23ECE216/23CCE215 Machine Learning

Assignment 1

Comparative analysis of optimization algorithms

Q. Select a function of two variables, say x and y, given by *f(x,y)* . The function should have at least one local minimum and one global minimum.

Find the minimum of the given function using the following algorithms:

a. Gradient Descent
b. Gradient Descent with Momentum
c. Adagrad

Select the parameters as per your understanding and state them clearly at the beginning of the algorithm.

Show the first three iterations only.

Now implement each of these algorithms using MATLAB Live-script. Use separate live scripts for each algorithm. DO NOT use any built-in functions. State clearly the termination condition used for each code example. Add detailed text explanations of the code sections to improve readability.

Use appropriate visualization to illustrate how the surface of the function f(x,y) looks like, the initial starting point and the movement of the solution in the direction of the global optimum.

Note: The three iterations, its description followed by the live script code with explanation should be submitted as a single .pdf file (you may use tools like pdfSam etc to merge multiple pdf files into a single one).