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Aggregated Time Series based Vehicular Traffic Path Recommendation

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Abstract—Periodic data related to vehicular traffic information have been flare-up and entered the era of big data. Vehicular traffic network is monitored continuously by motion detectors and video cameras. Advanced information about a travelling path is being used as an extraneous intervention tool to positively influence recommendation system performance. This situation directs us to think vehicular traffic path recommendation problem based on time series analysis. In this paper, a graph processing based vehicular traffic path recommendation method is proposed, which considers the spatial and temporal attributes. We cast a problem as an optimal path selection problem for the fixed origin and destination based on various data points acquired at a different time interval. Rigorous experimental evaluation on publicly available dataset shows the efficacy of the proposed method.

Index Terms—Time series analysis, traffic path recommendation, features aggregation.

I. INTRODUCTION

A recommendation system has been seen to be very useful to select a vehicular traffic path amongst many paths. With the development of economy in India, the numbers of vehicles are increasing. Traffic path recommendation within city traffic network is a huge task because traffic dynamics change concerning various periods of a day. Finding the shortest route, from source to destination in terms of traffic features, is a subject of interest. The recommendation of path mostly depends on route traffic features such as distance between origin and destination (OD pair), speed limits across a route, journey time, vehicular traffic flow at given time instance of a day and other relevant traffic restrictions. For path recommendations system, accurate and timely traffic information is essential, as it will provide support to ride hailing and logistic sector services. Potential cost saving in terms of travel time, consistent speed and flow will take place if optimal traffic path suggested to the traveller at different period of a day. Path recommendations based on traffic forecast has been gradually shifting to computational intelligence approaches, and short-term traffic forecast based on machine learning approaches has become a new trend.

The rest of this paper is organized as follows. Section II reviews the related work. In section III we introduce the proposed methodology. Section IV presents the data description and experimental setting. Section V shows the experimental results. Section VI presents a discussion and conclusions.

II. RELATED WORK

Vehicular traffic information prediction is a modelling task of the complex, non-linear spatio temporal relationship between each historical data point and the predicted value. Time series based accurate and timely prediction of vehicular traffic information is also an active topic of research. An unpredictable incident of accident, breakdown, congestion, and natural disaster also affects vehicular path recommendations [1]. Events of peak hour would cause a drop in traffic speed, leading to non-stationary time-series data [2]. To adapt to such uncertainty and to help a traveller to make better travel decisions, accurate and timely forward-looking traffic information is currently strongly needed [3]. The relationship between time series based historical traffic information and foreseen travel data has been studied using Convolutional Neural Network(CNN) [4]. Based on knowledge about vehicular traffic information and open-source libraries, researchers implemented path recommendation models for future few minutes to hours. A time series has a time (t) as an independent variable and a target dependent variable (y_t). Machine Learning algorithms extract knowledge from time-series data and predict a value for (y_t). Such data tend to be correlated in time and exhibit a significant autocorrelation [5]. Principal component analysis (PCA) based methodology play an important role for high-quality online traffic volume forecast by exploring functional characteristics of time series to make decisions [6]. On-line vehicle routing scrutinized using multivariate PCA. Forecasting about nearby future time intervals is carried in real-time by calculating the distribution of link travel times. Such methodology is used for network-level travel time calculations for various OD pair and different time interval [7]. Some travellers use to modify their routes dynamically based on travelling costs. A daily traffic assignment model capture traveller's reaction to information while moving across link references of the road phase. A path re-routing model based on the effect of differences of the approximated and the expected travel cost [8]. An intelligent path recommendation protocol for a driver to drive through grid-layout type area with three different variants, namely avoiding congestion, economical and context-aware trajectories [9]. Advancement of transportation

Recent Trends in Communication and Intelligent Systems pp 151–156

An Incremental Approach Towards Clustering Short-Length Biological Sequences

Neeta Maitre ✉

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The biological datasets are gaining tremendous importance due to their usefulness in the biomedical and bio technological sectors. The extension of the knowledge gained through these databases is proven to be useful in the field of agriculture also. The major contribution amongst these databases is the genomic datasets. Clustering methodology in biological data mining can be considered as a major prepossessing step. The approach tries to give an optimal and dynamic programming based solution for clustering based on similarity. On the technical front, it is developed in biopython which provides

programming comfort and ease. The technique is proven to be effective for short-length sequences. The approach can be further used to compare small sequences by integrating it with software applications. Thus, proposed incremental clustering approach can be applied to any kind of species specifically small-length sequences. The algorithm is compared with CLOBB (CLuster On the Basis of BLAST similarity) feature-wise, and is found to be effective due to its simplicity and optimality.

