FINDING GEO-LOCATIONS OF IP ADDRESSES BY USING AGGREGATE VARIABLE LENGTH SUBNET MASKING (AVLSM) TECHNIQUES

N.Baskar [1] G.Pranesh [2]

ABSTRACT

This paper is completely based upon tracking the location of IP address around every corner of the world with their respective ISP Provider. Each IP address is unique identification of a network system connected to the internet. The location details have been fetched with their IP and based on that latitude and longitude of the place pointed out in the map providers. The Gmap control had included in the windows form to show the geo location of the IP. With that stored IP address, Latitude and Longitude of the IP address has directly fetched from the www.ipdbinfo.com webpage by using the windows form. API is must to access that website and the information from the certain database. This system use Gmap control for the map providers, overlay and markers. It has been initialized to enable the map view in windows form, IP Geo position Locator is used to set the IP range of the specified IP Classes. And split the IP groups 4 by 4 to identify the Google map's IP. The proposed system has the ability to use the IPV4 address to trace the location and information regarding that IP.

Keywords: GMap, ISP, Report, IANA, geolocation, subnet, unique identification IP

[1]Asst, Professor, Dept. of Computer Science, SRMV CAS, Coimbatore.

[2]Research Scholar, Dept. of Computer Science, SRMV CAS, Coimbatore.

1. INTRODUCTION

The prior systems in the internet find only the location and details of a single IP address. But proposed system finds a set of IP address to know all the details. So that it can able to prepare the statistical analysis of the service provider who has provided the larger number of IP addresses. By accepting single IP address, it provides ISP, city, state, and country with all the required information. With the help of this result, the analysis and comparison taken place from the number of IP address for the various properties. This Research focuses not only the detail of the IP addresses, it also provides the latitude and longitude of IP addresses.[1]

Existing System

We can find the location and details of single IP address by using the IP Locator tool. This tool could allow us to trace the origin and original source of an IP address. The tool "IP locator" helps us to find the location details which had fetched from their IP. From the location that we got as Longitude and latitude, we can able to locate the ISP, Country, State, and City which have been pointed out in the map providers. It could determine the origin of a packet in the Internet. This Concept used only for one particular IP at a time. This would not work on the different number of IP address at a time.[1]

Drawbacks

Only one IP Address details can be viewed at the time. User can manually store the details in the Database.

Proposed System

Generally, we can able to find the location and details of a single IP address. But in this project we can find a set of IP address to know the details. So that we could able to prepare the statistical analysis of the service provider who has provided the larger number of IP addresses. For example if we provide 1000 addresses, we can find the country of the IP address. In case, if we provide 500 IP addresses, it will find the state of that IP address. If we provide 25 IP address, it will find city of that IP location. If we give single IP address means it will provide the service provider, city, state, and country with all the required information. So that we can compare and analyze the number of IP address for the various properties. This project not only gives us the details of that IP addresses, It can also give the Latitude and longitude of that single IP address or the group of IP addresses. This system could be accomplished through the Aggregate Variable Length Subnet Masking (AVLSM) is a technique that allows network administrators to divide an IP address space into subnets of different sizes, unlike simple same-size Subnetting.

Modules

Single IP Address Trace , Multiple IP Address Trace and IP Details Collection.

