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| Channel Assignment Using Self-Organizing Map |
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Channel Assignment Using Self-Organizing Map

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**Abstract:**

The demand for mobile communication has been steadily increasing in recent years. With the limited frequency spectrum, the problem of channel assignment becomes increasingly important, i.e., how do we assign the calls to the available channels so that the interference is minimized while the demand is met? This problem is known to belong to a class of very difficult combinatorial optimization problems there are many techniques used to solve such problems such as genetic algorithm, Hopfield neural network and Self-Organizing map, here in our project we apply Self-Organizing map Algorithm to benchmarking problems. Self-Organizing Map is a type of artificial neural network that is trained using unsupervised learning to produce a low-dimensional such a type of neural network differ from other artificial neural networks in the sense that they use a neighborhood function to preserve the topological properties of the input space. Hopfield neural network is involved to minimize the energy function.

**CONCLUSION:**

* The problem of assigning channels to calls in a cellular mobile communications network is of great importance in the telecommunications industry, finding application not just to cellular networks, but in satellite and other systems where the available frequency spectrum is a limited resource. The SCA problem has been formulated as a generalized quadratic assignment problem with the interference constraints in the objective function, and the demands treated as hard constraints.
* Here in our problems if the number of channel is less than the lower bound so, the Co-channel interference appears, but we achieved the minimum co-channel interference and to obtain interference free assignment we increased number of channel to be large than lower bound.
* Every run of all the neural techniques tested resulted in a feasible solution, which is a claim which cannot be made with a standard Hopfield network implementation. It should be mentioned here that no CPU times have been provided for these solutions. This omission is intentional, since the neural networks are designed to be run on suitable hardware, not simulated on a digital computer, we are not interested in simulation times.

**FUTURE WORK:**

* Decreasing simulation time.
* Solving the dynamic channel assignment problem, while solutions to the static channel assignment problem are useful for planning a cellular mobile communications network, and for its operation in the immediate future thereafter, it will become increasingly more difficult to find satisfactory assignments as the demands increase beyond some point. The ability to dynamically alter the channel assignments is imperative as demands increase, if efficiency of the frequency spectrum is to continue to be a goal of the optimization process.