Keywords

Biological sequences   **Incremental clustering**

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2. Wei D et al (2012) A novel hierarchical clustering algorithm for gene sequences. BMC

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Manasi Pathade ✉ & Madhuri Khambete

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Effective Vibration Damping Using Self-tuning Smart Material

Gayatri R. More ✉ & Sharada N. Ohatkar

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Bio-inspired AI Optimization Techniques to Evaluate Data Rate and Minimize Interference in Cognitive Cellular Network

Sharada N. Ohatkar ✉ & Dattatraya S. Bormane

Conference paper | First Online: 19 May 2020
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The concept of Cognitive Cellular Network (CCN) resolves spectrum availability crises arising from increasing demand of data rate, which is restricted in cellular network. The traffic demand is growing extensively consequently allocating the channels optimally in CCN is the purpose of

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Ohatkar, S.N., Bormane, D.S. (2020). Bio-inspired AI Optimization Techniques to Evaluate Data Rate and Minimize Interference in Cognitive Cellular Network. In: Kumar, A., Paprzycki, M., Gunjan, V. (eds) ICDSMLA 2019. Lecture Notes in Electrical Engineering, vol 601. Springer, Singapore. https://doi.org/10.1007/978-981-15-1420-3_9

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Internet Traffic Detection and Classification Using Machine Learning

Mrudul Dixit ✉, Ritu Sharma, Sanjya Shaikh & Krutika Muley

Abstract

Growth of Internet resulted in increased number of Internet users along with wide use of Internet. Besides its advantages, the disadvantage of this exponential rise is excess data flooding on the network. To ensure good quality of service, to maintain the speed of Internet, to secure the data flowing on the network, it has become essential to monitor and control the data traffic. Analysis of dataflow involves categorizing it into different types and further filtering it. On the basis of port numbers, payload information, source and destination IP address or statistical information, the data packets are categorized. This paper discusses classification of Internet traffic into different transaction protocols categories, on the basis of statistical parameters such as inter-packet arrival time, time to live, duration of packets and number of packets on the network. Categorizing using statistical parameters prevents invasion of packet data and preserves data privacy. Use of machine learning reduces human intervention in monitoring the Internet traffic. Classification of Internet traffic in the UNSW NB

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Modeling and Simulation of Inertial Navigation System

Madhavi Vedpathak ✉, Prachi Mukherji & Balkrishna Prasad

Abstract

There are many systems used to find out the location of the object or vehicle. The most widely used location tracking system is GPS that is the global positioning system. To find out the location of the missile, the inertial navigation system (INS) is used. Inertial measurement unit (IMU) performs the main role in this system, which consists of microelectromechanical system (MEMS) sensors. Accelerometer and gyroscope are used to give linear acceleration and angular rotation. Integrate the rates obtain from accelerometer and gyroscope twice to get velocity and position. To obtain the exact position of the missile, it is necessary to reduce

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Vedpathak, M., Mukherji, P., Prasad, B. (2020). Modeling and Simulation of Inertial Navigation System. In: Sharma, D.K., Balas, V.E., Son, L.H., Sharma, R., Cengiz, K. (eds) Micro-Electronics and Telecommunication Engineering. Lecture Notes in Networks and Systems, vol 106. Springer, Singapore. https://doi.org/10.1007/978-981-15-2329-8_48

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Video-Based Marathi Sign Language Recognition and Text Conversion Using Convolutional Neural Network

Ashwini M. Deshpande and Snehal R. Kalbhor

Abstract The communication between the deaf people and the hearing community is the challenging task. To overcome this barrier automatic sign language recognition plays an important role. It helps to remove the communication barrier between them. A Convolutional Neural Network (CNN) based approach for Marathi sign language is presented in this paper to help understand and interpret the hand gestures made for Marathi alphabets. This system using CNN is an automated process of constructing the handcrafted feature from gesture images. The system is able to recognize 25 Marathi sign language (MSL) alphabets with a testing accuracy of 99.28%.

Keywords Convolutional neural network · Marathi sign language (MSL) · OpenCV · Python

1   Introduction

Gestures are powerful means for the communication between a person with speech or hearing disability and normal person. Many systems have been designed so far for the detection and recognition of faces, palm and emotional expression and hand gestures. Gesture recognition is one of the active areas of research in computer vision and machine learning for assisting people with hearing disability. To design a model for good hand gesture recognition system a large training dataset is required.

Sign languages are mainly developed to aid deaf and other verbally challenged people. There are two approaches for capturing sign language i.e. appearance-based and vision-based method. The appearance-based method provides exact information about hand shape, orientation, location and movement. But, every time it is not

A. M. Deshpande (✉) · S. R. Kalbhor
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Proceedings of the Third International Conference on Microelectronics, Computing and Communication Systems pp 245–260 | Cite as

Operational Transconductance Amplifier Structured Highly Linear Analog Multiplier

Amitkumar S. Khade ✉ & Vibha Vyas

Abstract

Analog multiplier is a key element in modern communication systems. This paper presents the capability of cross-coupled operational transconductance amplifier (OTA) as an analog multiplier with performance analysis and design consideration. The proposed OTA structure is built and tested as a multiplier in Cadence Analog Design Environment (ADE) using standard 0.18 μm CMOS process. The simulation result shows that the proposed OTA structured multiplier has better linearity with comparable power consumption and noise performance.

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A Deep Learning Approach for Motion Segmentation Using An Optical Flow Technique

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There is a severe need of a constant human surveillance of the real-time security footage. Computer Vision is a novel way to reduce human involvement for the said task. Motion segmentation is a crucial step in analyzing video data. The challenges present in motion segmentation, such as illumination changes, dynamic background, and camouflage negatively affect the performance of existing motion segmentation algorithms. In this paper a method of using Convolutional Neural network with optical flow is proposed to improve performance and segment required motion properly. The proposed method is compared with the Lucas-Kanade optical flow method in terms of F1 score. The dataset used is wallflower video dataset. This contains different challenges of motion segmentation viz., illumination changes, dynamic background and clutter.

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3 Application of Machine Learning in Music Analytics

From the book Machine Learning Applications

Makarand Velankar, Amod Deshpande and Parag Kulkarni

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Abstract

With the growth of the internet and social media, music data is growing at an enormous rate. Music analytics has a wide canvas covering all aspects related to music. This chapter provides a glimpse of this large canvas with sample applications covered in detail. Machine learning has taken a central role in the progress of many domains including music analytics. This chapter will help the readers to understand various applications of machine learning in computational musicology. Music feature learning and musical pattern recognition give conceptual understanding and the challenges involved. Feature engineering algorithms for pitch detection or tempo estimation are covered in more detail with available popular feature extraction tools. Music classification and clustering examples

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Reliability, Safety and Hazard Assessment for Risk-Based Technologies pp 813–824 | Cite as

Markov Probabilistic Approach-Based Availability Simulation Modeling and Performance Evaluation of Coal Supply System of Thermal Power Plant

Hanumant P. Jagtap ✉ & A. K. Bewoor

Conference paper | First Online: 31 August 2019

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Abstract

The high demand of electricity from the society can be fulfilled by various sources, and thermal power plant is one of the largest sources of power generation in India. Availability of thermal power plant is dependent upon its subsystem and equipment in use. The equipment of thermal power plant can be maintained highly reliable if suitable maintenance is performed at defined time interval. This paper presents availability simulation modeling for coal supply

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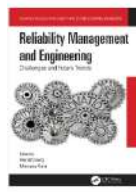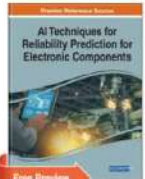GET ACCESS

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AI Techniques for Reliability Prediction for Electronic Components

Cherry Bhargava (Lovely Professional University, India)