Reports

Country Wise Report , ISP Wise Report, State Wise Report, City Wise Report and View All IP Address Report
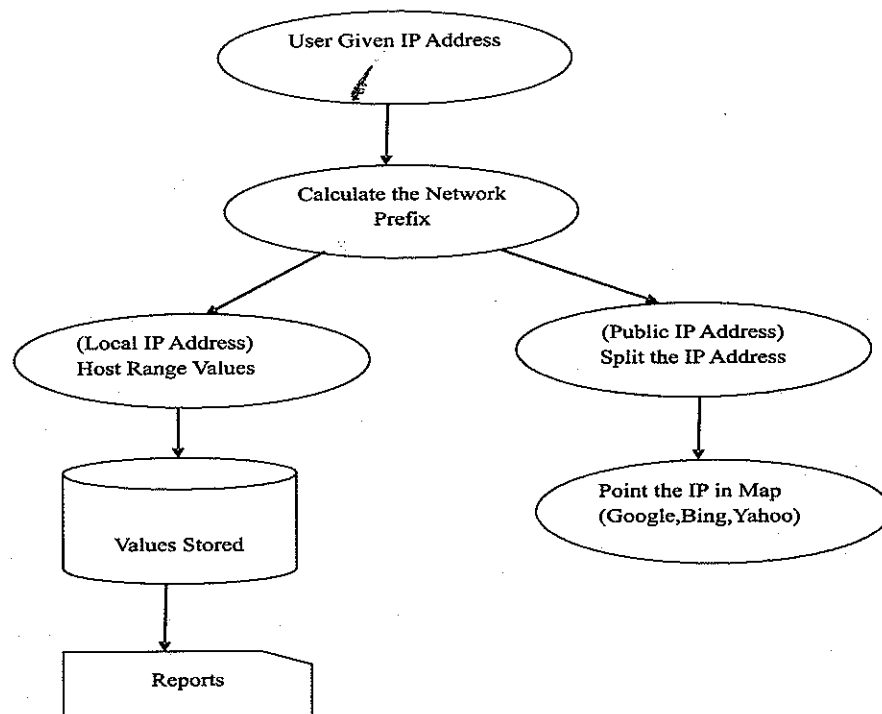
II. METHODOLOGY

IP Trace

(IP tracing) In computing, trace route is a computer network diagnostic tool for displaying the route and measuring transit delays of packets across an Internet Protocol network. IP trace back is a name given to any method for reliably determining the origin of a packet on the Internet. Due to the trusting nature of the IP protocol, the source IP address of a packet is not authenticated. As a result, the source address in an IP packet can be falsified (IP address spoofing) allowing for denial-of-service attacks (DoS) or one-way attacks (where the response from the victim host is so well known that return packets need not be received to continue the attack[clarification needed]). The problem of finding the source of a packet is called the IP trace back problem. IP trace back is a critical ability for identifying sources of attacks and instituting protection measures for the Internet. Most existing approaches to this problem have been tailored toward DoS attack detection. Such solutions require high numbers of packets to converge on the attack path(s).[6][2]

IP-based Geo-location

IP-based Geolocation is mapping of an IP address to the real-world geographic location of an Internet connected

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                    ┌─────────────────────┐
                    │  User Given IP Address │
                    └──────────┬──────────┘
                               │
                    ┌──────────▼──────────┐
                    │ Calculate the Network │
                    │        Prefix         │
                    └────┬─────────────┬────┘
                         │             │
        ┌────────────────▼──┐    ┌─────▼──────────────┐
        │  (Local IP Address) │    │  (Public IP Address) │
        │  Host Range Values  │    │  Split the IP Address │
        └─────────┬───────────┘    └──────────┬──────────┘
                  │                            │
          ┌───────▼───────┐         ┌──────────▼──────────┐
          │               │         │  Point the IP in Map  │
          │  Values Stored │         │  (Google,Bing,Yahoo)  │
          └───────┬───────┘         └─────────────────────┘
                  │
          ┌───────▼───────┐
          │    Reports     │
          └───────────────┘
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Multiple IP Address Trace and IP Details Collection

to a computing devices or mobile devices. Geolocation involves in mapping IP address to the country, region (city), latitude / longitude, ISP and domain name among other useful things.

Geolocation is the identification of the real-world geographic location of an object, like radar, mobile phone or an Internet-connected computer terminal. Geolocation may refer to the practice of assessing the location, or actual assessed the location. Geolocation is closely related to the use of positioning systems but can be distinguished from it by a greater emphasis on determining a meaningful location rather than just a set of geographic coordinates.

For either geolocating or positioning, the locating engine uses radio frequency (RF) location methods, for example Time Difference of Arrival (TDOA) for precision. TDOA

systems utilize mapping displays or other geographic information system. When a GPS signal is unavailable, geolocation applications can use information from cell towers to triangulate the approximate position, a method that is not as accurate as GPS but has greatly improved in recent years. This is in contrast to earlier radio location technologies, for example direction finding where a line of bearing to a transmitter is achieved as part of the process.

Internet and computer geolocation can be performed by associating a geographic location with the Internet Protocol (IP) address, MAC address, RFID, hardware embedded article/production number, embedded software number such as UUID, Exif/IPTC/XMP or modern steganography, invoice, Wi-Fi positioning system, or device GPS coordinates, or other, perhaps self-disclosed information. Geolocation usually works by automatically

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looking up an IP address on a WHOIS service and retrieving the registrant's physical address.[6][2][5]

IP-Trace Algorithm

STEP 1: Finding the single IP Address in G Map / Yahoo Map / Bing Map

STEP 2: IP Geo Position Locator: Giving Input address of IP address to calculate the Network prefix

STEP 3: Change the network prefix value to reduce the number of hosts.

STEP 4: Split the host range.

STEP 5: Select IP Address any one range in splits group and pointed to the G Map / Yahoo Map /Bing Map.

STEP 6: Select next IP address range in splits group and pointed to the G Map / Yahoo Map / Bing Map

STEP 7: Select so many IP address range in splits group and pointed to the G Map / Yahoo Map /Bing Map

STEP 8: Select different IP address range and pointed to the same location

STEP 9: Select the IP address range and store the IP information in the database

STEP 10: Report for Generation

IP-based Geo-location database

There are a number of geolocation databases available, and their pricing and accuracy are different. Ip2location,

MaxMind, Tamo Soft and IPligence offer a fee based databases that can be easily integrated into an web application. Most geolocation database vendors offers APIs and example codes in ASP, PHP, .NET and Java programming languages that can be used to retrieve geolocation data from the database. We use Ip2Location database to offer a free geolocation data on our website.

There are also freely available geolocation databases. Vendors offering commercial geolocation database also offer a Lite or Community edition that provides IP-to-Country mappings. Ip2Country.net and Webhosting.info (Direct) offer free IP-to-Country database that can be also integrated into your web application. There are companies also offering free web services that can be used to show geolocation of an IP address on your website.

Accuracy of IP-based Geo-location [4]

Accuracy of geolocation database varies depending on which database you use. For IP-to-country database, some vendors claim to offer 98% to 99% accuracy although typical Ip2Country database accuracy is more like 95%. For IP-to-Region (or City), accuracy range anywhere from 50% to 75% if neighboring cities are treated as correct. Considering that there is no official source of IP-to-Region information, 50+% accuracy is pretty good.

Internet Assigned Numbers Authority (IANA)[4][5]

Number Resources

IANA is responsible for global coordination of the Internet Protocol addressing systems, as well as the

Autonomous System Numbers used for routing Internet traffic.

Currently there are two types of Internet Protocol (IP) addresses in active use: IP version 4 (IPv4) and IP version 6 (IPv6). IPv4 was initially deployed on 1 January 1983 and is still the most commonly used version. IPv4 addresses are 32-bit numbers often expressed as 4 octets in "dotted decimal" notation (for example, *192.0.2.53*). Deployment of the IPv6 protocol began in 1999. IPv6 addresses are 128-bit numbers and are conventionally expressed using hexadecimal strings (for example, *2001:0db8:582:ae33::29*).[3][5]

List of countries by IPv4 address allocation

The list of countries by IPv4 addresses allocation, as of 2 April 2014. It includes 252 areas with all United Nations member states and the Holy See, Kosovo and Taiwan.

There are 232 (over four billions) IP addresses available in the IPv4 protocol. These addresses are allocated to countries by Internet Assigned Numbers Authority (IANA) via the Regional Internet Registries (RIRs).

S.No	Rank	Country or entity	IP addresses	%	Population (mostly 2014)	IP addresses per 1000 Members
-	-	**World**	**4,294,967,296**	**100.0**	**7,021,836,029**	**611.66**
1	1	United States	1,541,605,761	35.9	313,847,465	4,911.96
2	2	China	330,321,408	7.7	1,343,239,923	245.91
3	3	Japan	202,183,168	4.7	127,368,088	1,587.39
4	4	United Kingdom	123,500,144	2.9	63,047,162	1,958.85
5	5	Germany	118,132,104	2.8	81,305,856	1,452.93
6	15	India	34,685,952	0.8	1,205,073,612	28.78
7	43	Singapore	5,719,552	0.1	5,353,494	1,068.38
8	49	Pakistan	5,179,904	0.1	190,291,129	27.22
9	76	Bangladesh	924,160	0.0	161,083,804	5.74
10	90	SriLanka	534,272	0.0	21,481,334	24.87
11	194	Korea, North	1,024	0.0	24,589,122	0.04
12	195	Saint Lucia	256	0.0	162,178	1.58

III.Results
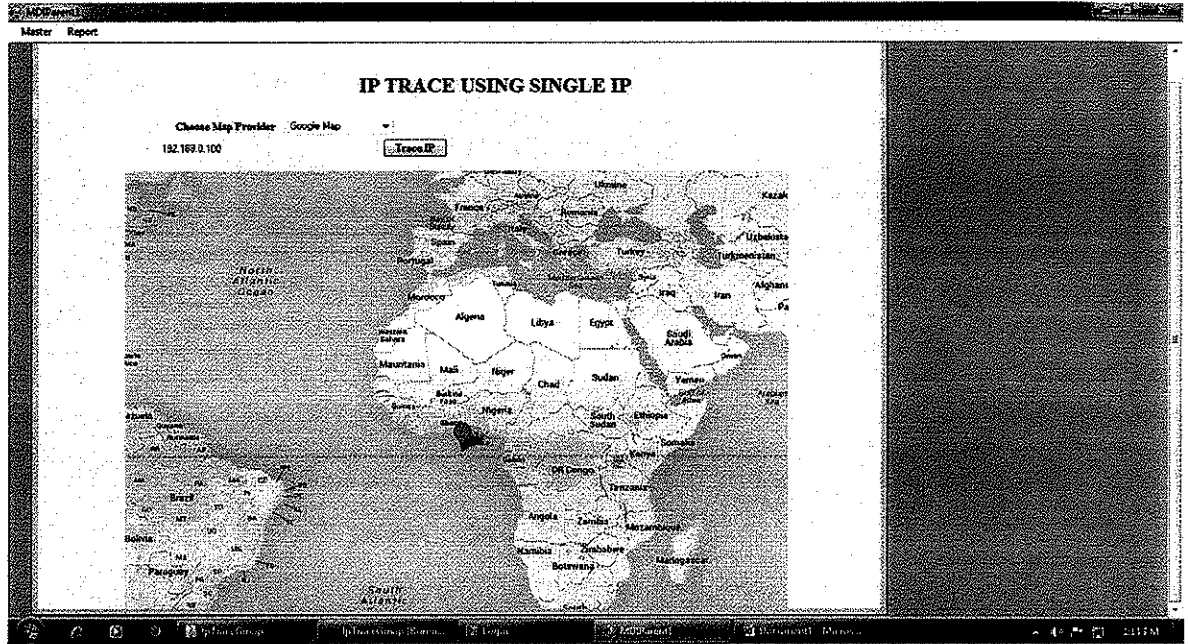
Figure 1: IP Trace Using
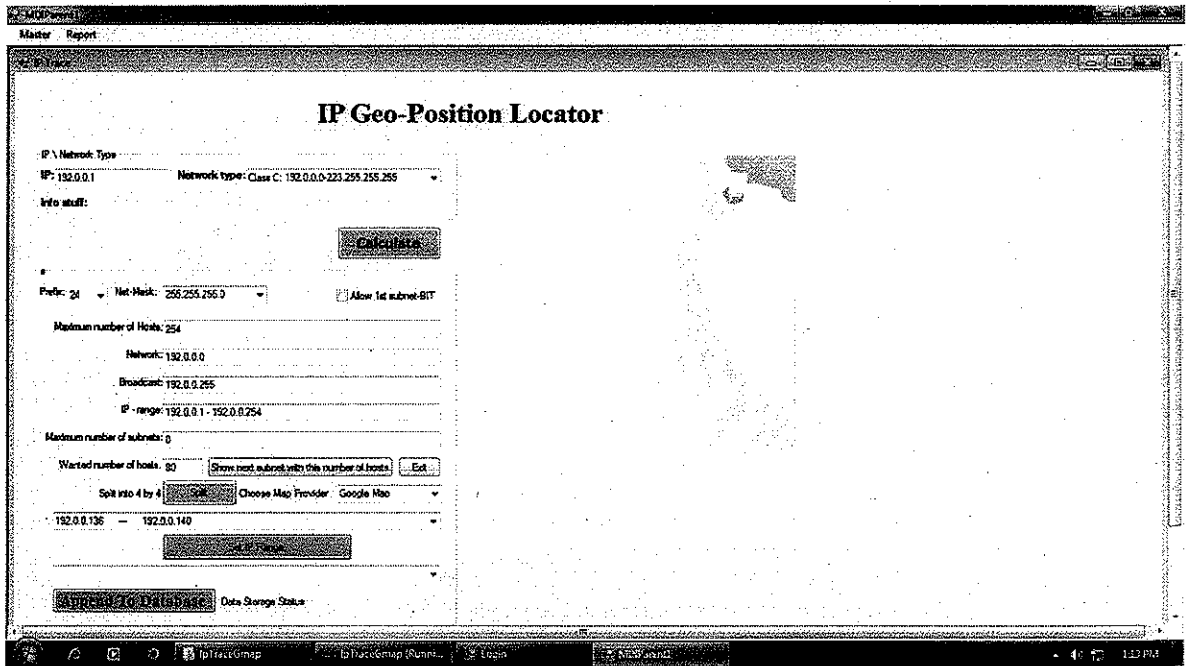
Figure 2 : IP Geo-Position Locator

