful diseases such as dengue fever must be handling seriously to minimize the risk posed by the disease. Dengue Hemorrhagic Fever (DHF) is a disease that causes area endemic. There are various risk factors that can lead to endemic dengue. These risk factors usually associated with one another that could provide great potential occurrence of endemic dengue. This endemic must be overcome in order to save from dengue fever. This study developed a decision support system for

	prevention of dengue based risk factors association. The modeling of Decision support system used the method of Association Rule combined Technique For Others Reference method by Similarity to Ideal Solution (TOPSIS). Results of this research is a recommendation for decision making handling of endemic dengue based on risk factors associated. The system can be handling prevention of dengue fever endemic that can be addressed quickly.
Keywords:	Decision Support Systems, TOPSIS, Endemic, Dengue Fever
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	TECHNIQUES FOR HANDLING IMBALANCED DATASETS WHEN PRODUCING CLASSIFIER MODELS
Author:	ROZIANIWATI YUSOF , KHAIRUL AZHAR KASMIRAN, AIDA MUSTAPHA, NORWATI MUSTAPHA, NOR ASMA MOHD ZIN
Abstract:	Imbalanced datasets are a well-known problem in data mining, where the datasets are composed of two classes; the majority class and minority class. A majority class has more instances compared to the minority class. Recent years have brought increased interest in handling imbalanced datasets since many datasets produced are naturally imbalanced. Most existing techniques for classifying data ignore the imbalanced condition, but focused on the accuracy of the model produced where it is biased to the majority class while giving poor accuracy towards the minority class. Although the minority class is something that rarely happens, but in some conditions it will give an important influence to the classifier model. This paper attempts to list all the techniques in handling imbalanced datasets, as well as to compare all the techniques for producing the best classifier model for imbalanced datasets. These techniques have been categorized into sampling, feature selection and algorithmic approaches in the form of a taxonomy for handling imbalanced datasets. The strengths and the weaknesses of these approaches will be discussed in order to identify an appropriate technique that will improve the performance of a classifier model produced. The recent trends in handling imbalanced datasets also will be discussed based on domain and problems exist in dataset.
Keywords:	Imbalanced Data, Sampling, Feature Selection, Cost Sensitive Learning, Classification
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	ENHANCING THE HIDING CAPACITY OF AUDIO STEGANOGRAPHY BASED ON BLOCK MAPPING
Author:	AHMED HUSSAIN ALI, MOHD ROSMADI MOKHTAR, LOAY EDWAR GEORGE
Abstract:	With the rapid growth in exchanging personal and confidential data through a unsecure channel like the internet and exposing it though disclosing by intruders, the necessity of information security became a great demand. As a result, data hiding or steganography appeared as a vital solution. Audio hiding is a concept of injecting the secret data in an audio carrier. This paper proposes a scheme known as ECA-BM, to improve the performance of the audio steganography. ECA-BM contributes in: (1) increases the hiding capacity, (2) maintains the transparency of carrier and (3) enhance the security of the proposed model. To increase the hiding capacity, fractal coding is adopted to create a mapping between the cover and secret blocks in order to encode the secret data into a set of coefficients with minimum size. To maintain the fidelity of the stego file, only 1-LSB from each cover sample is used for embedding. To increase the security of the ECA-BM, the cover samples for embedding are selected in a chaotic manner. LSB technique is utilized for embedding after converting secret coefficients into a binary sequence. Objective metrics, SNR, HC, and NC is used to evaluate the performance of ECA-BM. The Experimental results show a significant increase in the hiding capacity compared with some related studies. Moreover, the fidelity of the stego and reconstructed secret file are preserved.
Keywords:	Fractal Coding, Iteration Function System (IFS), Least Significant Bit (LSB), Steganography, Chaotic map.
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	PROPOSITION OF A MODEL FOR MULTI-PERIOD WORKFORCE ASSIGNMENT PROBLEM CONSIDERING VERSATILITY
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Author:	ABDELHAMID ZAKI, MOHAMMED BENBRAHIM, BAHIA BENCHEKROUN, GHASSANE AYAD
Abstract:	Workforce assignment becomes more complex when operators have multiple competencies and the operators efficiency changes according to the activities they are assigned to. In this context, only little work has considered the learning curve effect. In this paper, we will discuss a multi-period assignment problem, considering the versatility of the operators, which induces a dynamic view of their competencies and the need to predict changes in individual performance as a result of successive assignments. We are in a context where the expected durations and the awaited quality execution of activities are no longer deterministic, but results from the performance of the operators selected for their execution. In this article, we will present a mathematical model of this problem and a genetic algorithm approach to solve the workforce multi-period allocation problem.
Keywords:	Competence, Multi-Skilled Workforce, Individual Competence Level, Versatility, Multi-Period Assignment Problem, Performance.
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	PROPOSED HYBRID METHOD TO HIDE INFORMATION IN ARABIC TEXT
Author:	SUHAD M. KADHEM , DHURGHAM W. MOHAMMED ALI
Abstract:	In this method a new proposed approach to hide English texts (Secret data) in the Arabic text (Covers media). The secret text will be passed through several steps, Eventually it will be embedded in the cover text. In the proposed coding step each English character is converted to the binary code through secret tables that exist on the two sides (sending and receiving), which give us compression data. The output from the proposed coding will be two parts and these parts will be input to the next steps. The next step is Modified RNA Codon (MRNAC) which takes the first part that result from binary code and returns a stream of binary to be ready for embedding in embedding step. After that Modified Run Length Encoding (MRLE) that takes the second part that results from the proposed coding method and this result always contains a sequence of ones with fewer zeros, and apply RLE to this result. The last step is the embedding step using specific Arabic Unicode characters and non-printed characters to embed the secret information and provide complete similarity between cover text and stego text since these characters dont appear when written.
Keywords:	Security, Steganography, RNA, Codon, Coding
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	JOINT ENCRYPTION AND WATERMARKING TECHNIQUE USING BLOCK CIPHER AND WAVELET
Author:	B.SRIDHAR
Abstract:	This paper proposes a joint encryption and watermarking technique based on random block permutation and DWT with the motivation to enhance the security of the multimedia content. The original image is sectioned into the blocks and shuffle the blocks using random permutation, In this technique copyright information is concealed into an encrypted image. Based on the results, permutation of blocks is effective in significantly reducing the correlation thereby reducing the level of perceptual information, whereas the permutation of blocks is good at producing higher level security. Watermarked crypto image is freely distributed to channel with enhanced security, because it combines both encryption as well as watermarking techniques.
Keywords:	Copyright Protection, Encryption, Random Permutation, Watermarking, Wavelet transform
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	GENERATING AND EXPANDING OF AN ENCRYPTION KEY BASED ON KNIGHT TOUR PROBLEM
Author:	ALI SHAKIR MAHMOOD, MOHD SHAFRY MOHD RAHIM

