



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** X **Month of publication:** October 2026

DOI: <https://doi.org/10.22214/ijraset.2026.85080>

www.ijraset.com

Call: ☎ 08813907089

E-mail ID: ijraset@gmail.com

Digitization of Medicinal Plants in Gautala Autramghat with Quick Response Code

Amrapali M.Waghmare¹, Deepali G. Chaudhary², Bharti W. Gawali³

^{1, 2, 3}Department of Computer Science & Information Technology, Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar, MS. (India)

Abstract: *The implementation of activities, notably in the tourism industry, has transformed as a result of mobile devices transformation from communication tools to significant information resources. This is crucial for visitors, Researchers, Botanists, students especially when they travel to distant areas like forests. These tourists place a high value on learning about plants, and they typically rely on tour guides or books as their primary sources of information. The ability of these tourists to learn about the flora is not provided by tourism. This study suggests a technique for labeling plants with QR codes so that visitors can scan them to learn more about the plants. Also we developed the Website and Location of Medicinal Plants In Gautala Autramghat Sanctuary. The visitors merely need to use their mobile devices to scan the plant tag in order to obtain the information through this system. The plant ID is represented through the QR codes utilized. Based on these QR codes, the program will consult a distant database to collect the details of the plant that was scanned, which will then be shown to visitors on their mobile devices. Through their devices, visitors can use this system to obtain correct information about the forest's plants. Another benefit is that individuals can easily obtain information during their visit to the forest using this approach rather than relying on tour guides or reference materials.*

Keywords: QR code, Medicinal Plants, Digitization of Forest.

I. INTRODUCTION

A map or graph is the best way to see the outcome of many different geographic operations. Maps store and transmit spatial information very well. although cartographers

GIS offers fresh and innovative methods to further the art and science of map making, which dates back thousands of years. Cartography is a science. Reports, three-dimensional views, and map presentations can all be combined together. other products, such as multimedia and photographic photos. The biggest problems we currently face in the actual world are overpopulation, pollution, deforestation, and natural disasters, all of which have a significant spatial component. The mapping, monitoring, and management of forest resources are all made possible by geoinformatics technology. Given the vast amount of geographical data that has been gathered through a variety of applications, including remote sensing, geographic information systems (GIS), computer cartography, environmental assessment, and planning, the field of geographic decision support systems (Geo-DDS) is challenging.

Researchers mostly use a spatial database for the widely used data mining approach, despite some attempts to combine spatial mining with spatial decision support systems. In order to support strategic decision-making, GIS will provide you the ability to generate maps, integrate information, visualize situations, solve challenging challenges, present compelling ideas, and develop practical solutions like never before. Medicinal and aromatic plants are increasingly being used in pharmaceuticals, herbal cures, flavoring s, scents, cosmetics, and other natural goods. Since ancient times, people have employed medicinal plants to treat a range of illnesses and injuries. According to the study, forests continue to play a significant role in Gautala Autramghat's traditional use of medicinal plants for healing. Despite urbanization, the local community continues to collect and use the plants that are frequently used as traditional medicines in rural areas. As recommended in the Convention on Biological Diversity, rural people's indigenous knowledge practices can also be employed to conserve forest resources. Because many plant species have therapeutic applications, medicinal plant conservation in Gautala Autramghat Sanctuary serves as a kind of microcosm for plant conservation in general. In addition, there is a rising demand for herbal remedies rather than modern drugs, which is ultimately driving people to destroy the forests of medicinal plants. According to the findings, there are a lot of medicinal plants in the research region that are utilized by locals in traditional ways to cure a variety of illnesses. The cultivation, maintenance, and preservation of medicinal plants must be done in a sustainable manner. The government should carry out research and studies to help preserve medicinal plants. Forest digitization is a need of the environment.

In this study, we used Quick Response code is one of technology to digitization the forest. QR codes appear to be a suitable technique to swiftly and effectively communicate URLs to users given the rapidly evolving nature of mobile phone technology, particularly in the area of mobile internet access. This enables offline media, such as books, newspapers, business cards, signs, t-shirts, and any other medium that can print a QR code, to be used as carriers for adverts for things sold online. Due to the structural flexibility of the QR code, it can be used in a wide range of applications, including data capacity expansion and security applications like steganography and various types of watermarking. Additionally, certain tests that use scratch-removal methods have been conducted to improve the recognition of the QR code image. In an effort to identify some potential study fields while taking QR codes into consideration, this publication. the fundamentals of QR codes, their practical applications in daily life, and related academic subjects.