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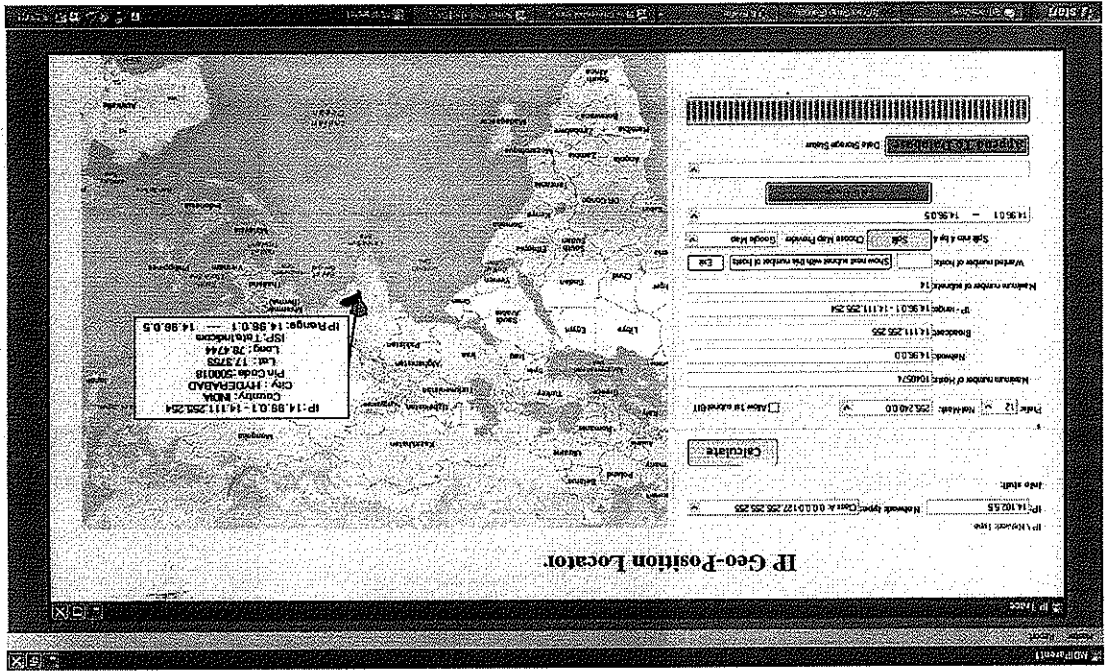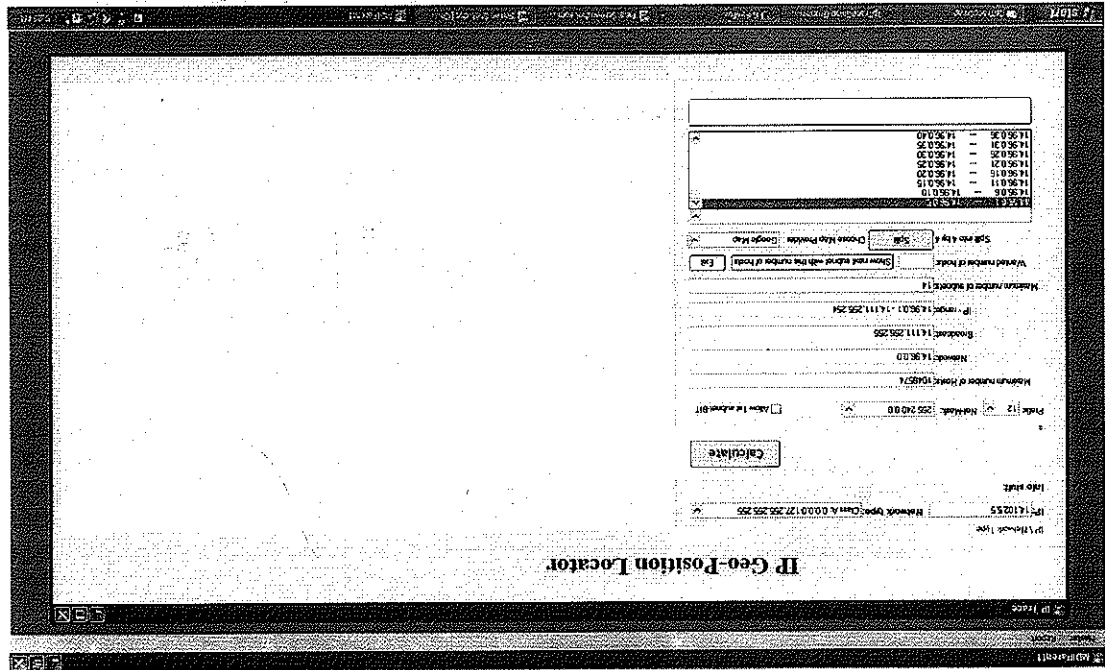