Abstract:	The encryption key considers as a vital part in designing of a cryptosystem. Whereas these keys must be random as can as possible. The ability to regenerate the same sequence with small initial value is still a major problem that faces the designer of encryption key system. The current paper designs a new method of random number generator with the ability to expand the generated encryption key to fit the proper image size. The knight tour problem was employed as a random number generator and used for encryption key expansion. The expansion process contains two steps, first one generate a random number with (64 x 64) key size and the second step consider the boundary numbers as from the previous step to initiate the knight tour as a second time, the second step continue until the image size was reached. Generated random numbers acquired from the knight tour problem have been subjected to the NIST 800.22 statistical test and successfully passed all statistical tests without requiring any additional processing. Per these results, it has been proved that the proposed system meets the security requirement and can be used in cryptographic applications. Furthermore, the knight tour generator provides a small initial value with the ability to regenerate the same sequence when feed up with the same initial value.
Keywords:	Random Number, Encryption Key, Knight Tour, Key Expansion, (NIST) Randomness Tests
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	TIME COMPLEXITY COMPARISON BETWEEN AFFINITY PROPAGATION ALGORITHMS
Author:	R. REFIAN TI, A.B. MUTIARA, S. GUNAWAN
Abstract:	Affinity Propagation is one of clustering technique that use iterative message passing and consider all data points as potential exemplars. It is complimented because providing a good result of clustering with low error rate. But it has several drawback, such as quadratic computational cost and vague values of preference. There are many research trying to solve the drawback to improve the speed and quality of Affinity Propagation. But, there are not any test to find the best Affinity Propagation expansion algorithm in speed. This has led researchers to try to compare the performance of several Affinity Propagation expansion algorithms. The tested algorithms are Adaptive Affinity Propagation, Partition Affinity Propagation, Landmark Affinity Propagation, and K-AP. There are two comparison made in this paper: theoretical analysis and running test. From both comparison, it can be found that Landmark Affinity Propagation has the most efficient computational cost and the fastest running time, although its clustering result is very different in number of clusters than Affinity Propagation
Keywords:	Affinity Propagation, Availability, Clustering, Exemplar, Responsibility, Similarity Matrix
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	PERFORMANCE EVALUATION OF SHADOW DETECTION AND REMOVAL FROM HIGH RESOLUTION IMAGES USING K-MEANS ALGORITHM AND IOOPL MAPPING ALGORITHM
Author:	ARULANANTH T S, ARUL DALTON G
Abstract:	Shadow detection and removal is very essential to process the images in the next level. Generally high resolution color remote sensing images are put it forward an object oriented shadow detection and removal technique. In this method shadow features are also taken into consideration during image segmentation and to the statistical features of the images, suspected shadows are extracted. Moreover some dark objects which could be mistaken for shadows are ruled out according to object properties and spatial relationship between objects. So we are introducing the Inner-Outer Outline Profile Line IOOPL matching is used for shadow removal. Inner Outer Outline Profile Line (IOOPL) matching obtained with respect to the boundary lines of shadows. Shadow removal is then performed based on the homogeneous sections attained through IOOPL. Similarity for matching we have to extract the Inner and Outer Outline Lines of the boundary of shadows. Thus grayscale values of the corresponding points of the Inner and Outer Outline Lines are indicated by the Inner-Outer Outline Profile Lines IOOPL.
Keywords:	IOOP, K-Means clustering, Shadow detection, Shadow removal, Reconstruction
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	MULTI CRITERIA SOFTWARE QUALITY ASSESSMENT OF OPEN SOURCE CONTENT MANAGEMENT SYSTEM
Author:	EMA UTAMI, JAMAL

