

BIODIVERSITY INFORMATICS AN INTERFACE BETWEEN SOFTWARE'S & WEB BASED TECHNOLOGY WITH BIODIVERSITY.

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ABSTRACT

Biodiversity maintains the ecological balance and is necessary for human survival and economic development. It provides a large number of resources and services that sustain our daily lives. Biodiversity-informatics derives knowledge from computer analysis of biological data. It applies principles of information sciences and computing technologies to make the vast, diverse, and complex lifesciences data which became more understandable and useful. The Software's & Web based Technology with Biodiversity-Informatics were used for developing databases that facilitated the data exchange and compatibility in handling a large volume of data with required security. In this present work the main objective of researcher was to develop DBMS along with the images and to make them available electronically with Internet interface. Databases were normally developed with the help of MS-Access software, which was one of the MS office tools. Visual Fox-Pro, Visual basic, Oracle, etc. Databases can contain all kinds of information about organism, including their characteristics, economic importance, conservation and management. In this present study the biodiversity informatics tools were utilized. These features support to provide information regarding planning and implementation and utilization of these resources in a sustainable manner.

Key Words: Morphdiversity, Biodiversity-Informatics, Vegetation Monitoring, DBMS, WWW.

INTRODUCTION

Central India represents the major forest cover of the country. Melghat Tiger Reserve is one of them, having tropical dry deciduous type of forests. The forest cover in this area is so large, complex and huge that it is very much difficult to understand it properly without applying computational tools. The large number of tree species are distributed in this region show significant diversity among them. Here researcher has intended to introduce totally new computational methodology as The Biodiversity Informatics Tools. Study is compartment based, Various computing tools would be applied to describe biodiversity informatics of Melghat. The objectives of this present study collect information on morphodiversity of tree species, mapping forest digitally using World Wide Web. Prepare Specimen Browser System for user friendly access. Develop database on forest trees using MS-Access software. Prepare Virtual Library of plants specimens. Introduce concept of Digital Visual plants.

REVIEW OF LITERATURE

Fasola and Egunyomi (2005) carried out investigations on Nigerian usage of bark in phytomedicine. A taxonomic key that would facilitate the identification of dry bark of 15 frequently used tree species had been constructed. Although, morphological features of some bark might change with increasing storage period, the key would still be useful for the identification of the most common species encountered. Hedge et al., (1998) studied variation in bark thickness in a tropical forest community of Western Ghats in India. They examined the relation between bark thickness and girth in a large sample of trees from evergreen and semi-evergreen rain forest. There was a significant tendency for bark thickness to increase with tree girth. They found a significant trend for species from more disturbed habitats to possess thicker bark. Species from more disturbed habitats also had a greater propensity for secreting gums and resins. Hargreaves (2006) studied vegetative morphology for species identification of tropical trees. Tree specimens from the ESAL herbarium of the Universidade Federal de Lavras, Minas Gerais, Brazil, were described by selecting vegetative characteristics using CARip, a Microsoft Access database application specially developed for this study. This work provided information on the distribution of 22 vegetative characters among 16 families having 10 or more species described. Torres et al., (2007) introduced a digital library framework for biodiversity information systems. Biodiversity Information System (BIS) involves all kinds of heterogeneous data, which include ecological and geographical features. The approach provided in this paper to meet these issues is based on taking advantage of advances in digital library innovations to integrate network collections of heterogeneous data. This architecture was easily extensible, and provided users with a considerable degree of flexibility in data management. This solution solves many current problems in this kind of system, allowing handling of images and textual information in the integrated fashion. In the opinion of Stuessy (2009) large stores of primary biodiversity data lie relatively inaccessible in herbarium collections around the world. Digitization of herbaria is being done primarily to meet the needs fulfilled by notes on labels, and to save actual specimens from avoidable handling. The objective is to digitize the most important elements of this unique collection and make the data available to a world-wide audience via the Web Digital herbaria (virtual herbaria) are digital images of herbarium specimens, plus information from labels, in an organized database. Moss (2007) presented information on forest inventories and monitoring for biological conservation. Within large forested landscapes, inventories provide the cornerstone for effectiveness monitoring of biological conservation. These systems of classification must underwrite reasonably reliable forecasts of future forest conditions. Lertlum and Murai (1995) carried out computer assisted monitoring of vegetation using multi-resolution satellite and geospatial data. The authors approach was object oriented, a relatively new method in computing, was an attempt to improve modeling of the real world. In their view previous modeling approaches were more record oriented, essentially to close to computers, this new Pedigram was a frame work for generating models closer to the real world features. Musavi et al., (2006) worked on mapping of biotic pressure and its impact on prey densities in Melghat Tiger Reserve, Maharashtra. The Melghat Tiger Reserve in Maharashtra was under immense biotic

pressure from villages both within and adjacent to it. Distribution of pressure from 10 major biotic parameters on the forests of MTR was assessed and mapped.