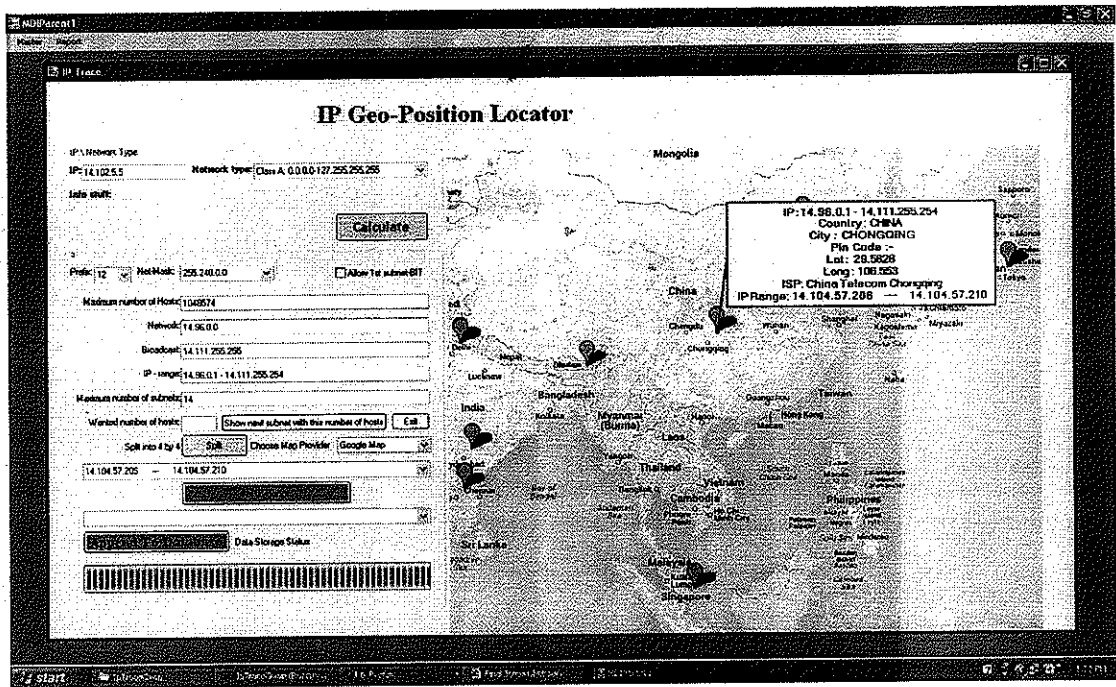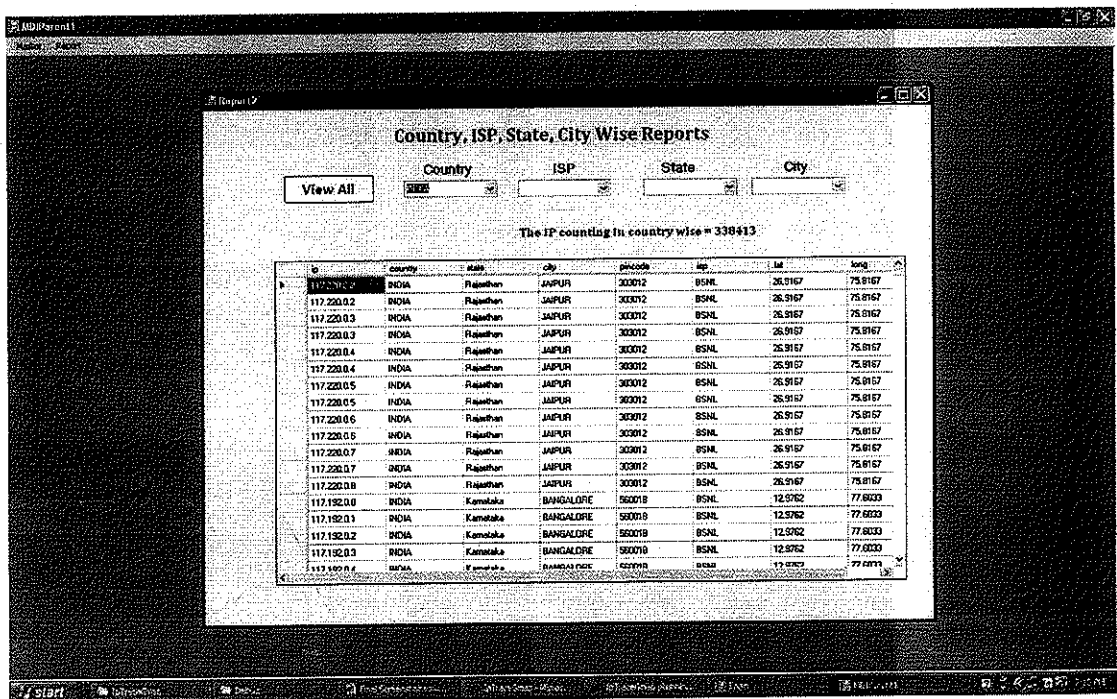**Figure 5: Select many IP Address range in splits group and pointed to the Google map**

