A Scalable Data Processing Using Hadoop & MapReduce for Big Data

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Abstract--- We live in an age where everything around us is being created. Data generation rates are so scary that it created a need for simple and cost-effective data storage and a pressure to implement recovery processes. In addition, the relationship between understanding and assets needs to be analysed in large dataset, which can be a good decision-maker and good business strategies. The objective of this paper is to develop an algorithm for the map reduce application, in which there is a ballet count application, which describes how to manage large data by different information mappers and how to distribute it using map () function. Mapper outputs and retenders have been implemented and map () to reduce the function. Set the execution input key / value pair and set the output key / value pair. Maps gets input from the user, it implements and collects the key / value pairs continuously. The map cuts pass on the libraries group with all the intermediate quality and low function. Low Function sets the value which related to the intermediate key and value pair key. It combines all associated values and creates a smaller value. Final result, only one value pair or zero value pair is generated by Reducer when we perform the pre-process which is responsible for taking the internet key and its related value.

Keywords--- Big Data, Data Analytics, Hadoop, Map Reduce, Cloud Computing, Ballet Count.

I. Introduction

Cloud computing, a new technical feature is a demand service, and it has many other features such as common shares, information and devices to pay customers at an explicit time according to their demand. It worked as a multitenant architecture. Using this technology, capitol and operational costs can be reduced. The entire network of the Internet can be expressed as a cloud. Load balancing for cloud computing systems is a rare phenomenon today Load balancing can always resolve the required distribution [1]. To meet the required demands, it is neither effective nor has the expenditure incurred to maintain the services of multiple servers, clients and clients should not be employed for efficient load balancing because the cloud has complex structure and their Sections are present in a wide spread area. Workflow is a group of management tasks and its dependence. In a XML-based format, it is represented as a directed ecological graph (DAG). The graph displays an independent application / process through each node and the dependency of the execution in the applications is provided by the shoreline. Both jobs (the output of a job is used as the second job input) can be dependent on the data. The application's dependencies allow its execution order and data flow from one after another task. Some of these tasks can be given in parallel. Using Cloud Computing Web Services reduces efforts to reach High Performance Computing and Storage Infrastructure. It provides scalability, considerable configurability and reliability with high processing power, the cost of application on a cloud depends on acceptance and storage resources that are used. A programming model such as a map-reduction consists of two functions-map and subtraction. Map work that is to process the sequence of pairs of input pairs, while subtraction is a set of values connected to a single key. Its purpose is to apply for map-reduction, such as the word count, the algorithm of developing, which shows how the system can internally divide a large set of data and this split data is used to map the split data Which can be used by using output mappers and using the Reduce () function. The map, which the user provides, accepts an input pair and provides a set of intermediate value / pair pairs. Reduce map merges library all intermediate values correspond to same intermediate key input and pass it into a reduced function.

1.1. Load Balancing

This is a method for load distribution for the total load on different node system of the system in order to use the standard resources. It helps to improve the response during the process and at a time we will eliminate a condition that loads some nodes and does not do otherwise. A dynamic natural load does not use the previous state or nature of

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CPW Fed UWB Antenna with Enhanced Bandwidth & Dual Band Notch Characteristics

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Abstract. This paper reports the design and performance of CPW fed UWB antenna having two U–shaped slots etched in the radiating structure. UWB performance of proposed structure is obtained through the truncated shape of the patch and L-slits etched in ground plane. By applying two U- shaped slots in a radiating patch, we achieved dual notch band characteristics. The proposed antenna is simulated by applying CST Microwave Studio simulator. This antenna provides wide impedance bandwidth of 12.585 GHz (2.74GHz - 15.325 GHz) with dual notched band characteristics. This antenna may be proved as a useful structure for modern wireless communication systems including UWB band.