II. GAUTALA AUTRAMGHAT MAP

Since many decades ago, maps in a variety of formats have shown information about our globe. Maps depicted crucial routes for navigating the known world as well as tactical political limits during the heyday of discovery. In GIS, maps have a unique place. Compared to previous manual or automated cartography methods, the GIS mapping process is far more versatile. Create a database first, then proceed. Printed maps that are already in existence can be digitalized, and GIS data that is compatible with computers can be added. Both continuous and scale-free cartographic databases can be created using GIS. Then, map products can be made that are scaled to any size, centred on any area, and that display selected information in a way that highlights particular traits. At the final stage of creation, computer programmes can be used to encode the properties of atlases and map series and compare them to the database. Data from the database can also be copied to create digital products for usage in other GISes. Topographic databases can be used as reference frameworks by other departments in a large corporation. We take the help of longitude and latitude to get the exact location of medicinal plants in Gautala Autramghat. The location of the medicinal plant was saved with the help of AndLocatin Application. Using PHP programming language, with the help of MySQL (PhpAdmin) to store the database, Gautala Autramghat Map was created.

III. QUICK RESPONSE CODE

QR-Code is a kind of two-dimensional barcode matrix designed by a Japanese company named Toyota subsidiary Denso Wave in September, 1994 and was created to track inventories in the vehicle components manufacturing industry. A QR code may hold much more information than a 1D barcode. A QR code's vertical and horizontal directions both include information. The maximum storage capacity of QR codes is 4296 characters. A QR code encoder and decoder compose the QR code system. The encoder is in responsible of encoding data and creating the QR code, so while the decoder is in responsible of decoding the data from the QR code. The QR Code symbol versions range from Version 1 to Version 40 [1]. Each version has a different amount of modules or module configuration. (The black and white dots that make up the QR Code are referred to as the module.) The number of modules contained in a symbol is referred to as "module configuration," and it ranges from Version 1 (21×21 modules) up to Version 40 (177×177 modules).

QR codes are available in 40 different versions and can be used for a variety of tasks, including as browsing websites, downloading personal card information, and uploading information to social media sites.

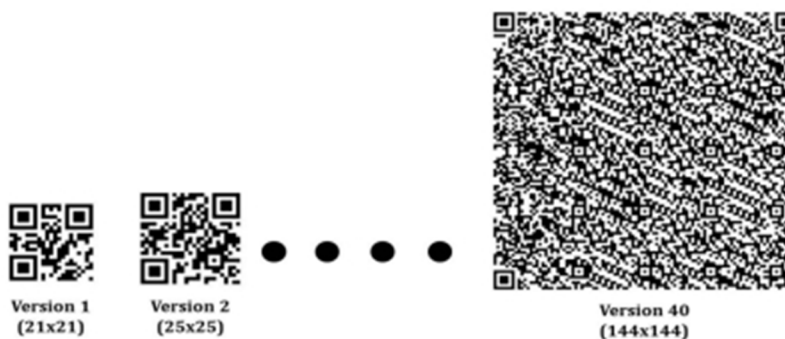


Fig. 2 Version module configuration of the QR Codes

The code consists of black modules arranged in a square pattern with functions such as encoding, image searching, decollating, image allocation and image revision. The advantages of QR code include large capacity for data storage, wide scope for encoding, mini-size printout, hyper velocity reading, strong error correction capability as well as being dirty-resistant, damage-resistant and 360 degrees readable [1].

Reed-Solomon codes are used in the QR Code to achieve powerful error-correction capabilities. There are four levels of error correction available, with the higher levels having the highest recovery capability. Even if symbols are dirty or damaged, the code allows them to be read. Finder patterns, separators, timing patterns, and alignment patterns are the four types of function patterns. Version information, format information, data, and error correction code words are all represented in the encoding region.

Quick Response (QR) codes are used to efficiently store small amount of data. They are increasingly used in all life fields, especially with the wide spread of smart phones which are used as QR code scanners. While QR codes have many advantages that make them very popular. The transformation of mobile devices from being a communication devices to be important information resources has changed the way of how activities being implemented including in tourism industry. This is very important for the tourists, medical field, botanic researches and plant taxonomy.

The International Standard for QR Automatic Identification and Data Capture Techniques - Bar Code Symbology – QR code was developed by the Barcode Automatic Identification Techniques Committee. Because QR codes do not cause any intellectual property rights disputes, they have been widely used in a variety of areas around the world. Following the introduction of QR code in China, the Article Numbering Center of China formulated GBT18284-2000, the Quick Response Matrix Barcode, as a national standard to broaden QR code's application areas. The QR code was chosen as one of the cellphone two-dimensional barcodes when China Mobile debuted its cellphone two-dimensional barcode operations in August 2006.

