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NaSCo 2018 ICT with Smart Computing IT

# 9th National Students' Conference on Information Technology

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# ABSTRACT PROCEEDINGS

## FOURTH INTERNATIONAL IT CONFERENCE ON ICT WITH SMART COMPUTING

Organized By

**Nepal College of Information Technology**

# Preface

It is a great honor for me as a chairman to welcome you for the Ninth National Students' Conference on Information Technology: Fourth International IT Conference on ICT with Smart Computing (NaSCoIT-2018). We are encouraged to continue the conference due to the success achieved from the past conferences. The main objective of these types of conferences is to encourage the IT students to write research papers.

In the recent years, information technology has been widely discussed subject of interest among all students and professionals. Particularly, the international market is interested in the information technology professional and has high job demands. This time the conference is expanded to the International level focusing on the recent development in ICT with Smart Computing. I hope that such type of conference will enable the participants to understand more about the recent trends, prospects and directions in the field of Information Technology like the previous conferences.

I appreciate the initiation taken by Nepal College of Information Technology for providing this type of forum for the IT students and researchers. At last, I would like to express my sincere appreciation to the organizing committee for their dedicated efforts to materialize the conference. I hope that all participants will have a fruitful and beneficial conference this time too.

**Conference Chairman**
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## Table of Content

# Mobile Ad Hoc Networks and its Security Issues, Challenges and Applications

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## ABSTRACT

*An Ad Hoc remote system is a pool of remote versatile hubs that design consequently to build a system without the prerequisite of any customary framework. Specially appointed systems utilize portable hubs to empower correspondence outside remote transmission run. Outlining a foolproof security convention for specially appointed remote is an exceptionally difficult undertaking. Some certain and selective highlights of specially appointed remote systems to be specific, shared communicate radio channel, shaky working condition, absence of focal expert, absence of relationship among hubs, limited accessibility of assets, and physical powerlessness assume a noteworthy hindrance part in planning this foolproof security. Amidst all correspondence MANET is a developing exploration zone with monstrous reasonable applications. Be that as it may, remote MANET is especially stranded because of its substantial abilities, for example, open standard, powerful topology, circulated participation, and obliged ability. Mobile Ad Hoc Networks (MANETs) have gotten extremely expanding interest, mostly attributable to the planned pertinence of MANETs to various applications. Since every one of the hubs in the system cooperate to forward the information, the remote channel is slanted to dynamic and simple assaults by malicious hubs, for example, Denial of Service (DoS), eavesdropping, spoofing, and so forth. Actualizing security is in this way of prime significance in such system, As MANET is rapidly spreading for the property of its capacity in shaping impermanent system without the guide of any settled framework or incorporated organization, security challenges has turned into an essential worry to give anchor correspondence. Guiding the network through different channels plays an important role in handling the security aspects of the entire system. Taking every aspect into consideration it is found that security is something that cannot be overlooked while working with MANETs. In this paper we endeavor to break down the dangers looked by MANETs and spotlight on the discoveries and future work that might enthusiasm for analysts.*

**Keywords:** Ad Hoc Network, MANETs, Security, Malicious hubs

# Intrusion Detection with Feature Selection and Dimension Reduction using WEKA

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## ABSTRACT

*As Internet is growing with a high speed, there are large number security audit data and complex intrusion behavior which makes intrusion system inefficient. Intrusion detection using data mining and machine learning can be one of the solutions to this problem. For this we can build intrusion detection system using machine learning algorithm. One of the machine learning and data mining tools that can be used for this purpose is WEKA which uses various algorithms. With this tool we can develop a model using various algorithms which can distinguish normal and malicious traffic and also we can analyze which algorithm gives accurate result. For a model to be created a dataset is given with large number of features and all the features are not that important. Feature selection helps in reducing computational time. We should be able to select various attributes which helps in developing an effective model in WEKA. The same model can be trained and used for other test data. The analysis is performed with a traffic data called VPN non VPN dataset from ISCX which consist of 14different traffic categories. This dataset consist of two class called VPN and non-VPN, and the model can classify correctly whether the traffic is coming from VPN or a non-VPN. This paper mainly deals with creation of model for intrusion detection using WEKA and also shows how the accuracy can be increased by feature selection and dimension reduction.*

**Keywords:** WEKA, Machine Learning, Data Mining, Classifier, Data Collection, Feature Selection, ROC curve

# Stock Market Forecast using Time Series Analysis

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## ABSTRACT

*Stock market, one of the financially volatile markets has attracted thousands of investors' hearts since its existence. The profit and risk of it has great beauty and everyone wants to get some benefits from it, so the stock price forecasting has always been a popular field of study in the area of financial data mining. Many methods like technical analysis, fundamental analysis, statistical analysis etc. are being used to predict the stock price in the share market but no one method has proved to be consistent forecasting tool. This paper contributes to the field of Time Series Analysis, which aims to forecast the stock market price using previous recorded stock prices. It discusses about how the Moving Average method can be used to identify the unknown and hidden patterns in share market data considering SARIMA as noble method. The proposed system consists of building and training the models using the past data of the selected stock and the results obtained from the model for comparing with the real data so as to ascertain the accuracy of the model. This result contributes to the development of more robust forecasting for the purpose of qualitative and quantitative information.*

# Breast Cancer Prediction using Machine Learning Algorithm

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## ABSTRACT

*The second important cause of cancer deaths in women today is Breast Cancer and it is the most common type of cancer in women. Disease diagnosis is one of the applications of AI which can be implemented and are proving successful results. The main idea behind this project is to see to what extent can machine learning algorithms be used for detecting breast cancer of biopsied cells from women with abnormal breast masses. To create the classifier, the WBCD (Wisconsin Breast Cancer Diagnosis) dataset is employed [1]. This dataset is widely utilized for this kind of application because it is virtually noise-free and has just a few missing values. The objective of this project is we predict breast cancer tumors as either Malignant (being cancerous) or Benign (being noncancerous) based on a given patient's symptoms and attributes so that we can pay proper attention towards health. The use of two popular algorithm KNN (K Nearest Neighbors) and Logistic regression is done in the project and hence based on their accuracy which is very close to each other we used KNN for further prediction. The performance of both algorithms is clos to each other. Accuracy of KNN is (97.84%) which is greater than logistic (97.14%).Hence; we implemented KNN for prediction of breast cancer.*

**Keywords:** Wisconsin Breast Cancer Diagnosis, Malignant, Benign, K nearest Neighbors, Logistic Regression

# Decentralized Application for Common Student Record on Hyperledger Fabric

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## ABSTRACT

*This paper describes the application which makes the record of students decentralized within the network of Universities. Existing record handling method in educational sectors are centralized. The very governing architecture leads to vulnerability in the loss of records on the failure or damage of the central record storage facility. In addition, there is no transparency on the management of records. In order to address these major issues, we implemented distributed ledger technology also known as Blockchain technology. With the use of Blockchain technology a ledger is created and distributed among the Universities, This makes the activities more transparent and secured as every activity on the network is recorded on this ledger. Also, the records that one University stores record on the local storage via an application, the record is distributed among the participant of the network. Among numerous existing platform for Blockchain application development, we implemented Hyperledger Fabric, Hyperlegder Composer, and IBM Blockchain platform. The resulting product is the composer application that runs locally on the device and is connected to the IBM Blockchain services' instance. This paper describes the development of a decentralized application which is able to share the record among the participant of the network, on top of the Hyperledger Fabric architecture.*

**Keywords:** Blockchain, HyperledgerFabric, Hyperledger Composer, IBM Blockchain Service

# Nepali Sentiment Analysis using Neural Network

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## ABSTRACT

*Sentiment Analysis also known as opinion mining is the process of identifying and categorizing opinions are now being possible due to the abundance of texts on the internet. For this, we have developed a system to analyze sentiment in Nepali sentences using a Recurrent Neural Network. The system is able to classify the Nepali text sentences as either negative or positive. We collected data from various news websites as well as from social media websites then labeled some data points and trained the neural network model to form the system that can classify sentiments. This paper deals with the collection of data, training the model to run inference on it. The results of this system show that the LSTM RNN approach to sentiment analysis can obtain about 70% test accuracy on our self-created corpus.*

**Keywords:** Natural Language Processing, Machine Learning, Neural Networks, Nepali Language, Sentiment Analysis

# Cryptocurrency Trend Analysis and Correlation with Twitter Sentiment

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## ABSTRACT

*This research is concerned with predicting the fluctuations in the volatile price of Bitcoin, which is nowadays increasingly used for online transactions worldwide and are considered as the global standard for transactions in the near future. Bitcoin lacks central governing authority and is built on a decentralized, peer-to-peer network with transactions being carried out by the members of the network which may be any general public. Thus daily transaction, trader's activities and general opinion of people towards Bitcoin can have direct or indirect influence on its market value. Twitter being one of the influential social media with many authentic news accounts is selected as a source of news related to Bitcoin for this research. A sentiment analysis system is devised using Linear Support Vector Classifier which gives either positive or negative label to each tweet from the news corpus with the accuracy of 84.43%. Then the sentiment score of each day is analyzed for cross correlation with corresponding price of Bitcoin of the same day which implied sentiment of today has maximum impact on price of tomorrow. Therefore to predict the increase or decrease of the price for the following day a Naïve Bayes classifier is trained with sentiment score and price which yielded an accuracy of 78.03%.*

**Keywords:** Bitcoin, Sentiment, Linear Support Vector, News Corpus, Cross-Correlation, Naïve Bayes.

# Comparative Study on Optical Mark Recognition (OMR)

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## ABSTRACT

*OMR is the process of reading data from filled sheets in the form of bubbles, squares, tick marks, etc. Optical mark recognition is also called as "mark sensing" because it involves the process of scanning the information filled in the predefined sheet. There has been a lot of work in different type of techniques used to implement OMR technology. Most of the papers have similar initial methodologies. However, the main algorithm is different in different papers. Therefore, this paper tries to compare different mechanism with each other and will try to implement one of the best technique among them in order to verify the result. We have purposed to use windowing technique as it gives the most accurate result. According to the test, the result obtained by program was nearly 100%.*

**Keywords:** OMR, algorithm

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# Quantum Annealing as an Optimized Simulated Annealing: A Case Study

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## ABSTRACT

*The paper presents a case study on Quantum Annealing in relation to Simulated Annealing. At first it includes theoretical details for Annealing method, Simulated and Quantum Annealing techniques for solving problems where search space is discrete. Onward, based on variant performance parameters, from various experimental results, conducted using quantum annealer (like D-Wave) in compare to different classical counter fits verifies Quantum Annealing as an optimized technique against Simulated Annealing.*

**Keywords:** Annealing, Simulated, Quantum, Discrete Search Space, Annealer.

# Theoretical Foundations of Computational Studies In Problem Solving Using Mathematical Induction and Apagogical Argument

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## ABSTRACT

*Computers are limited by space and time. With the building concept of theoretical foundations definition of both the types of problems that can be solved using a computer and the quality of their solutions can be dictated. Theoretical foundations required to study various sub disciplines in computer science. The actual solution to a computational problem usually lies outside these circumference, thus an approximate solution must always be computed. Topics included in the problem solving with the concept of theoretical foundations include propositional and predicate logic with applications to logic programming, database querying, and program verification; and graph theory with applications to analysis of algorithms; sets, relations, and functions and their applications in databases, functional programming.*

**Keywords:** Theoretical Foundations, functional programming, logic programming.

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# Steganography for Secure Message Transmission using Modified Hash LSB Technique and Twofish Cryptographic Algorithm

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## ABSTRACT

*Cryptographic algorithm secures message transmission over an open channel by scrambling the plain message with the help of a secret key, producing the cipher text. Intruders can get this scrambled message and tries to decrypt it and get the original message from it. Steganography hides the message inside digital media such that intruders does not know about the message transmission and removes his/her attention. The combination of both provides another layer of security, thus preventing the opportunity to work on the encrypted data for an intruder. This makes the transmission of message highly secure than using each separately. This paper is focused on combining both cryptography and*

*image steganography for highly secure message transmission. The message is encrypted using twofish encryption method with key length of 256 bits. This encrypted message is then embedded inside the RGB component of the pixel of the cover image using modified Hash LSB (HLSB) in (3, 2, 3) format producing stego image which is now ready to send over an open channel. After the implementation, MSE, PSNR, SSIM and KL Divergence (Relative Entropy) are calculated. The results show high security and greater similarity between cover image and stego image, making our system robust.*

**Keywords:** Steganography; Cryptography; Modified Hash LSB; Twofish Encryption

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# Facial Expression Recognition using Inception Layer in Deep Neural Network

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## ABSTRACT

*Facial Expression Recognition (FER) is a very active research topic due to its potential application in many fields such as Human Machine Interface, Driving Safety and Health Care. This work proposes an Inception Network to classify the Human Facial Expressions which also solves the short comes of the Convolutional Neural Network (CNN). The performance of the Inception Network was done with CNN in terms of accuracy, training time and error on publicly available FER datasets chosen was CK+ which has 7000 images. The Inception Network was compared with the CNN using the CK+ datasets and also with the reference Kaggle datasets to find the network accuracy. The experimental results obtained after training the network shows that the Inception Network performed better recognition of Human Expressions than CNN in both FER datasets. The overall accuracy of Inception Network was 88.3% and that of CNN was 62.0% while training on CK+ datasets. Similarly, the overall accuracy of Inception Network was 82.0% and that of CNN was 70.0% while training on Kaggle datasets. Also, when the images were applied some manipulation the result obtained was better in Inception Network*
*than that in CNN for both the datasets.*

**Keywords:** Facial Expression Recognition, Deep Neural Network, CNN, Inception Layer

# Fault Locating in Transmission Line Using Discrete Wavelet Transform, Neural Network and Genetic Algorithm

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## ABSTRACT

*This research compares three different algorithms which can be used for locating faults in power transmission lines where a neural network has been trained using genetic algorithm with the combination of two different types of fitness functions. The required discrete fault current samples used for training the neural network was acquired by the formula of three phase to ground fault current. To extract the information of different frequency bands of fault current discrete wavelet transform has been used and to reduce the number of inputs to the neural network, the energy of the decomposition coefficients has been applied to the input layers of the neural network.*

**Keywords:** Discrete Wavelet Transform, Neural Network, Genetic Algorithm, Power System Faults.

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# Caption Maker: Image Caption Generation using Deep Learning

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## ABSTRACT

*Image Captioning is the process of generating textual description of an image which uses both Computer Vision and Natural Language Processing. There has been significant improvement in image classification over the years with the popularity of deep learning models like Convolutional Neural Networks (CNN) and Recurrent Neural Networks (RNN). Caption generation requires models that can piece together relevant visual information about the shapes and objects present in an image along with the environment they are in and their activity. In this paper, we present a multi-model neural network method closely related to the human visual system that captions the content of an image. This is done using CNN, an object detection and localization model which extract the features of images along with a deep RNN based on Long Short-Term Memory (LSTM) units for sentences generation in natural language.*

**Keywords:** Computer Vision, Convolutional Neural Network(CNN), Recurrent Neural Network(RNN), Long-Short Term Memory (LSTM).

