The Angle Of Arrival (AOA) estimation techniques are used to enable smart antennas to find the mobile user's location accurately. The optimization of some key parameters using MUSIC algorithm enables improved estimation of the AOA. The Minimum Mean Square Error (MMSE) is implemented in the algorithm of adaptive beam forming. The ability of enhancing the beam pattern (main lobe direction and the beam width) is achieved by choosing different values of relevant parameters. It has been found that increasing the number of array elements, increases the accuracy of beam-forming and more focusing of the beam is realized.

Dr. Lotfy Gomaa supervised the M.Sc. thesis of Dr. Sherif Hekal, where MUSIC algorithm has been implemented and used throughout this work. Optimization of some important antenna structures is investigated. New criteria for optimization are developed and tested for uniform and nonuniform arrays. Genetic algorithm could be applied for future work.

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