QR indicating that the code contents should be decoded very quickly at high speed. The code consists of black modules arranged in a square pattern on a white background. The information encoded may be text, a URL or other data. The QR code was designed to allow its contents to be decoded at high speed [2]. The popularity of QR codes is growing rapidly all around the world. Nowadays, mobile phones with built-in camera are widely used to recognize the QR Codes. It was initially used for tracking inventory in vehicle parts manufacturing. The idea behind the development of the QR code is the limitation of the barcode information capacity (can only hold 20 alphanumeric characters). While they are developed for tracking parts in vehicle manufacturing, QR codes now are used in many other fields, from commercial tracking to entertainment, in-store product labeling, and in those applications that are aimed at smartphone users. Users may open URL; receive text after scanning QR codes. By using QR code generating sites or apps, users can generate and print their own QR codes for others to scan and use. The QR code system consists of a QR code encoder and decoder. The encoder is responsible for encoding data and generation of the QR Code, while the decoder decodes the data from the QR code[3].

Designing a QR code QR codes are divided into five groups [4]. The QR Code Models 1 and 2 The original QR Code is QR Code Model 1, a code capable of coding 1,167 numeric characters with a maximum version of 14 (73). The QR Code is generated by upgrading Model 1 so that it can be read by mobile devices. Even if it is damaged in some way, it can be read smoothly. QR Codes printed on curved lines or with distorted reading images due to reading angle can be read quickly by referring to an alignment pattern included in them. The maximum version of this code is 40, and it can encode up to 7,089 numbers (177 x 177 modules). Different kinds of QR code symbols, such as logo QR code, encrypted QR code, and iQR Code, are also available to the users to choose form based on their needs.

A. QR Code Work

Basically, a QR code works in the same way as a barcode at the supermarket. It is a machine-scannable image that can instantly be read using a Smartphone camera. Every QR code consists of a number of black squares and dots which represent certain pieces of information. When your Smartphone scans this code, it translate that information into something that can be easily understand by humans.

Quite simply, a QR code is an encoded piece of data. The data in a QR code can be alphanumeric, numeric, binary or Kanji (Kanji is a form of Chinese characters that are used in the modern Japanese writing system)

Although that is the technical explanation of how a QR code works, something much more important to focus on is the fact that QR codes can be scanned at the touch of a button by the hundreds of millions of people around the world that use a Smartphone on a daily basis. This makes them great for marketers. If you have ever scanned a QR code with your Smartphone, you'll likely have noticed that they can be scanned extremely quickly (we're talking within a second-or-two here). This makes QR codes an extremely simple way to access stored information in an instant which in-turn, makes them a perfect solution to conversion-hungry marketers.

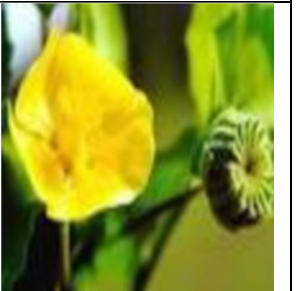
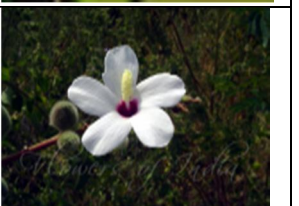
B. Use of QR Codes in various Applications

Nowadays, basically everything can be done online, including banking, shopping, communicating, storing, and sharing personally identifiable information.

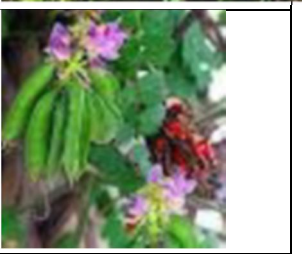
- Many examples of applying QR codes in business and industry can be found in Australia, China, Hong Kong, Japan, Korea, Singapore, India.
- Blood test process management in Australia
- LPG cylinder bottle management in India
- Jewellery certification system in China
- Bus commuters pass issuing system in Japan
- Sushi freshness control system in Japan
- Betting ticket management in India
- Patient identification in Japan, Hong Kong and Singapore
- Application in agriculture
- Telecom company as a basis of e-business
- QR Code Payments Startups: Phone pay, Google Pay, [BharatPe](#), [Yoyowallet](#), [TruPay](#), [tomato pay](#), [Naver Financial](#), [Dapp](#).
- Tesco making virtual stores a reality with QR Codes in South Korea
- Starbucks uses QR Codes to help promote sales.

Table:- Medicinal Plants in Gautala Autramghat Sanctuary

Sr. No.	Family	Botanical Name	Local Name	Parts used	Medicinal uses	Plant Image
1)	ANNONACEAE	<i>Anona squamosa</i> L. Sitaphal	Sugar Apple, Sweetsop, Custard Apple	Leaf, root, fruits and seeds.	Suppurative, antispasmodic, antihelminthic, cathartic, Sedative to heart antibilious, antiemetic, expectorant, antiphthitic, abortifacient	
2)	MENISPERMACEAE	<i>Tinospora cordifolia</i> (Willd.O.Miens.ex.Hk. .F.&Thoms.) Giloe/Gulvel.	Gulvel	Stem, root, and fruits	Antigonorrhoeic in general debility, skin diseases, dyspepsia, urinary disorder, antidiabetic, vaginal and urethral discharges, piles, anaemia in visceral obstruction, antidiarrhoeal, Jaundice etc. Decoction of bark is taken with turmeric powder two times a day.	
3)	PAPAVERACEAE	<i>Papaver somniferum</i> L. Afim, Aafu.	opium poppy or breadseed poppy	Latex from capsule, seed, seed oil, & leaf.	Analgesic, astringent, narcotic, sedative, antispasmodic, demulcent, purgative etc.	

4)	BRASSICACEAE	<i>Cleome viscosa</i> L. Higul/Burga.	Ujla Hulhul/ Hurhur/ Sticky cleome/ Dog mustard/ Wild mustard/ Yellow Spider Flower	Seed, Leaf and Bark.	Carminative, antihelmintic, antiseptic, externally as rubefacient, etc.	
5)	CAPPARIDACEAE	<i>Cadaba fruticosa</i> (L) Druce. Dabi.	Indian cadaba/ habab/ kali takali/ velibi/ dabi/ kodhab	Leaf and root	Stimulant, aperient, antihelmintic in source, used in uterine trouble etc.	
6)	MALVACEAE	<i>Abitulon indicum</i> (L) Sweet. Kanghi.	Country mellow/ Country Mallow/ Kanghi/ Petari	Seed and root.	Aphrodisiac, antipyretic, nervine etc.	
7	MALVACEAE	<i>Hibiscus ficulneus</i> L. Dula.	White Wild Musk Mallow/ Native rosella/ Jangli bhindi/ Ran bhendi	Fruits.	Fruits rich in vitamin C etc.	
8)	BOMBACACEAE	<i>Bombax ceiba</i> L. Saimal.	cotton tree/ Malabar silk- cotton tree/ red silk-cotton/ red cotton tree/ silk- cotton/ kapok	Root, bark, leaf, flower, seed and gum etc.	Emetic, anticonvulsant in haemorrhoids, antidote for snake bite in small pox and chickenpox, laxative, aphrodisiac, tonic, antidiarrhoeal etc.	
9)	TILIACEAE	<i>Triumfetta arhomboidea</i> Jacq. Chikti.	Jute	Root, bark, leaf, flower, and Leaf etc.	Tonic, styptic, lactogenic, diuretic in infameseyelids, hot infusion, child birth astringent, antidiarrhoeal etc.	

10	ZYGOPHYLLACEAE	<i>Tribulus terrestris</i> L. Gokharu.	Chota Gokharu	Root, Fruits, and Leaf etc.	Diuretic in painful micturition, aphrodisiac, antighnorhoicantiasmatic, in skin and heart disease, haemastasis, stomachic etc. The fruits are used. The decoction of dried fruits is drunk twice daily.	
10)	OXALIDACEAE	<i>Oxalis corniculata</i> L. Ambuti /Omlika..	Amti	Leaves and Roots etc. Whole plant	In scurvy, Dysentery, diarrhoea, in remove warts etc. Leaves are used in ayurvedic medicine	
11)	RUTACEAE	a) <i>Aegle marmelos</i> (L) Correa. Bel	Bel	Fruit pulp, root bark, stem, leaf, and flower etc.	Astringent, febrifuge, stomachic, in piles, antighnorrhoic etc, cardiotonic Laxative, tuberculosis, hepatitisantidysentric, emetic, antiinflammatory, expectorant in opti- Helminthic, jaundice, urinary troubles etc. Leaves are offered to God, fruit pulp is used to treat diarrhoea	
12)	RUTACEAE	b) <i>Citrus medica</i> L.	Nimbu, Limbu	Fruit juice, root bud, and flower etc.	Antihelminthic, purgative, antieletic in urinary calculus, astringent, stimulant etc. The leaves of this plant are soaked in water for overnight and such water is taken in next morning.	
13)	BURSERACEAE	<i>Boswellia serrata</i> Roxb	Salai/salar	Gum oil etc.	Diaphoretic, stimulant, antirheumatic in pulmonary nervous and skin diseases, urinary disorders ringworm diseases of bones, in chronic ulcer etc.	
14)	MELIACEAE	<i>Azadirachta indica</i> A.Juss. Neem	Neem	Fruits, seed oil, gum, bark, stem and flower etc.	Antiperiodic, astringent, in skin trouble, antiseptic, ulcer, stomatic, antihelminthic purgative stimulant etc. Bark decoction is used for drinking purpose	

15)	CELASTRACEAE	<i>Celastrus paniculata</i> Willd.	Malkangoni	Bark and seed oil etc.	Abortifacient, laxative, emetic, stimulant, aphrodisiac, antiparalytic in beriberi etc.	
16)	VITACEAE	<i>Vitis vinifera</i> L.	Draksh/Angoor	Dry Fruit etc.	Laxative, demulcent, expectorant, nutritive, blood purifier, used in dyspepsia, diarrhoea and dropsical affections etc.	
17)	FABACEAE	<i>Abrus precatorious</i> L.	Gunj/Ratti	:Leaf, seed, root etc.	Antiphlogistic, nerve depressant, analgesic, antihelmintic, antispasmodic Uterine, stimulant, abortifacient, toxic in leucoderma, emetic etc.	
18)	CAESALPINIACEAE	a) <i>Bahunia purpuria</i> L.	LalKachnar/Khariwal	Bark, Flower, root etc.	Carminative tonic, astringent, antidiarrhoeal, laxative in ulcer, goitre etc.	
19)	CAESALPINIACEAE	b) <i>Bahunia racemosa</i> Lam.	Kanchan/Gurial	:Leaf, seed and Stem bark etc.	Antimalarial, astringent, antidiarrhoeal, anticancer and antibacterial etc.	
20)	CAESALPINIACEAE Fabaceae	c) <i>Cassia fistula</i> L. Bahava	Bahava, Bahala	Root bark, pulp, seed, leaf and stem etc.	Purgative, tonic, febrifuge, anticancer, antiviral and hypoglycaemic etc. The decoction of flower buds taken in morning.	
21)	CAESALPINIACEAE	d) <i>Tamarindus indica</i> L.	Chinch/Imali.	Bark, Leaf, Ash, flowers, fruits and seed etc.	Antiparalytic, astringent, ulcers in ring worm, smallpox, bleeding piles, axative, anti-inflammatory, liver complaints, cough, useful in vaginal discharge etc.	

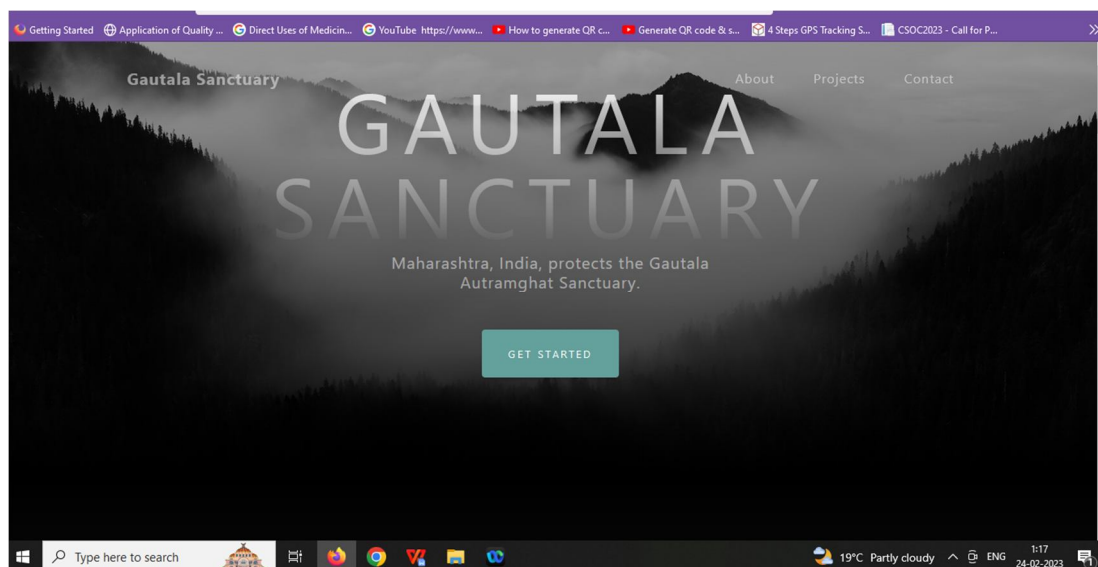
C. Database

In this system, a database is used to store tagged Medicinal plant data available in the Gautala Autramghat Sanctuary. Prior to the development of the system, a database design has been designed specifically for the plants in Gautala Autramghat Sanctuary. A relational approach has been used in designing the database. It is from this database that the mobile application will query in which the retrieved data will be sent to the users' mobile devices to be displayed. Users that already scanned the tagged plan in Gautala Autramghat Sanctuary can save the data in the database, in which a saved plant table is allocated for the registered user for their future reference. The remote database used in this approach is MySQL in which is run on a remote server.

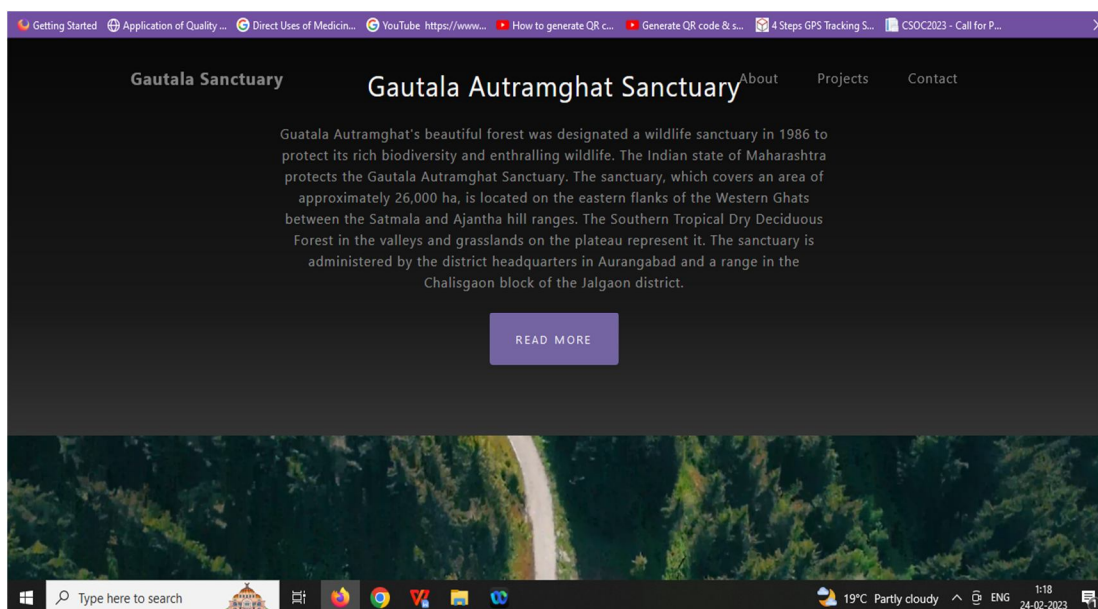
IV. RESULTS

A. Website Of Gautala Forest

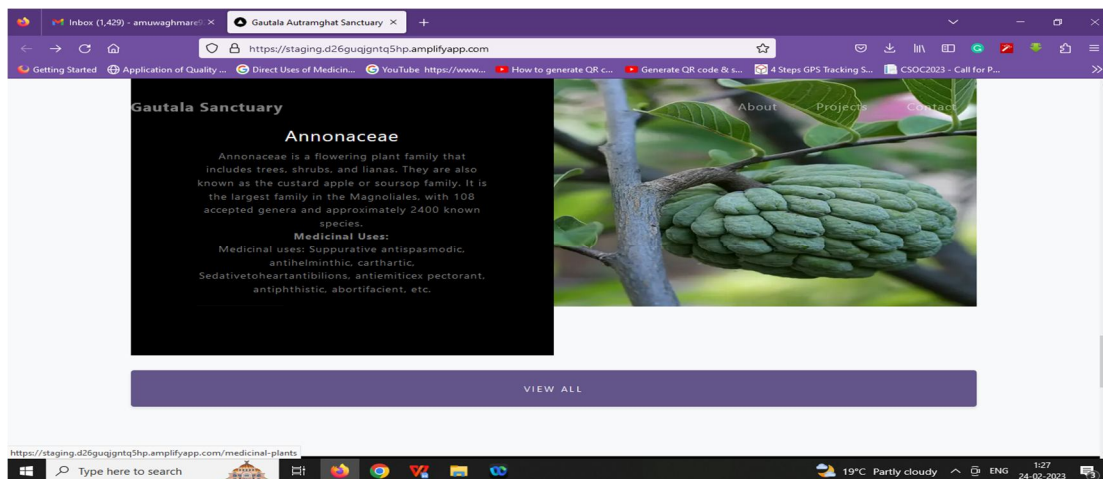
1) We Developed Website for Gautala Autramghat Sanctuary