# Handwritten Devanagari Character Recognition using Capsule Network

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## ABSTRACT

*This thesis proposes a Capsule Network (CapsNet) to classify the Handwritten Devanagari Characters. We take a brief look into the shortcomings of Convolutional Neural Network (ConvNet). A CapsNet model is proposed to solve the shortcomings of ConvNet and perform the test comparably accurately. The performance analysis of the network is done on MNIST digits and publicly available Devanagari Handwritten Character dataset and also on geometrically transformed (rotated, scaled, sheared) test datasets. A ConvNet model is also tested for the datasets and the performances of both the modelsare compared.*

*The handwritten devanagari characters are recognized by the experimental CapsNet model with 99.69% accuracy and for the same dataset accuracy of ConvNet is 98.96%.*

**Keywords:** Computer Vision, Handwritten character recognition, Convolutional Neural Network(CNN, ConvNet), Capsule Neural Network (CapsNet)

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# Steganography using Sequential and Pseudorandom Encoding

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## ABSTRACT

*Massive communication over the networks has raised the concern for the security of data transmitted. In order to prevent the data and information from being intercepted by the intruders various techniques such as steganography, cryptography and watermarking are used. Steganography is the art of passing information in a manner that the very existence of the message is unknown whereas Cryptography means converting the text from readable format to unreadable format. Proposed research intends to emphasize usage of hybrid method that involve both cryptographic and steganographic approach. Concept is to encrypt a secret message first, using a key that is shared by sender and receiver and then to conceal encrypted message within cover image. Main aim of this research is to develop encoding/decoding algorithm and program for Crypto-Steganography for concealing and extracting secret message (message could be text file or image file) within the RGB pixels of a cover image without visual distortion. Dual layer security has been ensured through the use of steganography and pseudorandom encoding and decoding algorithm.*

**Keywords:** Steganography,Cryptography, Pseudorandom generator

# Sentence Ranking and Answer Pinpointing in Online Discussion Forums Utilising User-generated Metrics and Highlights

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## ABSTRACT

*One of the major challenges in searching on the internet has been that search engines and online forums have not been able to extract and pinpoint exact answer to people's query despite information being available on the internet. Extraction of to-the-point answers from articles, posts and blogs tend to improve search accuracy. Sentence Ranking helps to rank answers according to a score that represents positive remark for the relevance of sentence. User-generated metrics can be used to improve sentence ranking. Also, the text selected and saved as highlights by users can be used to extract the most important parts of the content. Answer pinpointing in simple forums can be achieved by allowing users to highlight parts of the text, store it in a database and analyse such highlights using sentence ranking engine followed by answer extraction to find the best chunk of texts. It can prove to be a milestone in providing exact and relevant answers as per the searchers' intent and can also facilitate improvement of question answering in discussion forums.*

**Keywords:** sentence ranking, user-generated content, question answering, user-generated metric, user highlights, answer pinpointing, online discussion forum, engagement metric.

# Nepali Document Clustering using K-Means, Mini-batch K-Means, and DBSCAN

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## ABSTRACT

*Automated document clustering is the process of grouping documents into a small set of meaningful and coherent collections. This research evaluates K-Means, Mini-batch K-Means and Density-Based Spatial Clustering of Applications with Noise (DBSCAN) algorithms, in the context of Nepali documents, using four performance measures: Homogeneity, Completeness, V-Measure and Silhouette Coefficient. Features extraction is done using Term Frequency – Inverse Document Frequency (TFIDF). The empirical results show that Mini-batch K-Means performs better when using TFIDF. Similarly, in time-constrained environments, the clustering time of Mini-batch K-Means is better than the other two algorithms.*

**Keywords:** Clustering, Machine Learning, Nepali Document Clustering, K-Means, Mini-Batch K-Means, DBSCAN, TFIDF

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# Performance Analysis Between Haar and Daubechies Discrete Wavelet Transform in Digital Watermarking

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## ABSTRACT

*In this paper, the cover image is embedded with watermark image and from the watermarked image and the watermark image has been extracted by using Haar and Daubechies discrete wavelet transform based digital watermarking by using MATLAB Simulation software and also performance of these watermarking has been evaluated using different performance metrics they are mean square error (MSE), peak signal to noise ratio (PSNR), structural similarity index measure (SSIM) and correlation coefficient (CRC). In the simulation result, we found that Daubechies wavelet transform give better performance over Haar wavelet transform in terms of PSNR, MSE, SSIM and CRC.*