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In the industry of manufacturing and design, one major constraint has been enhancing operating performance using less time. As technology continues to advance, manufacturers are looking for better methods in predicting the condition and residual lifetime of electronic devices in order to save repair costs and their reputation. Intelligent systems are a solution for predicting the reliability of these components; however, there is a lack of research on the advancements of this smart

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AI Techniques for Reliability Prediction for Electronic Components

Traditional and Non-Traditional Optimization Techniques to Enhance Reliability in Process Industries

Ravinder Kumar (Lovely Professional University, India), Hanumant P. Jagtap (Zeal College of Engineering and Research, India), Dipen Kumar Rajak (Sandip Institute of Technology and Research Centre, India) and Anand K. Bewoor (Cummins College of Engineering for Women, India)

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Abstract

At present, optimization techniques are popular to solve typical engineering problems. It is the action of making the best or most effective use of a situation or resources. In order to survive in the competitive market, each organization has to follow some optimization technique depending on their requirement. In each optimization problem, there is an objective function to minimize or maximize under the given restrictions or constraints. All techniques have their own advantages and disadvantages. Traditional method starts with the initial solution and with each successive iteration converges to the optimal solution. This convergence depends on the selection of initial approximation. These methods are not suited for discontinuous objective function. So, the need of non-traditional method was felt. Some non-traditional methods are called nature-inspired methods. In this chapter, the authors give the description of the optimization techniques along with the comparison of the traditional and non-traditional techniques.

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Top

Formulation Of An Optimization Problem

The process consists of the number of steps as given below:

- Selection of control and state variables

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Abstract

Owing to the present scenario of industries, a massive demand for sustainable green materials made of natural fibre is provoking. Besides, the cost involved in experimental trails could be reduced. Perhaps, experimental never reflects the ideal conditions of any materials system due to their natural heterogeneity. In the present study, an attempt is made to develop a representative volume element (RVE)-based micromechanical model to evaluate mechanical properties of pineapple leaf fibre (PALF) composites numerically before being fabricated really

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Mechatronics system for diagnosis and treatment of major diseases in grape vineyards based on image processing

Nilesh R. Kolhalkar [a, b] ⌂ ✉, V.L. Krishnan [c]

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Grape is non-climacteric fruit. For export quality grapes, farmers regularly monitor plants for identification of possible diseases and spray relevant pesticides. Due to time constraints and effort involved, farmers usually spray an excessive pesticide

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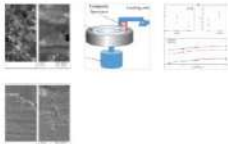
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Tribological investigation on nano-graphene and curauá filled three-phase polymer composites

Chithirai Pon Selvan [a], I. Siva [b, ⬛, ✉], Avinash Shinde [c], Sandro C. Amico [d]

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Abstract

Nano-graphene is one of the recently evolved engineering materials, mainly derived from graphite as graphene oxide. Due to its unusual characteristics, most of the engineered materials get doped with graphene. Especially wear resistant property of nano-graphene is one of the attracting characters found with. Present work investigates the effect of nano-graphene inclusion and various fiber activation on the tribological response of less explored vegetable fiber viz., Curauá/polyester

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Basalt fiber hybridization effects on the thermal degradation properties of curauá fiber composites

T. Premkumar [a], L. Siva [a,⋆,☒], Yashwant Munde [b], S. Rajesh [a], Sandro C Amico [c]

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Abha Gejji [a ✉], Shruti Shukla [a], Siddhee Pimparkar [a], Tamanna Pattharwala [a], Anand Bewoor [a]
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Use of Taguchi DOE for CFD Simulation to maximize the Reusability of Working Fluids of Centrifugal Filter

Pooja Tembolkar [a] ✉, Aishwarya Ponkshe [a], Vrushali Mulay [a], Anand Bewoor [a]

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Centrifugal filtration is a mechanical method of separation which uses centrifugal force and density difference for separation of particles. The paper aims to optimize