Abstract:	The purpose of this study is to compare the quality of software from five web applications based on open source Content Management System (CMS) e-commerce. Thus which has the best quality design model is providing recommendations to web developers, businesses and beginner on building an e-commerce website. This study uses a web application Prestashop, Magento, Woocommerce, Oscommerce and Openchart. The measurement of software quality uses traditional metrics and CK metrics suite parameters. To measure software quality using tools PHP Depend. Traditional metrics quantitative assessment, CK metrics suite and software quality factors to get the best quality web applications using a combination of methods Analytical Hierarchy Process (AHP) and methods Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). Determination of the quality of software is based on two main stages, namely the first stage by using AHP. AHP is used to find the weight of traditional metrics, CK metrics suite and software quality factors parameters. The second stage uses TOPSIS method. TOPSIS is used to search final score and ranking. The result of this study indicates that web applications Prestashop has the best software quality compared with Woocommerce, Oscommerce, Magento, and Opencart.
Keywords:	Traditional Metrics, CK Metrics Suite, Software Quality Factors, AHP, TOPSIS
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	LONG-TERM DEEP LEARNING LOAD FORECASTING BASED ON SOCIAL AND ECONOMIC FACTORS IN THE KUWAIT REGION
Author:	SALMAN ZAKARYA, HALA ABBAS, MOHAMMED BELAL
Abstract:	Load forecasting (LF) is a technique used by energy-providing companies to predict the power needed. LF is of great importance for ensuring sufficient capacity and manipulating the deregulation of the power industry in many countries, such as Arab gulf countries. Moreover, reduction of load forecasting error leads to lower costs and could save billions of dollars. Recently, further improvement has been introduced using more complex models that take into account dependencies among hidden layers. Also, many approach based model are presented, but all of them have limitations prediction capabilities. The purpose of this work is to demonstrate the load forecasting classes and factors impacting its performance, especially in Kuwaiti region in Arab Gulf. This work presents a novel deep leaning model that involves generating more accurate predictions for the electric load based on hierarchal learning architecture. It integrates the features of data in discovering most influent factors affecting electrical load usage. The dataset used is the actual data from Ministry of Electrical in Kuwait, the data for load is in mega-watt long-term for the years 2006 to year 2015, which is trained using ARIMA and neural networks models. The load forecasting is done for the year 2016 and is validated for the accuracy and less for error rate. Results indicate that this architecture performs quite well when compared to traditional approaches and deep neural network.
Keywords:	Power Electricity; Load forecasting; ARIMA; Regression; Long-term; Prediction; deep learning
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017

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Title:	SPECTRAL CLUSTER BASED TEMPORAL FEATURE EXTRACTION AND B-TREE INDEXING FOR VIDEO RETRIEVAL
Author:	RENUKADEVI .S , Dr.S.MURUGAPPAN
Abstract:	Storage and retrieval of video data is considered as a simple and straight forwarded task but considered to be trivial when retrieval of information from video data is concerned. Recently many research works has been developed for video indexing and retrieval. But, there is a need for effective video indexing and retrieval method. In order to overcome such limitation, Spectral Cluster based temporal feature extraction and B Tree indexing (SC-BT) model is proposed in this paper. The SC-BT model is designed to achieve higher video retrieval rate and to reduce the video retrieval time. At first, SC-BT model used spectral clustering algorithm to extracts video features form the collection of video frames and clustering the video clips in the data set. After that, SC-BT model used B tree indexing technique to index the clustered video clips in N-dimensional space with their features with the objective of improving the true positive rate of video retrieval and reducing the video retrieval time. Finally, SC-BT model effectively extracts more similar detected video clips based on user query by evaluating the features observed using co-visibility graph through spectral clustering are recomputed in all iteration. The performance of SC-BT model is evaluated with sports repositories data set by using parameters such as spectral clustering time, spectral clustering accuracy, true positive rate of video retrieval and video retrieval time. The experimental results show that SC-BT model is able to improve the true positive rate of video retrieval rate by 12% and also reduces the video retrieval time by 45% when compared to state-of-the-art works.
Keywords:	Video, Indexing, Retrieval, Spectral Clustering, Video Frames, B tree indexing, User query

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[Full Text](#)

Title:	A HYBRID METHOD OF FEATURE EXTRACTION AND NAIVE BAYES CLASSIFICATION FOR SPLITTING IDENTIFIERS
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Author:	NAHLA ALANEE, MASRAH AZRIFAH AZMI MURAD
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Abstract:	Nowadays integrating natural language processing techniques on software systems has caught many researchers attentions. Such integration can be represented by analyzing the morphology of the source code in order to gain meaningful information. Feature location is the process of identifying specific portions of the source code. One of the most important information lies on such source code is the identifiers (e.g. Student). Unlike the traditional text processing, the identifiers in the source code is formed as multi-word such as Employee-Name. Such multi-words are not divided using white space, instead it can be formed using special characters (e.g. Employee_ID), CamelCase (e.g. EmployeeName) or using abbreviations (e.g. EmpNm). This makes the process of extracting such identifiers more challenging. Several approaches have been performed to resolve the problem of splitting multi-word identifiers. However, there is still room for improvement in terms of accuracy. Such improvement can be represented by utilizing more robust features that have the ability to analyses the morphology of identifiers. Therefore, this study aims to propose a hybrid method of feature extraction and Naive Bayes classifier in order to separate multi-word identifiers within source code. The dataset that has been used in this study is a benchmark-annotated data that contains large number of Java codes. Multiple experiments have been conducted in order to evaluate the proposed features independently and with combinations. Results shown that the combination of all features have obtained the best accuracy by achieving 64.7% of f-measure. Such finding implies the usefulness of the proposed features in terms of discriminating multi-word identifiers.
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Keywords:	Feature Location, Split Identifiers, Feature Extraction, Naive Bayes, Source Code
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[Full Text](#)