**Keywords:** Haar discrete wavelet transform, Daubechies discrete wavelet transform, watermark image.

# Performance Analysis of Electricity Demand with Meteorological Parameters for Japan

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## ABSTRACT

*The quality of short term electricity demand forecasting is essential for all the energy market players for operation and trading activities. Electricity demand is significantly affected by non linear factors such as climatic condition, calendar and other seasonality have been widely reported in literature. This paper considers parsimonious forecasting models to explain the importance of meteorological parameters for the hourly electricity demand forecasting. Many researchers include only temperature as a major weather factor because it directly influences electricity demand, however other meteorological factors such as relative humidity, wind speed etc. are rarely included in literature. Therefore, the main purpose of this study is to investigate the impact of meteorological variability such as relative humidity, wind speed, solar radiation etc. for short term demand forecasting and analyzed it quantitatively. We demonstrate three different multiple linear models including auto-regressive moving average ARMA (2,6) models with and without some exogenous weather variables to compare the performances for Hokkaido Prefecture, Japan. We applied Bayesian approach to estimate the weight of each parameters with Gibbs sampling and results show overall improvement of mean absolute percentage error(MAPE) performance by 0.015%.*

**Keywords:** MAPE, ARMA

# A Nepali Rule Based Stemmer and its performance on Different NLP Applications

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## ABSTRACT

*Stemming is an integral part of Natural Language Processing (NLP). It's a preprocessing step in almost every NLP application. Arguably, the most important usage of stemming is in Information Retrieval (IR). While there are lots of work done on stemming in languages like English, Nepali stemming has only a few works. This study focuses on creating a Rule Based stemmer for Nepali text. Specifically, it is an affix stripping system that identifies two different class of suffixes in Nepali grammar and strips them separately. Only a single negativity prefix is identified and stripped. This study focuses on a number of techniques like exception word identification, morphological normalization and word transformation to increase stemming performance. The stemmer is tested intrinsically using Paice's method and extrinsically on a basic tf-idf based IR system and an elementary news topic classifier using Multinomial Naive Bayes Classifier. The difference in performance of these systems with and without using the stemmer is analysed.*

**Keywords:** Nepali, Stemming, Over-Stemming, Under-Stemming, IR, tf-idf, Paice method, News Topic Classification

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# Agent Based Control of Multiple Power Sources

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## ABSTRACT

*The reliability of a power source can be increased by using multiple types of sources with different attributes. Properties, such as environment friendliness of a solar power system, are preferable over attributes such as negative impacts and cost of diesel generating plants and utility grids. When using such a multi-source system, a common challenge is to use maximum or all of the power produced by the most preferred source. Conventional technique of simply connecting the outputs of the power sources cannot assure of the maximum utilization. The agent based approach developed in this paper maximizes the utilization of the most preferred source and minimizes the use of the least preferred one*

**Keywords:** Agent System, Bounded Knapsack Problem, Divide and Conquer Approach

# Impact of Pico-hydropower Plants on Rural Development (Gotikhel)

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## ABSTRACT

*With the assumption of, the development and promotion of Pico-hydro can eradicate poverty and uplift the social standard of people living especially in remote hills and mountains of the country. Introducing Pico-hydro will provide them access to TVs, radio, computer, health equipment, and cottage industries etc., which definitely improve their living standard. This paper shows the social, economic, political, environmental and infrastructural advancement due to Pico-hydro in Gotikhel. Here to identify the impact of Pico-hydro in Gotikhel different historical data are collected for the qualitative and quantitative analysis, social, economic, political, environmental and infrastructural impact in past and present are studied. And the study will cover KII and questionnaire method to study the households and its impact on their living standard. The importance of the study is to accumulate the information about the small-hydro communities. Similarly, to increase the interest of research on Pico or small hydro projects. The study will cover the sufficient range of literature review of Pico-hydro and Gotikhel from socio, economic, political, environmental and infrastructural development of Gotikhel.*

**Keywords:** Pico-hydro,Infrastructure,Environment,Vijuli Adda,Penstock

# An Analysis of Heart Disease Prediction using Different Data Mining Techniques

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## ABSTRACT

*Data mining is one of the important fields of research whose significant goal is to find a useful pattern of data from large data sets. After analysing, the discovered pattern can be used to make decisions on a different field like healthcare industry. With the increase in worldwide population and evolution of different new diseases along with old diseases, healthcare industry produces numerous amounts of data on a regular basis. Heart disease is a word that collectively represents different medical disorder related to the heart and directly affects the heart. On treatment or during research, the healthcare industry collects numbers of data related to heart disease which contains hidden information that can be important in making decisions. With data mining techniques it is possible to analyse those data from different aspects to create a relationship among them. This paper works on the utilization of various decision tree algorithms of data mining in order to predict heart diseases.*

**Keywords:** Heart Disease, Naïve Bayes, Neural Networks, Decision Tree

# Vision Based Motorcycle Monitoring at Intersection of Nepal Roads

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## ABSTRACT

*Computer vision plays important role in Intelligent Transportation System (ITS) for traffic management and surveillance. This paper implements existing vision-based detection and tracking algorithms to detect and track motorcycles. While few research has been carried out for vehicle detection, but no research has been carried as far known for tracking vehicle in Nepal roads at intersections. GMM and Haar Cascade Classifier method are used for detection. Results show that contextual combination in bike detection gets 89% for sensitivity, 60 % for precision and 0.72 for F1-s core. Low precision is due to high false positive in detection of every frame in video. The optical flow tracking with Haar detections rejects false positive which was high detected in detection process. This tracking improves all performance metrics: Sensitivity, precision, F1-score and accuracy. While tracking with optical flow gets 86.96% for sensitivity, 95.23 % for precision, 83.3 % for accuracy.*

