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Author: Mr. Aafaque Khan
Maulana Azad National Institute of Technology, India

Mr. Mayank Mishra
Maulana Azad National Institute of Technology, India

THE TREE COUNT: AN APPROACH OF GREEN INDEXING IN URBAN AREAS USING CITIZEN SCIENCE FOR EARTH OBSERVATION AND GIS

Abstract

At the Maulana Azad National Institute of Technology (MANIT, Bhopal, INDIA), under the Division of Geomatics of Department of Civil Engineering, an innovative approach is being developed by students to assess the number of trees in urban areas using citizen science and crowd sourcing to collect data on candidate trees in selected locations and assign a relative green index (say, ratio of tree count in a sub-section to total number of trees in the region) as a statistical indicator of vegetation in the region.

In this paper, the authors highlight this innovative approach of green indexing of urban areas using citizen science and public participation. This approach uses an online interface which allows any public user to contribute in counting trees in an urban area. The online interface uses Google Earth and Google Map Application Programming Interface (API) to acquire the available satellite image of a particular urban location; the users can mark the trees in these locations with the help of instructions and tutorials. The post processor has a database in which markings of individual users is stored with their corresponding Lat-Long Coordinates; these individual marking are then cross referenced and compared to eliminate random inputs and poor data. Hence, a final database is prepared with tree location which gives an approximate number of trees in the locality.

As a proof of concept, the project team, in its present phase, is working to count the number of trees in the Campus of MANIT, Bhopal with help of students living on campus. This approach allows students to participate and understand various applications of Earth Observation. Once the data is acquired, green indexing, will be done by normalizing areas of each sub-region in the campus (say the academic blocks, the residential regions which have different areas). These results are compared with geo-intelligence software, developed for object extraction (e.g. Trees) from Remote sensing images using rule inversion technique of Cellular Automata enhanced by optimised search technique such as Genetic Algorithm and N-dimensional classifiers like support vector random field. Actual tree count in the campus is done by a team of volunteers to provide primary data for comparison.

After the completion of this phase, the interface can be put in public domain. This project aims to connect citizens with application of Earth observation and science, and demonstrate that such citizen science projects are innovative tool for Outreach.