Title:	FPGA-BASED HIGH SPEED BLOWFISH ALGORITHM
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Author:	SOUFIANE OUKILI, SEDDIK BRI
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Abstract:	Nowadays, security has become essential element of all systems and applications, due to the rapid growth of information and communication technology. In this context, high speed and high volume secure communications have been a high priority and challenging research area in both fields of mathematics and engineering. In this paper, we present high speed hardware architecture of Blowfish cryptographic algorithm. We had used pipeline technique to allow a parallel processing in order to obtain high throughput. In addition, 5-stage pipeline round of Blowfish algorithm is proposed to increase the speed and the maximum operating frequency. Furthermore, the S-box tables of each round of the algorithm had been implemented in block RAMs to allow parallel data encryption. The proposed design had been successfully implemented in FPGA devices. It improves data throughput by 104%.
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Keywords:	Security, Cryptography, Blowfish, Pipeline, High speed; FPGA
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Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017
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[Full Text](#)

Title:	SEGMENTATION OF CORONARY ARTERIAL TREE USING LOCALIZED DEFORMABLE MODEL EMBEDDED WITH AUTOMATED SEEDS
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Author:	SAMMER ZAI, MUHAMMAD AHSAN, YOUNG SHIK MOON
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Abstract:	This paper presents a fully automatic approach for isolating the left and right coronary arteries from CTA images by embedding our improved fast seed detection method into localized active contour model. Usually active contour based methods require starting point known as seed for their evolution. Accurate provision of this seed point leads to the accurate segmentation. Manual feeding of seed point requires expertise as well as may lead to wrong segmentation. Therefore, in this paper we have combined the quantile and median based thresholded Hessian-based vesselness with that of local geometric features of the vessel to detect the coronary seed points accurately in an automatic fashion. Further, the detected seed points are fed to the active contour model which evolves in a localized way to track the entire coronary arteries to their distal ends. The obtained seed points as well as the obtained segmented left and right coronary arteries are verified by the radiologist at each step. The method is evaluated and validated on nine real clinical CTA datasets and also compared with the previous methods proposed by Lankton et.
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	al and Khedmati et. al.. Experimental results reveal that the proposed method outperforms the previous methods qualitatively as well as quantitatively.
Keywords:	Computed Tomography Angiography, Coronary arteries, Hessian-based vesselness, Coronary Artery Disease, Deformable Model.
Source:	Journal of Theoretical and Applied Information Technology 15 th April 2017 -- Vol. 95. No. 7 -- 2017
Full Text	

ARBANTENOTONAN: A LEARNING MEDIA BASE ON AUGMENTED REALITY TRADITIONAL BALINESE BIRTHDAY CEREMONY EQUIPMENT

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ABSTRACT

Yadnya ceremony is a important thing in Bali. This *yadnya* ceremony is worth to be preserved through ICT. It is due to its meaning, function and specified purposes which are influenced by the exotic culture and local values of Bali itself. Otonan ceremony is an important implementation of *manusia yadnya* which is the part of *yadnya* itself. It is a ceremony that is held in order to celebrate one's birth date based on Balinese *Wuku* Calender. It is being held once every 210 days or once in 6 month on purpose to purify one's body physically and spiritually. The production of *Banten Otonan* has been significantly being forgotten by the young generation due to the limited information as well as the difficulties that ones may face during the process. The process of making *Banten Otonan* and *Sampian* are wrapped in form of Augmented Reality based educative application on android based smartphone. It is expected to be able to help users in recognizing, realizing and understanding the whole process of making *Banten Otonan* and *Sampian*. This application is using 3-dimensional animation model as well as 3D animation video. The result that is obtained by this application can give us the information in form of multimedia of how to make *Banten Otonan* and *Sampian*.

Keywords: *Augmented Reality, Banten Otonan, Balinese Birthday Ceremony, Hindu Religion*

1. INTRODUCTION

The implementation of Hinduism in Bali cannot be separated from the implementation of *Yadnya*. *Yadnya* is sacred offerings that is done with sincere heart for the creator of the universe or Ida Sang Hyang Widhi Wasa. Hinduism consists of 5 types of *Yadnya* which are called *Panca Yadnya* namely; *Dewa Yadnya*, *Rsi Yadnya*, *Pitra Yadnya*, *Manusia Yadnya* and *Bhuta Yadnya* [1]. *Yadnya* ceremony in Bali is one of crucial aspects of Balinese culture that is worth to be preserved [2].