**Keywords:** GMM, Haar, Intelligent Transport System, Optical Flow, Tracking

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# A Methodological Approach for Analysis, Design and Deployment of Data Warehousing and Business Intelligence

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## ABSTRACT

*Leading organizations are using a set of theories and technologies that converts raw data into useful informationfor the business use. They are seeking new, smarter ways to improve performance, grow revenue, develop stronger customer relationships and increase workforce effectiveness – and they expect individuals in every role to contribute to these outcomes. Business intelligence is a key factor in achieving such results because it supports informed decision making at every level, enabling managers, executives and knowledge workers to take the most effective action in a given situation. This paper not only explores the underlying issues and the development of information technology that provide business intelligence ,it also provides an actionable insight on how to plan, build, and deploy business intelligence and data warehousing solutions.*

**Keywords:** Business Intelligence, Data Warehouse, DBMS, ETL, OLTP, OLAP

# Pattern Recognition for Cercospora Coffeicola in Coffee Plant

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## ABSTRACT

*In the current context of Nepal, cofee cultivation is one of the major cash crops cultivated most widely across the country. In spite of being cultivated extensively the yield and growth of coffee are found to be inadequate due to different reasons like old techniques of cultivation, infection, climate change and so on. The main aim of this study is to use the pattern recognition technique to detect a specific plantpathogen Cercospora Coffeicola in coffee plant and prevent from leaf spots and berry blotch disease in the plant. The TensorFlow framework with Mask R-CNN would help to detect the lesions at the pixel level to provide more accurate results.*

**Keywords:** TenserFlow, CNN, R-CNN

# Development of Actuator Interface Circuit for Portable Device for Health Monitoring of Metallic Structure

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## ABSTRACT

*Damage detection of the metallic structures such as hydro-powers pipelines, water supply pipelines and bridges are the crucial issues in the modern world. The early detection of the generation of cracks and corrosion in such structures can prevent the unwanted accident and can save the structures as well as human lives. One of the widely used method in structural health monitoring is to generate the lamb wave and to analyze the wave for detection of damage in the structure. This paper describes the generation of the actuation lamb wave through low power portable device. The frequency and amplitude of lamb wave plays a vital role to determine the quantity and quantity of the damage in the structure. The proposed device can generate up to the lamb wave with central frequency of137 kHz, 6-cycles and 10 Vp-p amplitude. The device comprises of amplifier, signal selective circuit and microcontroller with DMA controller and DAC to generate, as well as, to control the frequency of the actuated lamb wave. The generated lamb wave can be further used with different sensors such as Laser Doppler Velocimetry (LDV), Piezoelectric (PZT), Micro electro mechanical system (MEMS) accelerometer and so on for further analysis of the lamb wave data.*

**Keywords:** Structural health monitoring,damage detection,lamb wave generation

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# IOT and Use-Cases of Bluetooth Smart

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## ABSTRACT

*The world is now getting huge interest on IoT and every day the no of IoT devices are increasing. The environment around us is being smarter through the IoT technology. The devices are getting internet connectivity and making our activities smarter and easier.*

*The IoT devices can be a very good solution for controlling today's issues of insecurities like rape, kidnap. In this paper, we tried to highlight some possibility of IoT in light of Bluetooth Smart as a solution to such crime or actions and means of saving lives and moreover illustrating the Bluetooth Smart as an alternative to cover the security and privacy issue in IoT.*

**Keywords:** IoT,Bluetooth,Privacy and Security,Internet,Bluetooth Smart

# Nepal: A Wonder State for Technology

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## ABSTRACT

*Every year, Nepal witnesses an exponential growth in the number of youths leaving their homeland for a safer life and higher career opportunities. On the other hand, looking at how the rest of the world is progressing by means of technology, Nepal seems to lag too far behind. This however is also an indication about the countless opportunities still available when it comes to technology.*

**Keywords:** Youth Empowerment

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# Super-resolution: An Overview and its Modern Application

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## ABSTRACT

*The objective of super-resolution is to reconstruct a high-resolution (HR) image from a low-resolution (LR) input image. Super-resolution technique has been there for quite some time and has received a lot of attention recently in the research field. In this paper, we aim to provide an overview of superresolution and its different techniques used for reconstructing a high-resolution image. The paper also discusses various applications of super-resolution that impact our daily life.*

**Keywords:** Super-resolution, image reconstruction, applications.

# Internet of Things In Education and Different Ethical Issues

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## ABSTRACT

*The internet of things is the conceptual system which is defined as the interconnecting different devices, machines , objects or people which help to provide different identity and ability to give unique identifiers and helps to transfer data in different network. The internet of things(IOT) has developed internet oriented communication to be occurred with physical devices, different sensors and controllers which has changed education sector in high amount. With the implementation of sensors in objects, cloud computing, augmented reality and big data different type of environment can be determined. This process has developed new mode of communication between people and educational institutes. In this research proposal paper aim to show the impact of IOT in education from authors research review. This proposal will be focus on the IOT project in education where our research will be focus on smart school/college.*