INTRODUCTION

Looking present day scenario, ultra-wideband (UWB) technology is widely preferred amongst the researchers due to its conceivable usage in communication systems [1]. The spread bandwidth of UWB technology is very useful for high speed data transmission and microwave imaging. For modern day communication systems; printed UWB antennas with favorable signal-to-noise ratio, acceptable unidirectional radiations patterns and high gain are preferred. The WIMAX bands 2.5 / 3.5 GHz (2.5 - 2.7 / 3.4 - 3.69 GHz), IEEE 802.11 WLAN band (5.15-5.825 GHz) bands used to provide electromagnetic interference with UWB communication systems [2-3] hence in practical applications, rejection of these bands is desired. Several efforts have been made to obtain band notch characteristics at these frequencies which include insertion of slots of various shapes on radiating patch and in feed line, planting of two slits on a circular monopole, E–shaped slot antenna for UWB band notch characteristics, adjustment of an H-shaped thin slot on the square ring slot antenna [4-8] etc. This paper reports the design and performance of a planar CPW fed edge truncated circular patch antenna. Two U-shaped slots in the radiating patch are introduced to obtain the desired dual band-notched characteristics for Wi-Max and WLAN bands.

ANTENNA DESIGN AND ANALYSIS

Initially a CPW fed circular patch (having patch radius 9.3 mm) is designed on glass epoxy FR4 substrate material having relative permittivity (ε_r) 4.4, substrate height (h) 1.59 mm and loss tangent = 0.025. The overall dimensions of considered antenna are 30 mm x 20 mm x 1.59 mm. The two edges of the circular patch parallel to feed line are truncated with truncation length T as shown in Fig. 1. Two L-Shaped slits are also introduced one by one in the ground plane to achieve desired UWB performance from this structure. The width of feed line, gap 'g' between feed line and ground plane, dimensions of inserted L- shaped slots in ground and truncation length 'T' of circular patch are then optimized to achieve UWB characteristics from this antenna. All the optimized design parameters of this antenna are reported as: size of the substrate (L × W) 30.0 mm × 20.0 mm; radius of the patch (R) 9.30 mm; truncated length parallel to Y-axis (T) 8.50 mm; length of the feed line (f_l) 10.80 mm; width of the feed line (f_w) 5 mm; gap between

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U-SHAPED SLOTS LOADED PATCH ANTENNA WITH DEFECTED GROUND PLANE FOR MULTIBAND MODERN COMMUNICATION SYSTEMS

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Abstract

In this article, the design and performance of circular radiating patch element with two U-shaped slots and defected ground plane, comprising of a triangular notch monopole structure with rhomboid shape resonator, is reported. The proposed multiband antenna has a compact structure design for GSM 1800 MHz, WLAN, WiMAX and UWB communication systems. The antenna is designed on FR4 glass epoxy substrate of size 39 mm × 34 mm × 1.59 mm by using computer simulation tool CST Microwave Studio 2014. For confirmation of simulation results, prototypes are fabricated and their performance is tested in free space. Measured results demonstrate that fabricated antenna provides triple bands with impedance bandwidth of 157 MHz (1.733 GHz to 1.89 GHz), 3.2 GHz (2.29 GHz to 5.49 GHz) & 10.45 GHz (6.83 GHz to 17.28 GHz), almost flat high gain between 4 to 6 dBi and good radiation patterns in the desired frequency range. The maximum measured gain of proposed structure is close to 6.59 dBi at 4.40 GHz. The circular polarization is also realized in the frequency range 4.12 GHz to 5.20 GHz with axial impedance bandwidth 1.08 GHz. The specific absorption rate SAR values of proposed design are also evaluated at various frequency spots which are well within the SAR values specified by the FCC. Proposed design may be proved a useful structure for advance radio communications systems as well as for the present requirements in defence applications.

Keywords: Double U-shaped slots, Monopole structure, Multiband patch antenna, Rhomboid shape resonator, Specific absorption rate, UWB communication system, WLAN.

Wideband Dual Frequency Modified Ellipse Shaped Patch Antenna for WLAN/Wi-MAX/UWB Application

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Abstract. This paper communicates the design and performance of microstrip line fed modified ellipses shaped radiating patch with defected ground structure. Wide impedance bandwidth performance is achieved by applying a pentagonal slot and T slot structure in ground plane. By inserting two semi ellipses shaped ring in ground, we obtained axial ratio bandwidth approx 600 MHz. The proposed antenna is simulated by utilizing CST Microwave Studio simulator 2014. This antenna furnishes wide impedance bandwidth approx. 4.23 GHz, which has spread into two bands 2.45 GHz - 5.73 GHz and 7.22 GHz – 8.17 GHz with nearly flat gain in operating frequency range. This antenna may be proved as a practicable structure for modern wireless communication systems including Wi-MAX, WLAN and lower band of UWB.