Upakara is the medium that is used in a ceremony. The term *Upakara* terminologically consists of 2 morphemes namely; “*upa*” and “*kara*”. “*upa*” means surrounding or everything that is related. While “*kara*” means hand [3]. *Upakara* in Hinduism has its own meaning, function and specified purposes that are influenced by the culture as well as the local values of Bali [4]. One important implementation of *Manusa Yadnya* which is the part of *Yadnya* itself is the *Otonan* ceremony. It is a ceremony that is held in order to celebrate one's birth date based on Balinese *Wuku* Calender. It is being held once every 210 days or once in 6 months on purposes to physically and spiritually

purify one's body. *Otonan* ceremony is Hinduism traditional ceremony in celebrating one's birth date.

ARBantenOtonan Application using Augmented Reality Technology. Purpose of that Application is motivated the people to figure out how to make *Banten Otonan*. Another purpose is provide the information about *Banten Otonan*.

Augmented Reality Technology is one of the magnificent progress in ICT aspects. It is the combination of digital 2D and 3D object which is projected to the real world with real time display [5].

Augmented Reality Technology that introduces the existing local culture is being implemented in DewataAR application. DewataAR is used for promoting the tourism destinations that exist in Bali especially Tanah Lot Temple [6]. Another example is the Application of Basic Balinese Dance using Augmented Reality on Android which is an educative application about basic dancing movement of Balinese dance. It is aimed as an alternative media for the general society especially the children in order to start learning Basic Balinese Dancing movement [7]. Augmented Reality for Chemical Elements: PeriodikAR is application to learn periodic table of elements. This application

can run dynamically to give information about elements in form of animation video. The information involves name, atomic number, boiling degree, melting degree, density, atomic mass, oxidation, elements symbols, elements types, characteristic of elements, electron structure as well as how to do electron configuration [8]. Learning Media of Balinese Script Writing based on Augmented Reality is application about Balinese letter of the alphabet/ script. This educational learning media application can give us the information of how to write Balinese alphabets in form of 3D animation that is also supported by the sounds and explanation of the usage of its implementation as well as the example of every words of the respective letters [9].

Instructional Learning Media to Create Upakara for Nyiramin Layon Procession based on Android explains about the whole process of *Nyiramin Layon* which is the process of bathing the corpse or the dead body which is called *wawu lampus* in Hinduism *upakara*. This application is in 3D form which involves photos, videos as well as the process of making *upakara* or *ete-ete* that is clearly and comprehensively illustrated [10].

Implementation of Tree Structure and Recursive Algorithm for Balinese Traditional Snack Recipe on Android Based Application explains about how to make the dough of Balinese traditional snack. This application is android based and using tree structure. The information that is provided is about the process of how to make Balinese Traditional snacks [11].

Difference ARBantenOtonan Application with another Augmented Reality Application is ARBantenOtonan provide two learning feature, in this case is how to make *Banten Otonan* and how to make *Sampian*. That application also have feature to show both of 3D animation model and 3D animation video.

Augmented Reality Based Educative Application *Banten Otonan* Maker is designed for users to be able to recognize, realize and understand the process of making *Banten Otonan*. This application can be used in Android based smartphone. Marker that is used in the process of making *Banten Otonan* and *Sampian* is functioned as a mark. Furthermore, this application is expected to be able to give sufficient information of how to make *Banten Otonan* and *Sampian* in form of 3D animation model and 3D animation video.

2. RELEVANT STUDIES

2.1 Augmented Reality (AR)

Augmented Reality is the combination of digital 2D and 3D object which is projected to the real world with real time display [5].

The explanation of Augmented Reality according to Ronald T. Azuma (1997) is the combination of concrete object and virtual object in real world which is operated interactively, real timed and co-integrated between the 3D objects. According to Stephen Cawood & Mark Fiala on a book entitled "Augmented reality: a practical guide" Augmented Reality is a natural way of exploring 3D objects, data and the combining concepts of Virtual reality with Work reality [12].

2.2 Blender

Blender is an open source 3-dimensional project under licensed of GNU GPL (General Public License). Blender supports the creation of 3D modeling, rigging, animation, simulation, rendering, compositing, motion tracking, video editing as well as game production [13]. Blender is cross platform which can run well in Windows, Linux and Macintosh Computer. Its Interface is using OpenGL which gives constant experience.

Blender is a free and open source software that can be used for creating 3-dimensional object. Its features can be acquired freely, therefore, the developing of the program can be done by anyone, either amateur or professional users of Blender [14].

2.3 Vuforia

Vuforia is library that is used in creating Augmented Reality and Virtual Reality based application. Developer can add the functionality from computer vision of the library of Vuforia to possibly recognize a picture or objects which is further reconstructed into the real world.

Vuforia can develop a game as well as product marketing. The main feature of library of Vuforia involves its ability to recognize and track picture, objects, texts, markers and further reconstruct it into the real world [15].

2.4 Banten Otonan

Banten Otonan is a ceremony of celebrating one's birth date based on the Balinese Wuku Calendar which is being held once every 210 days or once in 6 months in order to physically and spiritually purify one's body according to Ida

Wayan Asta [16]. The purpose of the purification is to balance the sins that have been committed because no humans are free from mistakes [17]. “oton” comes from morpheme “metu” which means birth while “odal” comes from “medal” which means out or outside. *Otonan* or *odalan* for human is a celebration of birth date which is special because everyone has their own birth date which are of course different one to another [16].