**Keywords:** Internet of things, smart college, Benefits and application of IOT

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# Earliest Due Deadline Real-Time Scheduling for Load Balancing in Fog Computing

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## ABSTRACT

*Fog computing is a recent invention and it is new emerging technology. The birth of fog computing is directly related to the growth of IoT. It is very difficult to provide the requested resources for cloud due to day by day increase in the number of devices and the user data. Thus, as a supplement to the cloud computing and as extension to it, fog computing concept can be used. It acts as a bridge between cloud and users. Thus, it provides lot of benefits by minimizing the burden on cloud. Its purpose is to manage resources, perform data filtration, preprocessing. The fog manager need to assign available resources to tasks for execution to improve system performance, reduce response time and maximize utilization of resources. One of the biggest issues in fog computing systems is the development of effective techniques for the distribution of real tasks on multiple processors. The paper implements Earliest Due Date scheduling policy for real tasks and then resources are allocated to these tasks using Round Robin method. For scheduling, task length and absolute deadline are provided randomly. The paper also modifies Earliest Due Date scheduling that reduces number of missed tasks by executing probable missed tasks at the end. However, the modified algorithm do not improve maximum lateness.*

**Keywords:** Fog Computing, Cloud Computing, Task Scheduling, Real-time systems, Earliest Due Date scheduling.

# Systematic Management of SIM Cards

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## ABSTRACT

*Systematic management of the SIM cards is the research based on SIM cards which is made available by the telecommunication company to their consigned retailers. Systematic management of the SIM cards is for knowing the possession of the SIM card as of under whose name, citizenship the SIM card has been registered and from which retailer it was bought and when. The first phase of the project involves filling up the forms for the customers who intend to buy the SIM card from the respective retailer. Later, all theinformation that is filled in the form is stowed in the database for suitable record and future persistence. The purchase & sales and inventory of SIM cards is secondary priority of this system. The main objective of this study is to terminate the traditional entry of the SIM cards which was initially written in a form by hands and are stored in piles of folders. We found that the forms are likely to get vanished or sabotaged due to occurrence of various natural catastrophes like fire, earthquake and heavy rain. Once the data is stored in the database, the backup of them data can be done using run backup script or run restore script. There will be proper record of the person who bought the SIM card if incase it is looked-for in future. This will benefit the telecommunication company as well to have the appropriate archives of the SIM cards which they have given to retailer for vending*

**Keywords:** traditional, SIM cards, purchase, inventory, sales, customers, management.

# Weather Research and Forecasting Application Performance Benchmark using MPICH and OpenMPI

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## ABSTRACT

*Last few decades have experienced an unprecedented use of multi-core and multiprocessor architectures for building systems with high computational power. A large number of Message Passing Interface (MPI) implementations are currently available, each of which emphasize different aspects of high-performance computing and are intended to solve specific research problem. Weather Research and Forecast (WRF) model's performance is crucial for saving computing time. This is important because computing time in general is resource intensive and hence highly expensive. This research implements MPICH and OPENMPI as MPI's API, for shared and distributed parallelism using WRF Application. WRF build times were calculated with increasing number of cores and WRF runs were carried out on number of processors ranging from 5 till 30 in DMPar mode, and from 5 to 20 in SMPar mode. WRF run times showed significant change in SMPar with linear curve while in DMPar mode, it showed a non-linear curve with increase in number of processors both in MPICH and OPENMPI. The time taken to run WRF using DMPar mode in MPICH is lesser than in OpenMPI. In SMPar mode, WRF takes lesser time to run in OpenMPI than MPICH. The findings were such that DMPar functions better, in terms of time taken to run WRF, in MPICH and SMPar functions better in OpenMPI.*

**Keywords:** MPICH, OPENMPI, DMPa

# Potential Sectors to use ESRI Story Maps in Nepal

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## ABSTRACT

*This paper focuses on potential use of cloud based ESRI story map for Nepal. Government, INGO, NGO, local agencies and others generate data and maps related to topics important to their work but they are not as interactive nor user friendly and stored within organization. Here story maps can be considered as one of the powerful way of sharing and engaging end user in simple, effective and efficient way. Story maps is a web application that combines interactive maps with narrative text, images and multimedia content to tell a story. Different sector of Nepal can benefit with the use of story map, as it helps to delivered/convey message in compelling way, enhance the public engagement with data and interactive maps and communication. ESRI story map uses ArcGIS Online cloud based platform so one need not to worry about hardware*

