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Paper Title: Prediction of Hydrogeologic Risks of Dump Sites using Fuzzy Approach A Case Study of Some Dumpsites at Igbara-Oke, South-Western Nigeria

Abstract: Geophysical investigation was carried out within the vicinity of some open active waste dumpsites at Igbara-Oke, Southwestern Nigeria along ten traverses with sixty-two (62) Vertical Electrical Sounding (VES) positions being occupied in the East- West and South-North direction to assess the geology and hydrogeologic condition of the subsurface around the dumpsites. The interpreted geoelectric sections showed subsurface layers as top soil with resistivity range of 5-448 Ωm and thickness 0.30-7.7m; weathered layer resistivity value varying from 9-250 Ωm had thickness values between 0.4m-7.1m. Thickness of the fractured/fault layer having resistivity values lesser but not greater than 750 Ωm, ranges from 1.2 m to 11m and depth to bedrock thickness extended beyond 17.9m having resistivity value exceeding 1000Ωm. Underlying possible lithologic sections was inferred using the information from the geoelectric sections. Aquifer systems of weathered/fractured unconfined aquifer, weathered/fractured confined aquifer, weathered layer aquifer, weathered layer/fractured semi-confined aquifer types were delineated. A fuzzy model implemented asserts the relative hazard rating of the dumpsites as 1.72 and 1.67 on a scale of 10, indicating the dumpsites may not be currently posing a risk based on its sizes, waste content and localization of leachates plume.

Keywords: Groundwater, Hydrogeologic, Hydrogeological risks, Fuzzy logic, Relative Hazard Rating

References:
<table>
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<tr>
<th>Paper Title:</th>
<th>Correlation of CBR Values with Soil Index Properties by Regression Model using Soft Computing Techniques</th>
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</table>
| Abstract: | The spatial variation of soil properties is beyond the designer’s control. Designer often feel discomfort before reaching at any conclusion and totally rely on the soil testing. This soil investigation takes much longer time and resources of a project. So geotechnical engineers usually attempts to develop empirical equations. But these empirical equations are more specific to the location & type of soil. However the empirical relation is useful for future projects coming in the vicinity. In road construction, civil engineers always encounter difficulties in obtaining representative CBR value for design of pavement. The type of soil is not the only parameter which affects the CBR value, but it also varies with different soil properties possessed by the soil. Laboratory CBR test requires relatively large effort to conduct the test and it is time consuming. Currently, many road construction projects and railway constructions are undergoing in the country. In light of this, the output of the proposed correlation will provide road authorities, railway authorities, consultants and contractors preliminary background information on the value of CBR, for a localized sub-grade material, from soil index properties with a benefit of time saving and without incurring any additional cost for carrying out laboratory CBR test. As a result, our present study aims to find the correlation between CBR values with soil index properties. So to develop correlation, Single line regression (SLR) & Multiple line regression (MLR) is done to correlate CBR value with soil index properties and their precision is examined by Statistical data analysis tool. Accordingly, 100 disturbed samples were collected from different location of Haryana district and required laboratory test have been conducted in order to establish an equation of CBR as a function of grain size parameters, atterberg limit by considering the effect of an individual soil properties and effect of combination of soil properties on the CBR value. The developed correlation lead to a regression value of $R^2 = 0.729$, using SLR, while MLR generated relatively an improved value of $R^2 = 0.650$. After validating the established correlation with other empirical equation developed by other researchers, it was observed that correlation of CBR value with soil Indian properties is more applicable for preliminary characterizing the soil strength.

<table>
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<tr>
<th>Keywords:</th>
<th>California Bearing Ratio (CBR), Regression, Index Properties.</th>
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<tbody>
<tr>
<td>Authors:</td>
<td>P. Sai Sameera, M. Usha</td>
</tr>
<tr>
<td>Paper Title:</td>
<td>Microstrip Grid Array Antenna for 5G Applications</td>
</tr>
<tr>
<td>Abstract:</td>
<td>A Compact microstrip grid array antenna is designed for 5G applications. A microstrip grid array antenna is designed because it provides more gain than regular microstrip patch antenna. The geometric of the proposed grid array antenna is 26 ×26 mm² in length and width of the antenna. Rogers Duroid 5880 with $\varepsilon_r=2.2$ and loss tangent tan δ =0.0009 is used as substrate and height of the substrate is 0.381mm.The proposed antenna has a reflection coefficient, $\mathrm{s}_11$ of -32.0369 dB and Gain of 12.858dBi at 28 GHz. As the proposed antenna has higher gain it can be used for 5G applications.</td>
</tr>
<tr>
<td>Keywords:</td>
<td>Microstrip Antenna, Microstrip Grid Array Antenna, Milli-Meter Wave Band, 5G.</td>
</tr>
</tbody>
</table>
Enhanced UWB Wireless Rake Receiver By using New Combining Technique

Abstract: In wireless communication system, the signals are arriving to the receiver in terms of general summation for several "multipath components (MPCs)" through "direct line of sight (LOS) and indirect non line of sight (NLOS)". Multipath occurs due to "reflection, diffraction, and scattering" of transmitted signal. “MPCs” are considered one of the main problems in wireless communication system especially in "ultra-wideband (UWB)" system because these “MPCs” have a different amplitudes, phases, and delays with respect to the transmitted signals and cause signal distortions and fading that degrade the quality of the received signal and lead to poor performance in wireless communication systems. However multipath phenomena is used to enhance system performance by using a dedicated wireless receiver such as wireless "rake receiver" to resolve the “MPCs” and reduce "multipath fading" effects to improve system performance. The combiner is a main part of rake receiver that coherently combines “MPCs” using one of the combining schemes to form a complete replica of a transmitted signal to capture most of the energy of the received signal. By this combiner, the system can achieve better performances that lead to maximize the average "signal to noise ratio (SNR)" to recover the transmitted signal with lower "bit error rate (BER)". This technique is suitable for "UWB" wireless devices that are commonly used for high-speed data rate through short-range indoor wireless communication. In this paper new combiner was proposed to enhance the combining performance of “UWB” wireless rake receiver named adaptive partial-hybrid (AP-H) combiner. For comparison, the two conventional combiners: "selective combiner and partial combiner" were designed. The simulation results were obtained by using MATLAB software, these results showed higher system performance when using the proposed AP-H combiner than other conventional combiners. For this work "UWB" signal was used with binary phase shift keying-Time Hopping (BPSK-TH) multiple access modulation scheme.

Keywords: "UWB" Technology, Rake Receiver, MRC Adaptive Partial-Hybrid Combiner, Multipath Components.
References: