Newcomers to a city lack a strong sense of the distinction between safe and dangerous parts of town. This results in many tourists venturing upon unfavorable areas of their desired destination, which can result in loss of possessions and bodily harm. Using the crime data for the city of Boston I have built a neural net to predict the dangerousness of any given location. Dangerousness is a term I define in my model on a scale from 0-100, where 0 is benign and 100 is alarmingly dangerous. With a proprietary scale developed by myself I labeled each of the thousands of data points and trained a neural net to predict the dangerousness of any given location in Boston.

Neural nets are a machine-learning tool intended to mimic the way the human brain makes decisions. Neural nets consist of three chunks, the input layer, the hidden layers, and the output layer. Each layer consists of nodes, which can be thought of as neurons, which take multiple inputs and return a single value. The input layer consists of inputs to the model, in this case: a latitude and a longitude. The hidden layers are all the layers between the input layer and the output layer, which is where the deep learning aspect comes into play. Given the immensity of nodes in neural nets and the complex nature of their construction they can be used to model complex systems accurately. The output layer takes the outputs of each node in the final hidden layer and outputs it. This layer is responsible for outputting the usable information for users, in this case: a dangerousness rating.

Using the machine-learning library tensor flow I implemented my neural net. The net has of course the input layer and output layer, as well as two hidden layers with 256 and 512 nodes respectively. The activation function of each node is rectified linear. The loss function is a mean squared error. Using the loss at each step the net is optimized via gradient descent. I train the net with 25 iterations and 90% of the data, using the other 10% to validate the net and ensure no over fitting.