3. TABLES AND FIGURES

3.1 System Design

General view consists of the general view of the prototype of Augmented Reality Based Educative Application *Banten Otonan* maker which is application that illustrates 3-dimensionally the process of making *Banten Otonan* and *Sampian*, the sounds or narration of every steps of the process as well as the information related to *Banten Otonan* and *Sampian*.

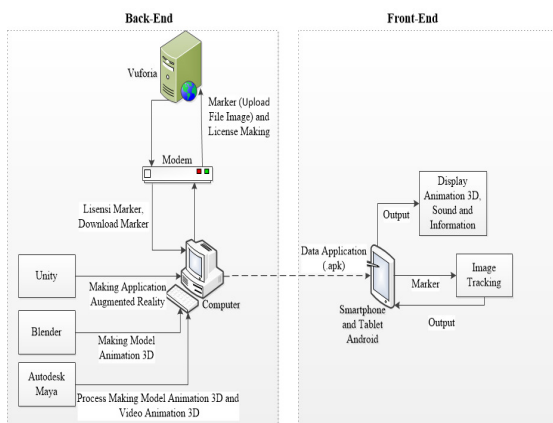


Figure 1: System Design

Figure 1 shows the general view ARBantenOtonan which consists of 2 process namely; back-end process and front-end process.

The first process, the back-end process involves the process of the creation of 3D model using Blender Software. The creation of 3D animation model and 3D animation video is done by using Autodesk Maya Software. The creation of license key and database marker is using Vuforia Library. The creation of license key is done in order to identify every application that are made and to give the access based on Vuforia platform.

The creation of database marker has function to list markers that are used during the creation of Augmented Reality based application. The process that is done after creating license key and database marker is the process of downloading database marker in form of Unity Editor or unity Package

File. The creation of Augmented Reality based application needs Vuforia SDK which later on is used in Software Unity by importing that Vuforia SDK. Unity is one of softwares that is used in creating Augmented Reality based application. The result of creating Augmented Reality based application by using Unity will be in form of .apk file which later on can be installed in android based smartphone.

The second process, front-end part, involves the installing process of the .apk file in android based tablet or smartphone. The Augmented Reality based application that has been installed can run and do tracking image on image by fitting the existing data marker from the .apk file with the pictures or marker that is being tracked by using camera of the smartphone. The result will be in form of 3D animation model, 3D animation video, sounds or narration as well as information related to the process of making *Banten Otonan* and *Sampian*.

3.2 Use Case Diagram

Use Case Diagram is the display of the functionality that is expected from the application or an interaction between users with the application [18].

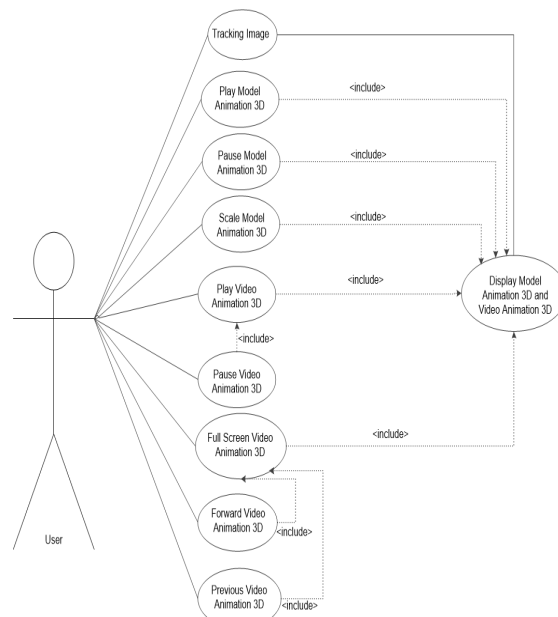


Figure 2: Use Case Diagram

Figure 2 shows use case diagram of ARBantenOtonan application. Figure 2 shows the features that are used in doing the process of ARBantenOtonan application.

3.3 Activity Diagram

Activity Diagram is aimed for showing the working diagram of ARBantenOtonan. Activity diagram can help user in using this application.