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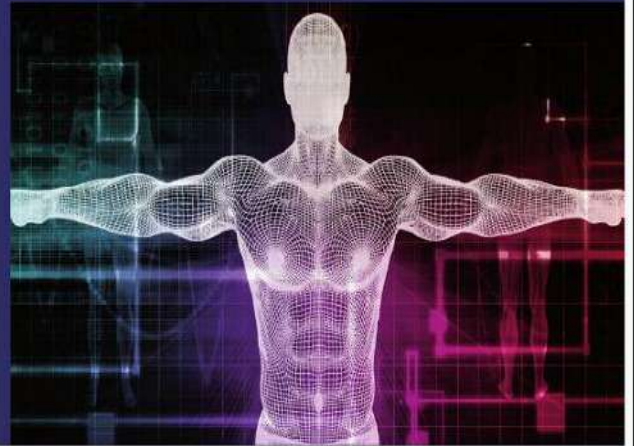
Dr. Revati Shriram has received her Bachelor of Engineering degree in Instrumentation and Control from MKSSS's Cummins College of Engineering for Women, Pune, in 1999. She has completed her 'Master of Science' in Electrical Engineering from RHIT, Indiana, USA in 2002 and Doctor of Philosophy from Sathyabama University, Chennai, India, in 2018.

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Coherence Analysis of Physiological Signals

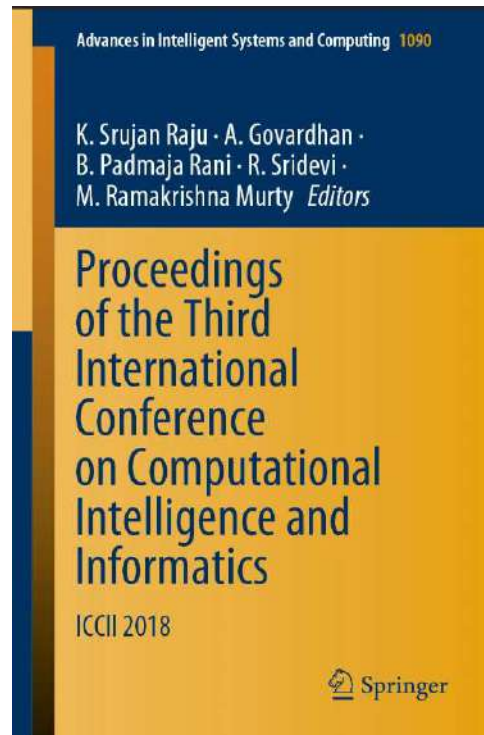Concurrent Signal Analysis between Brain Signals and Peripheral Signals

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Abstract

Parkinson's disease is a very common neurodegenerative disorder and movement disorder. Two types of symptoms are observed in Parkinson's disease which are motor and non-motor symptoms. Out of these, the non-motor or dopamine non-responsive symptoms have a major impact on the patients. Some of the non-motor symptoms are cognitive impairment, depression, REM sleep disorder, speech and swallowing difficulties, loss of smell and change in the body odor. It becomes difficult to perform basic tasks in daily routine as the symptoms aggravate. The symptoms and the rate at which the disease worsens vary from individual to

Detection of Parkinson's Disease through Speech Signatures

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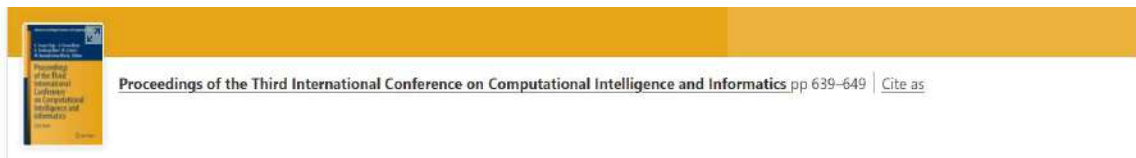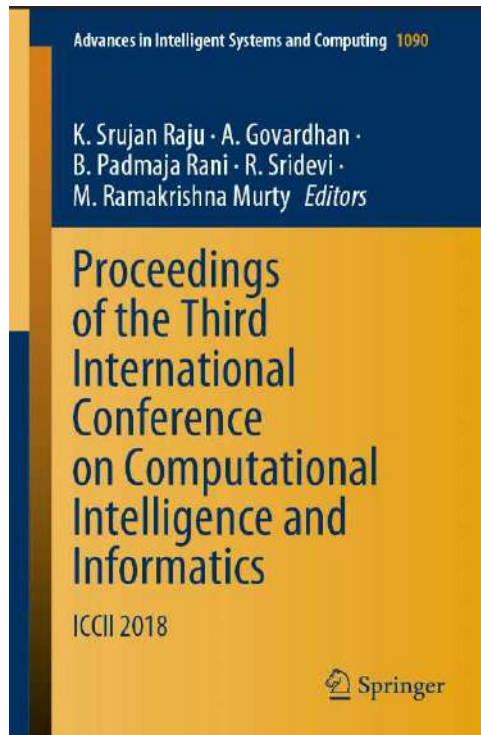Copyright information
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This paper deals with the various physiological parameters like ECG, EEG, PP and PPG that show deviation from normal values when a person is under stress. Electrocardiography (ECG) is the process of capturing the electrical activity of the heart for a period of time using electrical conductors placed over the skin. ECG waveform tells us about the electrical activity of the heart. Electroencephalography (EEG) is the process of capturing electrical activity of the brain.

