Activity: MLP Structure

ML for Health, Week 3

Part I

For each of the following, determine (a) how many logistic regression models and (b) how many parameters are contained in the model.

1. Logistic regression with 3 input features
2. An MLP with 3 input features and 1 hidden layer with 6 hidden units
3. An MLP with 3 input features and 2 hidden layers, each with 6 hidden units
4. (challenge) An MLP with 3 input features and 3 hidden layers with 6, 2, and 6 hidden units, respectively

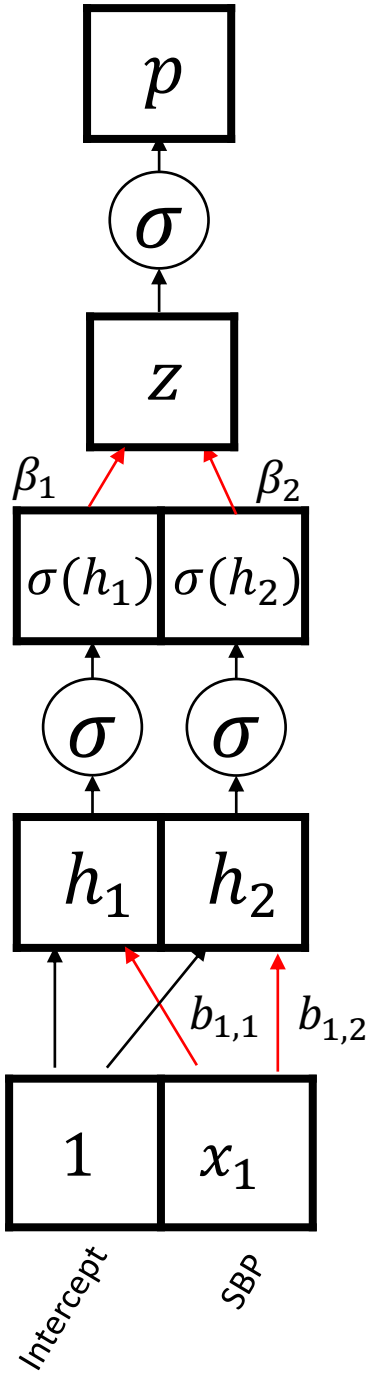
It may be helpful to draw or create graphs for these models. For this activity, bias/intercept parameters may be ignored.

Part IIA

- The MLP at right is designed to predict ICU mortality from systolic blood pressure on admission.
- We would like to have a model that predicts high mortality risk associated with both *very high* AND *very low* systolic blood pressure.
- Let's suppose that h_1 detects *very high* blood pressure, h_2 detects *very low* blood pressure, and p is the model's final prediction about the probability of mortality.

Goal:

For each of the parameters highlighted in red, determine whether the value of that parameter should be (a) positive, or (b) negative.



Part IIB

- The MLP at right is designed to predict disease mortality from age and sex
- We would like to have a model that predicts high mortality risk only for *males over 60* AND *females under 60*
- Let's suppose that h_1 detects *males over 60*, h_2 detects *females under 60*, and p is the model's final prediction about the probability of mortality.

Goal:

For each of the parameters highlighted in red, determine whether the value of that parameter should be (a) positive, or (b) negative.