In this work, a new regularization term that penalizes the conditioning of the weight matrices in a deep neural network is presented. We give a mathematical argument that suggests that in certain situations, the conditioning number of the weight matrices have a direct impact on the error in classification. Empirical evidence suggests that improving the weight matrix associated with the output layer of a matrix improves generalizability when classifying ECG data from a benchmark data-set, and also a novel malaria infection data-set. (Received September 17, 2019)