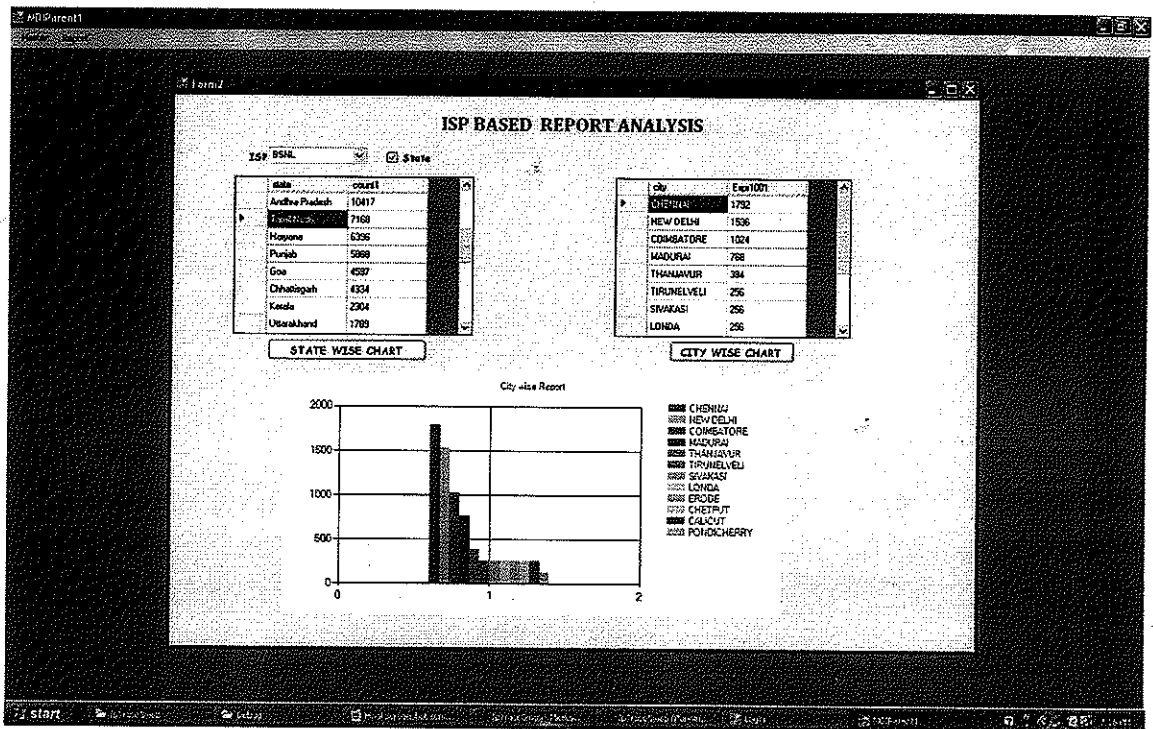**Figure 6: Country Wise IP Address Report**

