NuScenes Based Tracking Project Status Report

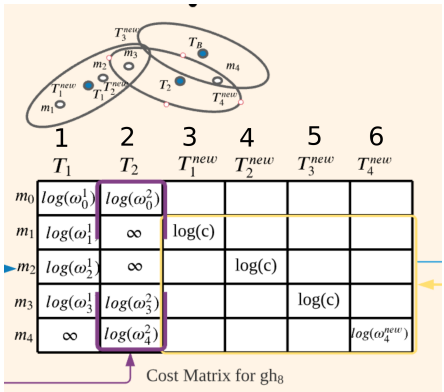
January 16, 2022

Experiment Result

result definition

implementation details for improved score

- tracking based on classification instead of tracking with all measurements
- Label for ID
- code



Key Issue

- ML: mostly lost. Only tracked for less than 20% of the trajectory
- MT: mostly tracked. Tracked for over 80% of the trajectory
- guessing: slow start for short tracks

PMBM birth Implementation

1. track management before poisson 2. how to generate Bernoulli directly

So unlike a standard PMBM filter, we incorporate the detection confidence score into the update step of **objects detected for the first time**. For detections with confidence scores larger than a threshold, we generate a potential new target by adding **a new Bernoulli process**, and plug the negative logarithm weight in the right m $\times$ m blocks diagonal in cost matrix L discussed in Section IV-C. For detections with lower confidence score, since we are not certain about their existences and require more evidences from the future, an undetected track with PPP density is generated for each of them. paper

PMBM birth Implementation

birth with measurement + additive noise

Add new Gaussian to the mixture (which represent the poisson intensity). This birth process is driven by measurements. Each measurement induce 3 birth of the same class by adding noise (uniformly distributed) ▸ repository

```
    def give_birth(self, measurements: List[ObjectDetection], birth_per_meas=0) -> None:
        """
        Add new Gaussian to the mixture (which represent the poisson intensity). This birth process is driven by
        measurements. Each measurement induce 3 birth of the same class by adding noise (uniformly distributed )
        to its value
        :param measurements: [x, y, yaw]
        :param classes:
        :param birth_per_meas: number of birth induced by a measurement
        """
```

Research Plan

- generate visualization for diagnosis
- analysis over the Validation dataset
- find out the best parameters
- implement that parameters for testset

IMPORTANT DISCUSSION

PMBM based Paper publication

theoretical considerations for detection score