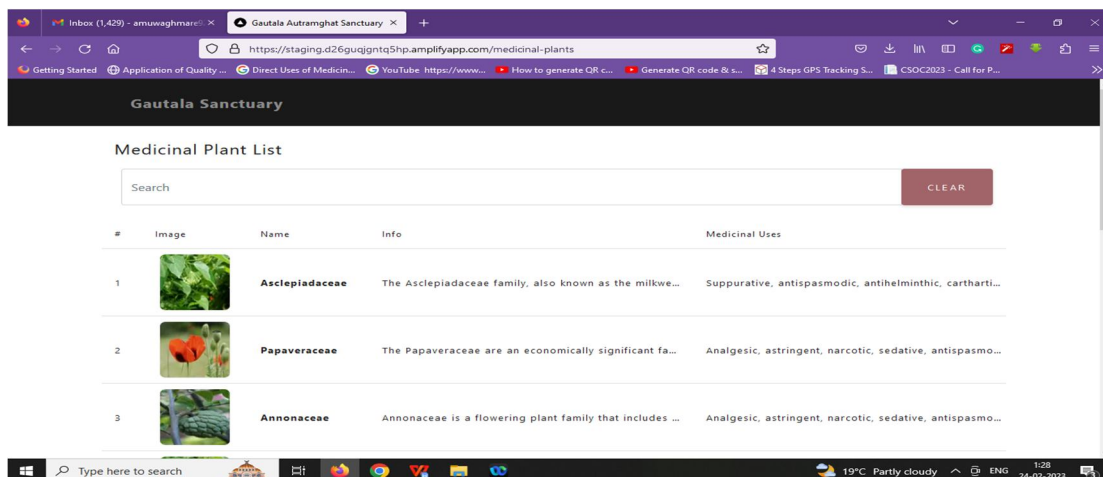
2) Information About the Sanctuary.



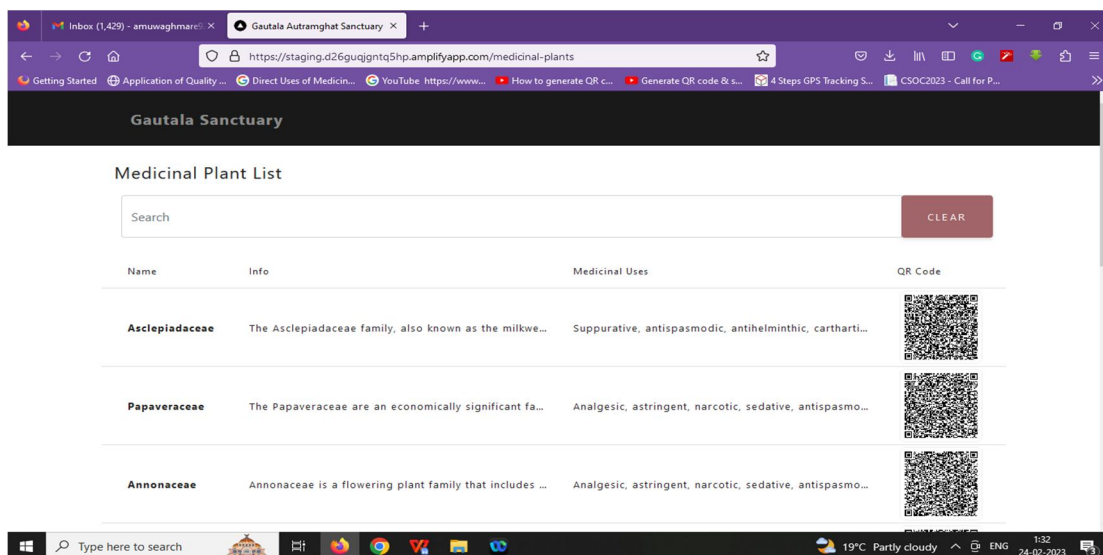
3) In this Page, we shown the medicinal Plants Inforamtion.



4) List of Medicinal Plants



5) Medicinal plants with QR-Code.