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Figure 7: Selected state based city IP address report displayed in the chart

IP Geo position Locator is used to set the IP range of the specified IP Classes. And split the IP groups 4 by 4 to identify the Google map's

There are a number of commercial geolocation databases available, and their pricing and accuracy may be vary. Ip2location, MaxMind, Tamo Soft and IPligence offer a fee based databases that can be easily integrated into web application. Most geolocation database vendors offers APIs and example codes (ASP, PHP, .NET and Java programming languages) that can be used to retrieve geolocation data from the database. We use Ip2 Location database to offer a free geolocation data on our website. Fetch IP address based network provider and stored in to the database as a data set, for finding the accuracy of users in around our world those who uses this Network provider. Normally there are two types of IP address Public address and private address, save a Public address in the database to identify the related IP address, and use the geo location method to trace the IP, This system running only in the online, this fetch the IP from the database and check with in the Gmap, whether it is same or not if it is same it give the location.

IV. Conclusion

This research work is completely based upon efficiency of using IPv4 addresses. Each IP address is unique identification of a network system connected to the internet. In different Classes of network (i.e Class A , Class B , Class C) it is found that the network can only be divided into equal subnets addresses. Each Class uses a constant number of addresses which may be used for our network. In case the subnet used is smaller than the Class then the addresses may be wasted.

The proposed system has developed for the IP location tracer tool where we can able to use number of IP addresses. So far, this system has the ability to use the IPV4 address to trace the location and information regarding that IP. IPV6 is the on growing IP address concept in networking technology. The Scope of upcoming development is to use this IPV6 address for let the user to make use of it.

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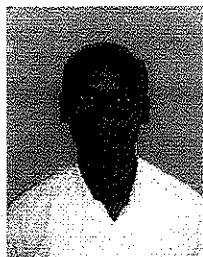
N.Baskar has obtained his Bachelor of Science in Computer Science from Sri Ramakrishna Mission Vidyalaya College of Arts and Science, Coimbatore in 1996 and Master of Computer Applications from Bharathidasan University in 2000. Now he is doing Ph.D., He commences more than fourteen years of experience in teaching field moreover industrial experience in Coimbatore. At present he is working as Assistant Professor in Computer Science at SRMV CAS. His research interests are in the area of Software Engineering and Computer Networks. He presented number of papers in reputed national and international journals and conferences. Email id: n_bas@rediffmail.com

G.Pranesh obtained his MCA from Sri Ramakrishna Mission Vidyalaya Colloge of Arts and Science, Coimbatore. His research interest includes Object Oriented Programming and Computer Networks. He published some papers in conferences. Email id: pranesh.rose@gmail.com