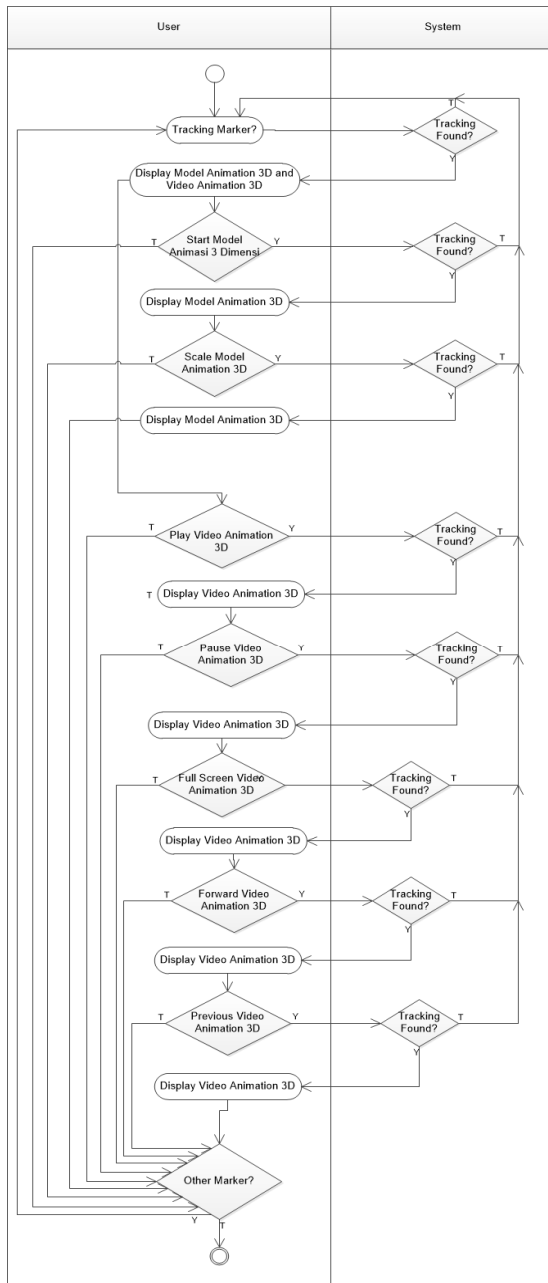


Figure 3: Activity Diagram

Figure 3 shows activity diagram of ARBantenOtonan application. Figure 3 is the working diagram from ARBantenOtonan application on purposes to ease users in doing the process from users to systems.

3.4 Marker Designing

Marker that is used in ARBantenOtonan is book about *Banten Otonan*. Marker has function to help the application in the process of tracking to show the 3D animation model as well as the 3D animation video.



Figure 4: Marker of Banten Kurenan

Figure 4 shows the marker of *Banten Kurenan*. Marker of *Banten Kurenan* later on is used as marker to show 3D animation model.



Figure 5: Marker of Banten Guru

Figure 5 shows marker of *Banten Guru* which is used as marker to do tracking image from the camera of android based smartphone.

3.5 Testing

The testing of ARBantenOtonan is highly needed to be done in order to inspect the rate of success in creating the application. The trial is done by using android based smartphone.

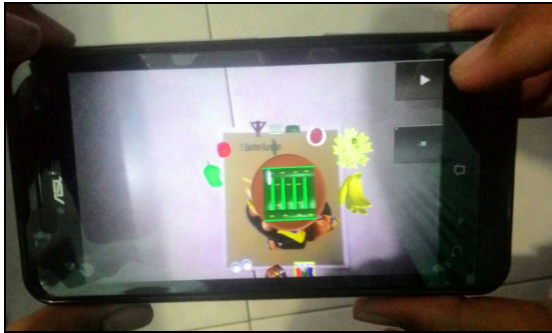


Figure 6: The Result of 3D Animation Play Model

Figure 6 shows play 3D animation model that is aimed for running the 3D animation model and sounds in creating *Banten Otonan* especially *Banten Kurenan*.



Figure 7: The Result of Scaling 3D Animation Model

Figure 7 shows scaling 3D animation model. Scale animation is aimed for changing the size of the 3D animation model by using the scale button. Scale button is supported by event toggle which can be used for giving true and false value when the event toggle button is being touched. If Event toggle values true means that users can do scaling process for the 3D animation model. On the other hand, if Event toggle values false means that users cannot do scaling process for the 3D animation model.

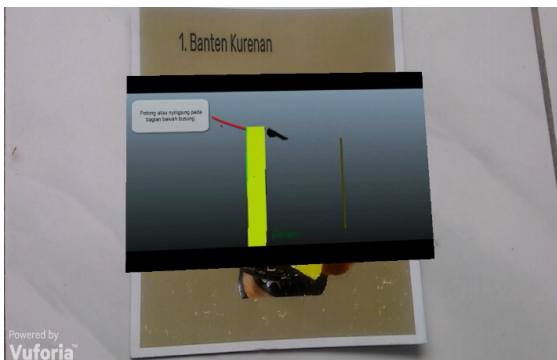


Figure 8: The Result of 3D Animation Video

Figure 8 shows 3D animation video of making *Sampian Banten Otonan*. This video later on is functioned to tell the process and steps in making *Sampian Banten Otonan*.

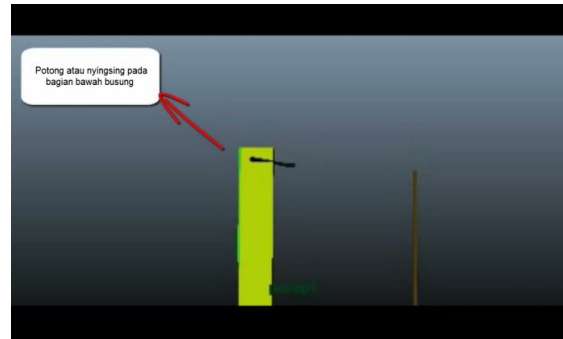


Figure 9: Full Screen Model 3D Animation Video

Figure 9 shows the full screen mode of 3D animation video. Full screen features is used for easing users in learning step by step the process of making *Sampian Banten Otonan*.

