The paper suggests using the distances that the LiDAR beams travel before being intercepted by an obstacle to detect the type of intersection present ahead of the vehicle.
360 beams with a 1 degree angle between two adjacent beams is launched from a LiDAR with a variable launching point.
The beams are used to build a 2-D gridview of the surrounding similar to a bird-eye view of the location.
Using the data from these beams we remove the parts of the map interrupted by obstacles like pedestrians, vehicles, etc. by examining the height and width of the obstacle detected.
At a primitive level, on plotting normalized beam length vs serial number of beam (beams are numbered from 1 to 360), we are able to differentiate between a + intersection and a normal road segment from the number of peaks in the graph.
For a more clear cut classification, we consider each beam length as a feature and feed them an Support Vector Machine (SVM) model to perform two-class classifications (first between road segment and intersection, then + and T shaped intersections).

Note: The distance of launching point from the autonomus vehicle(D) is related to its velocity (v) as: $D = 5 + v*t$ (t taken as 1 sec in the paper)

The accuracy rates are generally over 90% under normal conditions and over 80% for challenging datasets. This shows that the algorithm works quite effectively even in certain difficult conditions.
However, more disturbances in the surroundings could bring the accuracy rates further down.