**Classifying Hurricane Damage Imagery with Machine Learning**

A picture containing electronics

Description automatically generated

![A screenshot of a cell phone

Description automatically generated]()

**Interpretation of Confusion Matrix:**

Looking at row starting with C\_11(Damaged\_Trees) classified by human the same were classified as C\_22(Intact\_Roof, 1 value), C\_23(Destroyed\_Building, 2 values) and C\_31(Open\_Roads, 2 values) by machine.

The row starting with C\_23(Destroyed\_Building) had 4 values classified as C\_11, 3 values classified as C\_22, 5 values classified as C\_23 and 1 value classified as C\_31 which brought down the accuracy to almost 38% (0.3846). The reason being some of the destroyed buildings looked like damaged tress and open road.

There was perfect agreement when it came to identification of C\_22(Intact\_Roof).

The row starting with C\_21(Blue\_Tarp\_Cover) had one value being classified as damaged tree and one value being classified as open road.

The row starting with C\_31(Open\_road) had 2 values being classified as damaged tree and one value being classified as destroyed building. The reason of slight accuracy was because there were points which looked very similar to destroyed buildings.

The Kappa value of 0.76 indicated “substantial agreement” between human/user and machine/producer.

**Discussion Questions**:

1. Yes, open grass should have been included as one more form of classification. There were many points that lied between damaged trees and open grass which made it tricky to classify. The same applies to points lying between open roads and grass. After having a look at big imagery of Hurricane Dorian there were other things like open land, airports, seacoasts, power lines that were damaged. The inclusion of these classification classes could have given more information about the disastrous nature of the hurricane.
2. The layout has incorrect classified classes because of the few points that were classified as damaged trees which actually were open grass. This in turn hampers the classification and creates inaccurate results. Thus, it will create problems while using this output for analysis of disaster. Such inaccuracy will misguide analysts who are working on damage assessment maps using machine learning algorithm.