**Keywords:** ESRI, Story Map, Cloud Based Platform

# Information and Communication Technology Challenges for Digital Tourism Business Model for Nepal

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## ABSTRACT

*Information and Communication Technology has created a huge impact on the business models. It has changed the way business was done few years ago, redefining business in the light of digital technologies. Tourism is one such vital industry that finds enormous application of Information and Communication Technology on it, changing the entire value chain from tourism creation and marketing to distribution and consumption. Tourism is one of the biggest industries of Nepal and the government of Nepal has targeted this industry as a prime source for economic development. Nepal government has identified that the role of ICT is vital for the growth and development of Tourism. Besides a lot of technological development and innovation in global tourism industry, Nepal is unable to attain benefits from the application of Information and Communication Technology. In our study we have examined the factors that are responsible for poor implementation of ICT in Tourism industry of Nepal. We employ qualitative exploratory method based on interviews, structured and semi structured questionnaires to accomplish the study. The study contributes in finding the factors responsible for poor implementation of ICT and analyzes the challenges regarding its implementation. Further, the findings are elaborated to build a conceptual framework for Digital Tourism Business Model for Nepal.*

**Keywords:** ICT, DTBM

# Context-Aware Privacy Preservation Approaches on Location Based Services using Recurrent Neural Network

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**ABSTRACT**

*With the widespread proliferation of usage of social networks, smartphones and smartphone apps, privacy preservation has become an important issue. This has led to increased concerns about the privacy of the underlying data. Various social media, mobile devices and sensors are collecting huge amount of data daily and analyzing them for business purpose or designing more convenience systems. But on the run, privacy of people has been on threat. Service providers might have chance to misuse the individuals private information. On the other side, facilitating people for making their lifestyles easier and automated systems can be more expecting. Thus, data mining by preserving the privacy can be the best way. The existing privacy preservation approaches for smartphones usually are less efficient due to the lack of consideration of active defense policies and temporal correlations between contexts related to users. Among various types of data collected according to various contexts, the privacy of trajectory data collected by Location Based Services (LBS) is also very important according to contexts for various persons and groups. In this paper, through modelling the trajectory data and the temporal correlations among contexts, we present an efficient approach that preserves the privacy of location data of users from adversaries dynamically on the basis of the sensitivity of user's context. Our efficient approach adopts active defense policy and decides how to release the current location information and contexts of a user to maximize the level of Quality of Services (QoS) of context-aware apps and services with privacy preservation. To make our approach more efficient and robust, and increase privacy involving long-term dependency we have used Recurrent Neural Network (RNN) model irrespective of the traditional Markov Chain model to model the trajectory data and contexts and their temporal correlations. Further, we have adopted the "release and deceive" policy and implemented a special kind of RNN i.e. Long-Short-Term-Memory (LSTM) and treated sensitive contexts as exceptions to preserve the sensitive contexts. We have conducted the extensive simulations on real datasets and compared the performance of our algorithm and approach with previous approaches on the basis of privacy, performance and utility of data.*

**Keywords:** Context-aware Privacy Preservation, Data Mining,Location Based Services,Recurrent Neural Network

# E-waste management in Nepal: An Approach for Minimizing E-waste to Ensure a Safe Environment

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**ABSTRACT**

*Electrical and electronic waste– e-waste – has become a global environmental pollution problem in developed and developing countries. Moreover, management of these waste is a challenge for developing countries like Nepal. The study covers the effects of e-waste generation in the global scenario. Meanwhile, current recycling practices, challenges and the impact of e- waste in Nepal have been comprehensively presented. On the basis of a comparison between e- waste management in the developed countries and Nepal, sustainable e- waste management solutions have been proposed. The aim of the research is to understand the importance of ewaste management and to advise a sustainable ewaste management system, which is used in developed countries, to improve the quality of e- waste management in Nepal*

**Keywords:** E-waste, e-waste management

# Application Aware Route Optimization In SDN using Bandwidth and Latency

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## ABSTRACT

*Software Defined Network (SDN) is a new network architecture for designing, building, and managing networks that separates the network's control plane and forwarding plane to better support the scalability and innovation in a network infrastructure. The overall network performance of an application is mostly affected by the two major factors, bandwidth, and latency. Between each pair of network elements in network infrastructure, there may exist multiple paths connecting them with different properties. A traditional network does not take this knowledge into Consideration and may result in the sub-optimal performance of applications and underutilization of a network resource. This research proposes a concept of Application aware routing which could improve the overall performance of a network by categorizing the application in bandwidth oriented and latency oriented and allocate the separate route for each type of traffic based on the application preferences using Software defined network architecture and OpenFlow protocol. The research also proposes a design of an application aware network topology by using software defined network architecture which uses open flow protocol and open flow protocol based controller. Routes for the application packets are chosen based on the application type. To verify the feasibility and practical implementation of the proposed concept SDN topology is implemented in an emulated environment using mininet)*

**Keywords:** Software defined network, OpenFlow, Application Aware Routing, Latency and bandwidth aware network

# Optimization of Range Queries Using Segment Trees

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**ABSTRACT**

*Range queries are the queries where a function needs to be computed on a range of numbers. As the number of such queries gets high, the simple sequential scan method that has linear time complexity isn't efficient. The use of segment trees can answer the same queries in logarithmic time. In this paper, the method of using segment trees for answering range queries is discussed with reference to an example of calculating the sum of a range of numbers.*

**Keywords:** Range queries,Range sum query,Segment tree

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