INTRODUCTION

In the last decennium, the radio communication i.e wireless local area network (WLAN), wireless interoperability for microwave access (Wi-MAX) and the digital communication system (DCS) have developed at incredible rate. The compact antenna structures with capability to operate in multi frequency bands simultaneously at a time, are in high demand [1-2]. The succeeding wireless communication systems also need wide impedance bandwidth for transfer data in very high speed. Various antenna structures such as wideband triangular monopole patch antenna [3], compact dual-band patch antenna using spiral shaped structure for high speed wireless networks [4], a triple band monopole patch antenna with a trapeziform ground for WI-MAX and WLAN applications [5], dual band X-shape patch antenna [6], ring slotted U-shaped patch antenna, are discussed in literature. In this paper, we communicate the design and performance of a modified ellipse shaped radiating patch with defected ground structure. Two semi ellipses ring is also introduced to pentagonal slot ground structure to achieve circular polarization bandwidth.

ANTENNA DESIGN AND ANALYSIS

Antenna Configuration

The front and back view of ellipse shaped patch antenna with defected ground structure is depicted in Fig. 1. The proposed structure is printed on glass epoxy FR4 substrate with relative permittivity (ε_r) =4.4, substrate height (h) = 1.59 mm and loss tangent = 0.025. The comprehensive dimension of reported antenna is 32 mm x 28 mm x 1.59 mm. A 50 ohm microstrip feed line etched on the radiating patch structure with dimension of 16.1 mm and 20mm. The optimized dimensions of the proposed patch design are achieved by applying 3D electromagnetic simulator CST 2014. Four rectangular shaped slits are also introduced one by one in the radiating patch structure to obtain coveted wideband performance. The simulated variation of reflection coefficient of this antenna with frequency is shown in Fig. 2. The obtained results provide a dual wide band impedance bandwidth covered between frequency range 2.45 GHz to 5.73 GHz and 7.22 GHz to 8.17 GHz for VSWR < 2. Nice matching between radiating element and feed are also detected

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Wavefunctions and optical gain analysis in $Al_{0.42}Ga_{0.58}As/GaAs_{0.64}Sb_{0.36}$ type-I quantum well heterostructures under the effect of external electric field

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Abstract

This paper reports the optical gain computed in $Al_{0.42}Ga_{0.58}As/GaAs_{0.64}Sb_{0.36}$ type-I quantum well heterostructure under the effect of the external electric field. We observe the variations in wavefunctions and bandgap energy by applying external electric field. Bandstructure calculations are done by Luttinger Kohn model. The 6×6 k·p Hamiltonian matrix elements are evaluated for optical gain computation. The charge carrier injection made is $4\times10^{12}/cm^2$ for wavefunction calculations. The optical gain of ~1600/cm is observed from the designed heterostructure without applying external electric field at 300K. A significant gain improvement is observed when an electric field is applied. In this paper optical gain in $Al_{0.42}Ga_{0.58}As/GaAs_{0.64}Sb_{0.36}$ QWheterostructure under the external electric field of20, 40 and 60kV/cm is calculated. The designed structure finds its application in optoelectronics in near infrared (NIR) region with a requirement of high optical gain.

Keywords: Type-I QW structure, optical gain, AlGaAs, GaAsSb, heterostructure.

1. Introduction

Optoelectronics is the study and application of electronic devices and systems that source, detect and control light, usually considered a sub-field of photonics. This deals with the interaction of electronic processes with light and optical processes. Some major optoelectronic devices involveLED (Light Emitting Diode), LASER (Light Amplification by Stimulated Emission of Radiation), Photodiodes and Solarcells. Direct band gap semiconductor compounds are used for the fabrication of LASERs. There are different types of heterostructures studied for the generation of the light through the LASER. Heterostructurescan be defined as structures having different semiconductor layers on a substrate. They can be classified as type-I, type-II and type-III according to their alignment of bands producing the discontinuity. In NIR region (700nm to 1400 nm) lasers are used in telecommunication, range finding systems, material processing etc. Arsenide Antimonide compound material systems can be used to generate wavelength range of 1.1 to 3μm for optical devices. For the fabrication of photo diodes, photocathodes, LED's and edge emitting laser to operate for long wavelength type-II GaAsSb/GaAs QW structure is preferred [1-4]. A study of band alignment of GaAsSb/GaAs is also done recently Optical gain in InGaAs/GaAsSb type-II nano heterostructure has been calculated using the k.p method [5].

The aim of this paper is to report optical gain in $Al_{0.42}Ga_{0.58}As/$ $GaAs_{0.64}Sb_{0.36}$ type-I quantum well heterostructure under external electric field for NIR applications. The 6×6 Hamiltonian matrixis used for theband structure evaluation and calculation. In the next section, design and theory of $Al_{0.42}Ga_{0.58}As/$ $GaAs_{0.64}Sb_{0.36}$ type-I QW heterostructures is presented and simulation results are shown. Finally, the conclusion of the work is done.

2. Structure and Theory

The single quantum well structure designed consists of a $GaAs_{0.64}Sb_{0.36}$layer in between two n and p type barrier layers of $Al_{0.42}Ga_{0.58}As$. The barrier layers are of equal width being 8nm each and the width of quantum well is 6nm. The energy band structure is shown in fig. 1 which shows various valence sub bands, heavyhole (HHB), lighthole (LHB) and split off band (SOB). The type-I QW heterostructure is grown on GaAs substrate with thickness of 10nm. From fig.1 we can observe that split off sub band plays less role in optical gain as it lies far below the heavy holeband. The light hole and heavy hole sub bands are closer to each other for type I structure.

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RADIATION EFFECTS ON MHD BOUNDARY LAYER FLOW AND HEAT TRANSFER ALONG A STRETCHING CYLINDER WITH VARIABLE THERMAL CONDUCTIVITY IN A POROUS MEDIUM

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This study considers MHD boundary layer flow and heat transfer of a viscous incompressible fluid over a radiative stretching cylinder with variable thermal conductivity embedded in a porous medium. Using similarity transformation, the nonlinear partial differential equations of momentum and heat transfer are converted into nonlinear ordinary differential equations which are then solved by the homotopy analysis method (HAM). The effects of significant physical parameters on the velocity and temperature are investigated and discussed graphically. The obtained results are also compared with known results and are found to be in excellent agreement.

KEY WORDS: *MHD flow, HAM, porous medium, thermal conductivity, radiation*

1. INTRODUCTION

The investigation of boundary layer flow and heat transfer of a non-Newtonian fluid over a stretching cylinder has a wide range of applications in various areas such as in fiber technology, the chemical and petroleum industries, geophysics, biological sciences, extrusion processes, drying of porous solids/plasmas, geothermal reservoirs, thermal insulation, enhanced oil recovery management, and underground energy transport. The rate of heat transfer at the stretching/shrinking surface determines the quality of the product after materials handling by the conveyers to test at significant levels. Sakiadas (1961a,b) was the first to study the boundary layer flow over a moving continuous surface. Thereafter, Crane (1970) extended the concept of Sakiadas to a stretching sheet on a linear surface. In this study he has presented an exact solution for the steady two-dimensional flow over a stretching surface in a quiescent ambient fluid. Since then, remarkable work has been done by many authors in various aspects (Laha et al., 1989; Afjal, 1993; Prasad et al., 1993; Abel and Mahesha, 2008; Abel et al., 2007; and Bataller, 2008). Fluid flow in porous media is an important dimension in many areas of reservoir engineering, such as petroleum, environmental, and groundwater hydrology. Accurate description of fluid flow behavior in the porous media is essential to the successful design and operation of projects in these areas. Darcy's law depicts fluid flow behavior in porous media. According to Darcy's law, the pressure gradient is linearly proportional to the fluid velocity in the porous media. The one-dimensional Darcy equation can be written as

$$-\frac{dP}{dX} = \frac{\mu v}{k},$$