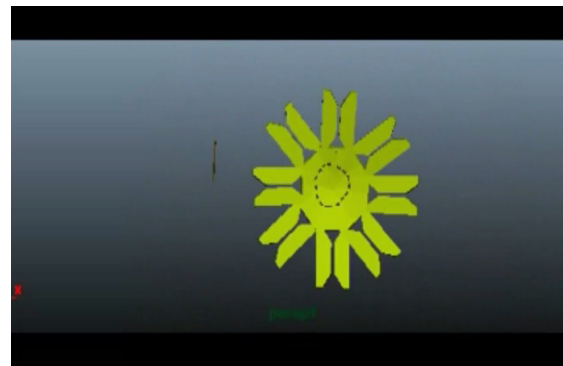


Figure 10: The Final Result of The Process Making *Sampian Banten Otonan*

Figure 10 shows the final result of the process of making *Sampian Banten Otonan*. That result is acquired from every step starts for the step of nuas busung till the process of nyait.

3.6 Result of Application Test

Trial is needed to acquire the expected output of the software. The trial by using Android based smartphone with specified specification is shown on table 1.

Table 1: Specification of Smartphones

No	Type Device	Specification	Detection Time	Minimum range	Maximum range
1	Device 1	Android Version : 4.4 (Kikkat) Processor :	2 seconds	12 cm	50 cm

		Dual-core 2.0 GHz RAM : 2 GB Camera : 8 Mega Pixel			
2	Device 2	Android Version : 4.0 Processor : Dual Core 1.5 Ghz RAM : 1 GB Camera : 12 Mega Pixel	2 seconds	12 cm	48 cm

Table I shows the specification of smartphones that are used in trial process. The trial of the application is done by using several comparing parameters.

The average time of detecting target object is 2 seconds which is acquired by calculating the detecting time using device 1 which is 2 seconds and device 2 which is 2 seconds as well.

The trial of minimum distance of marker detection and quality tester of 3D animation is aimed for determining the minimum distance between the smartphone with the target object in the process of marker detecting. The minimum distance of marker detecting by using device 1 is 12 cm with the quality that is displayed is categorized good. Meanwhile, the minimum distance of marker detecting by using device 2 is 12 cm with good quality 3D animation display. The device specification influences the minimum distance of marker detection.

The trial of maximum distance of marker detection and quality tester of 3D animation is aimed for determining the maximum distance between the smartphone with the target object in the process of marker detecting. The maximum distance of marker detecting by using device 1 is 50 cm with the quality that is displayed is categorized good. Meanwhile, the maximum distance of marker detecting by using device 2 is 48 cm with good quality 3D animation display. The device specification influences the maximum distance of marker detection.

3.7 Analisis of The Output of Augmented Reality based Application

The comparison of the application is aimed for comparing the result or output of ARBantenOtonan application with the other Augmented Reality based applications. The comparison is divided into 2 namely; the comparison of 3D animation model and the comparison of 3D animation video.

3.7.1 Analisis of the output 3D animation model application

The analysis of the comparison of 3D animation model of ARBantenOtonan with other Augmented Reality based applications are shown by Table 2 below.

Table 2: Analysis of The Output 3D Animation Model Application

Augmented Reality application name	Detection Time	Mini- mum Range	Maxi- mum Reange	Application Size
Augmented Reality-based Educational Application of Banten Otonan Making	2 seconds	12 cm	50 cm	157 mb
Learning Media of Writing Aksara Bali based on Augmented Reality	2 seconds	6 cm	55 cm	125 mb

Table 2 shows the comparison of Augmented Reality applications in terms of time detection, minimum distance, maximum distance and the size of the application. Based on the table, it can be concluded that the minimum and maximum distance are affected by the number of resources and the size of the markers that are used.

3.7.2 Analisis of the output 3D animation video

The analysis of the comparison of 3D animation video from ARBantenOtonan application with the other Augmented Reality based application is shown by Table 3.

Table 3: Analysis of The Output 3D Animation Video

Augmented Reality Application Name	Time Detection	Minimum Range	Maximum Range	3D animation video size
Augmented Reality-based Educational Application of Banten Otonan Making	2 seconds	10 cm	35 cm	15,1 mb
Augmented Reality For Chemical Elements : PERIODIKAR	2 seconds	6 cm	25 cm	12 mb

Table 3 shows the comparison of Augmented Reality based applications in terms of time detection, minimum distance, maximum distance and the size of 3D Animation Video. As for the result, the minimum and maximum distances that are shown on Table 3 are affected by the number of resources.

4. CONCLUSIONS

ARBantenOtonan is created by using Augmented Reality technology. This application is developed for Android platform by using Vuforia Library.

The result of the trial that has been done shows that ARBantenOtonan application has run well. The result of the trials namely;

- The minimum or maximum distance to successfully display animation is determined by the process of marker tracking.
- 3D animation video of making sampian that is produced through tracking marker process has a good quality of video.
- 3D animation model of making *Banten Otonan* which is produced through marker tracking process is in a good quality.
- All functions and features that ARBantenOtonan has run well.
- The average time for detecting object is 2 seconds.
- ARBantenOtonan Application can be develop to dynamic augmented reality application.
- ARBantenOtonan can only to run in Android platform.

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