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Abstract:

Parkinson's Disease is a neurodegenerative and intensifying disorder. The symptoms of this disease are classified into two types - motor and non-motor symptoms. Some of the motor symptoms are instability in posture, bradykinesia, tremor, etc while on the other hand, the non-motor symptoms are changes in body odor, sleep disorders, difficulty in swallowing and depression. The intensity of these symptoms differs from person to person. Amongst these two types of symptoms, non-motor symptoms are identifiable at an early stage. Hence detection of these symptoms helps in recognizing whether a person has Parkinson's Disease at an early stage. Patients diagnosed with Parkinson's Disease give out a distinguishable musky smell. The paper describes a non-intrusive and definite method for detecting Parkinson's disease through an individual's smell signatures. VOC sensors which determine the components in sweat were used to achieve this objective. The sensors were interfaced with Arduino UNO, which in turn gave the values of the different components of sweat in the Arduino programming software. The values of the various components of sweat obtained from people with Parkinson's Disease and healthy individuals is compared. This comparison is used to determine whether that person is suffering from the disease. The proposed system can be utilized by clinicians in their annual health check-ups without the usage of exorbitant diagnostic tools.

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I. Introduction

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Cybernetics, Cognition and Machine Learning Applications pp 89–96

Origin Identification of a Rumor in Social Network

Sushila Shelke ✉ & Vahida Attar

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The emergence and growth in social networking data, where the information gets shared without veracity, results in the problem of rumor dissemination. The negative effects of rumor diffusion can be controlled by recognizing the origin of a rumor in the network. This paper centers the issue of identifying the origin of a rumor in the social network by reducing the search space. In the previous work, they followed monitor-based observation for small networks or with multiple snapshots for large networks, which shows good accuracy but required more time. The proposed model mainly focused on reducing the search space by identifying the candidate

partition, where the source node is present. We follow the discrete-time susceptible-infected model and monitor-based approach for the assessment of the origin. We have proposed a method for progressive delay during the process of diffusion. The origin has been determined by applying the maximum likelihood estimator on the candidate partition. The experiment has been performed in a synthetic and real-world network. The experimental result shows that the real source is identified within 0–2 hops distance in a synthetic network and within 0–4 hops in a real-world network.

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Ashish B. Itolikar [a] ℅ ✉, A.S. Joshi [b], S.S. Deshpande [c], V.M. Arole [a], M.L. Kurtadikar [d]

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Abstract

Microwave interaction with earth resources like soil and vegetation provides useful information for remote sensing techniques. Such interaction is mainly governed by a complex dielectric property of target material. This paper reports on laboratory measurements of complex dielectric constant of sorghum vegetation (leaves) at room temperature ($30°C$) at C-Band microwave frequency. Von Hippel (shorted waveguide) method is used to conduct the measurements. The measurements were performed for freshly cut sorghum leaves as a function of moisture content by using automated C-Band microwave bench set up with movable reflector. The least square fitting technique is used to calculate dielectric constant (ε'), dielectric loss (ε'') and errors in their measurements. Emissivity and radiometric brightness temperature is estimated from measured dielectric properties at different angle of incidence for dry and moist sorghum leaves using Fresnel equations. This study is useful for interpretation of microwave remote sensing of vegetation and applications specifically in agriculture

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