MATERIALS AND METHODS

Digital Bark Library: The bark specimens are collected by cutting small portion of the bark of the trees and tagged. External features like colour and texture of the bark was studied. The barks of the trees were well organized and labeled in presentation form. The Digital bark library was prepared. **Ethnobotany:** The database table was prepared using database software and the medicinal plant database was also prepared using MS-Access software. **Bioinformatics Tools:** Bioinformatics is more of a tool than a discipline. Information technology makes usage of software, hardware and internet based communication systems for the analysis of Biological Data. Using World Wide Web, the information on vegetation cover was prepared. **Mapping forest digitally using internet technologies:** Satellite forest cover maps of the Melghat Tiger Reserve were down-loaded through World Wide Web or Internet technologies. Actual topographic locations of vegetation-spot potential from the satellite photographic images were studied. **Specimen Browser System - Hyperlinks:** Specimen browser system was prepared to explore the information visually. Photo images were seen as a specimens; these hyperlinks were prepared in MS-Access.

OBERVATIONS AND RESULTS

Tree Bark: The tree bark was broadly classified on the basis of morphological characters, colour and texture whether it was smooth, scaly, furrowed, warty or shaggy. It was found that bark samples were smooth, 6 scaly, 8 furrowed, 20 warty and 16 Shaggy types . From this study it was evident that the diverse natures of the barks the forest trees pave way for identification of species. **Tree bark: An important source of the medicine:** Tree bark was an important ethnobotanical source of tribal life to control health related problems such as skin diseases, cuts, dysentery, digestion, acidity, body power, bone fracture and cough. In present study the ethnobotanical information was gathered by communicating the local resident of Melghat. **Database Management System (DBMS):** Medicinally important plant database was prepared that supports in tree species description and identification. Here, MS-Access software was used to store the data of tree species. Database software was the best alternative to the conventional methods for handling huge/large amount of data or information in user friendly manner with sufficient security. **Manipulation of biological information:** This was the new method applied in the preparation of Digital Virtual Herbarium which was preserved in the form of .mdb files. The storage of specimen images and data was processed with the help of computer. The objective was to process available plant information through computer devices for its easy accessibility.

DISCUSSIONS

Fasola and Egunyomi (2005) carried out investigations on Nigerian usage of bark in phytomedicine and indicating that the newly-grown bark was also medicinally useful. A taxonomic key that would facilitate the

identification of dry bark of 15 frequently used tree species had been constructed. In present study ethnobotanical information of the bark was collected from knowledgeable persons of Gullarghat and Dharghad, Ethnobotanical use of the bark of 20 trees species on various human health problems such as bone fracture, acidity, injury, worm control, body power, blood impurity, antidote to snake poison, cough, and dysentery were recorded. Musavi et al., (2006) observed that the Melghat Tiger Reserve in Maharashtra was under immense biotic pressure from villages both within and adjacent to it. Combined biotic pressure from grazing, feulwood collection, lopping and illicit felling of trees and grass cutting affected 75% of compartments of MTR. Thus there was need for providing adequate protection to the region so that habitat in this area could be improved. Torres et al., (2006) focused on combining research on image processing, databases, and digital libraries provided biodiversity researchers with Biodiversity Information System (BIS). This solution solved many current problems. Allowing handling of images and textual information in the integrated fashion. Stuessy (2009) gave stress on digitization of the herbarium; with proper planning and suitable software; digitization could produce many very useful 'by-products'. One such collection was the Forest Research Institute Herbarium at Dehradun, Uttarakhand, India, their objective was to digitize the most important elements of this unique collection and make the data available to a world-wide audience via the Web. Digital herbaria are digital images of herbarium specimens, plus information from labels, in an organized database. Hargreaves (2006) Studied vegetative morphology for species identification of tropical trees. Tree specimens from the ESAL herbarium of the Universidade Federal de Lavras, Minas Gerais, Brazil, were described by vegetative characteristics using CARip, a Microsoft Access database application specially developed for this study. Thus, 2 observers described 567 herbarium species as a base to test methods of identification as part of a larger study. The work formed part of that study and provided information on the distribution of 22 vegetative characters among 16 families having 10 or more species described.

CONCLUSIONS

Digital bark library was further to conclude that bark could become one of the important taxonomic characters for plant description. The computer assisted monitoring of vegetation was done by using World Wide Web to illustrate the out line idea of a new vegetation monitoring methodology through aerial digital satellite maps by using Software's & Web technologies. Mapping of the forest digitally assisted in understanding the complexity of the forest which could not possible even by using any other technical device. Huge area of the MTR was focused through digital satellite maps. Specimen Browser System: This linking information could share in different ways in the study of forest biodiversity and could access in developing large databases. Database Management System: Structured query language was applied for data extraction for searching the tree code and local species, genera, family names with their associated characters, for example, sorting flowering and fruiting periods, flower and fruits types of different species could be done very quickly. So, biodiversity informatics is an interface between software's & web based technology with biodiversity.

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