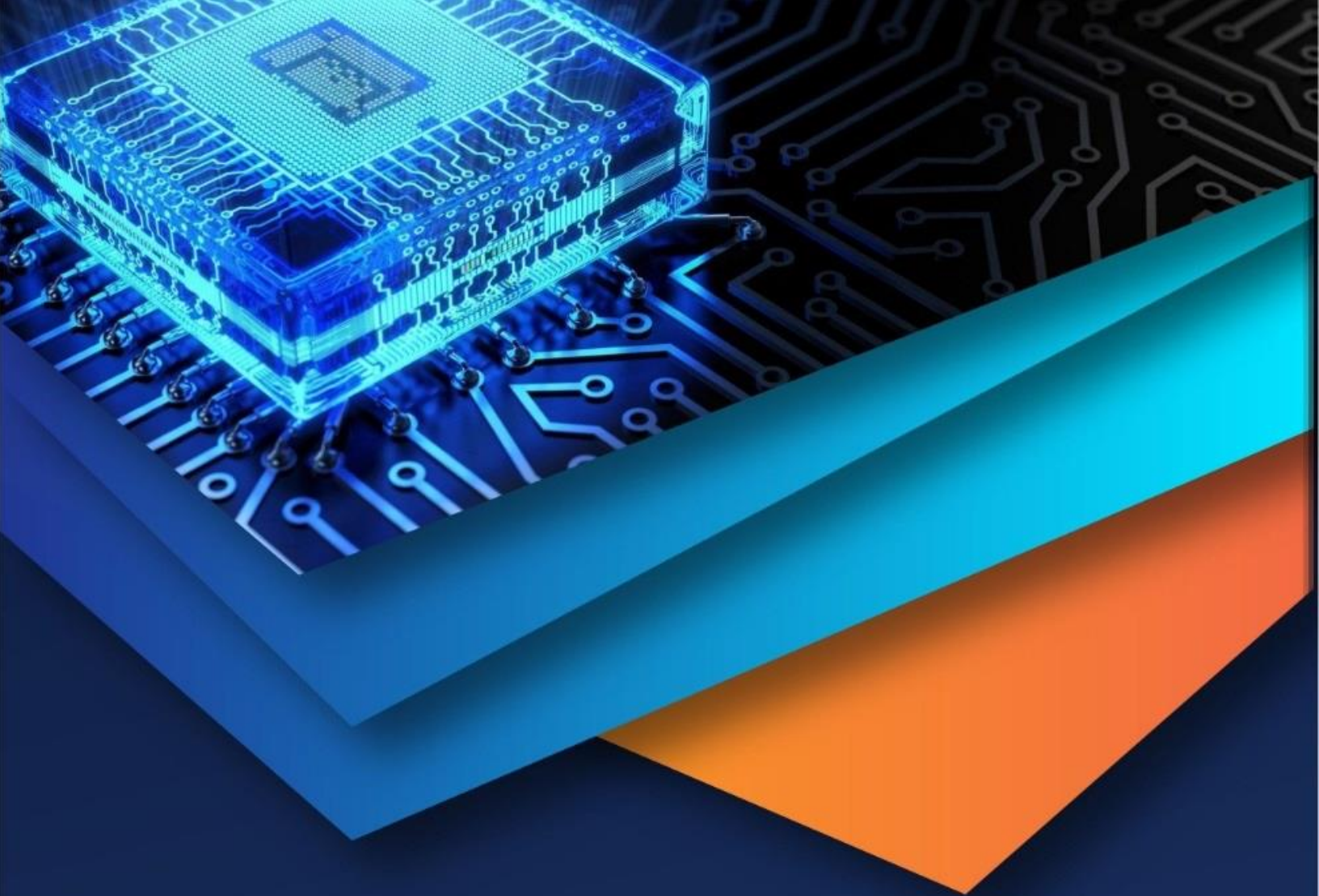


V. CONCLUSION AND FUTURE WORKS

In this paper, a mobile plant tagging system for forest ecotourism is proposed. The proposed method uses QR codes to tag the plant which visitors of the forest can scan and obtain the plant's information through their mobile devices. Unlike the previous methods in which visitors of an forest such as Gautala Autramghat Sanctuary needs to depend on human tourist guide or books to get information about the plants, this system uses mobile devices. Through these devices, visitors can get accurate, and reliable information regarding the plants in the forest in a matter of time. However, due to the fact the proposed system is still only a prototype version, further enhancements such as in terms of security and its performance by real users need to be done prior to its deployment. Other considerations for the system includes the integration of the mobile-based system with Gautala Autramghat Sanctuary already available web-based information system. Other user requirements will also be taken into consideration, such as how the application will function without an Internet connection and the addition of other features like geolocation, forest weather forecasts, and search functionality. As a result, future development will take into account these additional concerns and further enhancement

REFERENCES

- [1] Zhu Mingli. "2D code bar code recognition applications." Xi'an: Xi'an University of Electronic Science and Technology, 2006.
- [2] Shin, D.H., Jung, J. and Chang, B.H., The psychology behind QR codes: User experience perspective. *Computers in Human Behavior*, 28(4), pp.1417-1426, 2012
- [3] haisam Sutheebanjard, Wichian Premchaiswadi, "QR Code Generator", IEEE 2010 8th International Conference on ICT and Knowledge Engineering (24-25 Nov. 2010) pp 89-92.
- [4] Tiwari, S., 2016, December. An introduction to QR code technology. In *2016 international conference on information technology (ICIT)* (pp. 39-44). IEEE.
- [5] QR Code Tutorial, <http://www.thonky.com/qr-code-tutorial/>
- [6] <https://fsi.nic.in/index.php>
- [7] <https://www.mynation.com/views/how-maharashtra-is-using-technology-to-increase-forest-cover-pnzwijs>
- [8] <https://doi.org/10.1016/j.jksuci.2021.02.009>Get rights and content



10.22214/IJRASET



45.98



IMPACT FACTOR:
7.129



IMPACT FACTOR:
7.429



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089  (24*7 Support on Whatsapp)