A
Dissertation
On

"A method for detection of Groundwater using Cuckoo Search"

Submitted in partial fulfilment of the requirement
For the award of Degree of

MASTER OF ENGINEERING
(Computer Technology and Application)

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CERTIFICATE

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This is to certify that the thesis entitled "**A method for detection of Groundwater using Cuckoo Search**" submitted by Ms. Bidisha Das of Delhi College of Engineering in partial fulfilment of the requirement for the award of the degree of **Master of Engineering** in **Computer Technology & Application** is a record of the student's work carried out by her under my supervision and guidance. This is beneficial work in the field of Geoscience using recent technologies of Bio-inspired technique. The matter embodied in this thesis has not been submitted for the award of any degree or diploma.

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Abstract

"Biology and computer science – life and computation – are related. I am confident that at their interface great discoveries await those who seek them." (L.Adleman, [1])

Natural Computation is a field that draws inspiration from Nature to solve problems that is hardly solved by our traditional system. Nature has lots of simple rules and premises which can be applied to new and complex environments quickly and efficiently. It solves computationally unsolvable problems and even problems that require good quality of solutions in exponentially large search space.

Our project mainly emphasized groundwater detection methodology using a new technique of Natural Computation i.e. Cuckoo Search but even we have applied Membrane Computing in Image Classification. Membrane Computing is a technique that directly comes under Natural Computation. Thus we have covered two different fields of Natural Computation in different application areas of geosciences.

"***If the wars of the twentieth century were fought over oil, the wars of this century will be fought over water***" [The World Bank]. Groundwater is located beneath the ground surface which is precious natural resources. Geoscientist had to know the location of groundwater for extraction of water. Thus we have applied cuckoo search in the detection of groundwater in various landforms. Geologists provided us with values of landforms; soil, lineament and other geology features and our algorithm detected the presence of groundwater in such situation. Thus we have formulated different values of these characteristics as cases and then detected the potential of groundwater of new cases depending on the previous values of our cases.

In this review we have even applied membrane computing in image classification. Image processing has been a wide field of application in remote sensing. Remote sensors capture images of earth and this remotely sensed image is used by scientist and in various laboratories for identifying different terrain features. Thus natural computation had been used for extracting the features contained in an image. Thus the work includes natural computation in image classification.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES