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Kudan 3D-Lidar SLAM (KdLidar) update: Map streaming

Scalability matters for large-scale applications in autonomous vehicles and robotics

In the previous update on [KdLidar's map merging function](#), we mentioned that not only accuracy and robustness but also other practical functions are critical for real applications with scale.

Two significant challenges for autonomous mobile robots and vehicles start emerging when the area of operation grows to city or country scale and when the number of robots and vehicles increases into the hundreds or even thousands.

The first obvious challenge is the map size. When an autonomous vehicle or robot needs to operate across a city or country, each device needs to be able to store the entire map where it is running. With practical memory size limitations, initializing and searching for where it is within the whole map can be challenging.

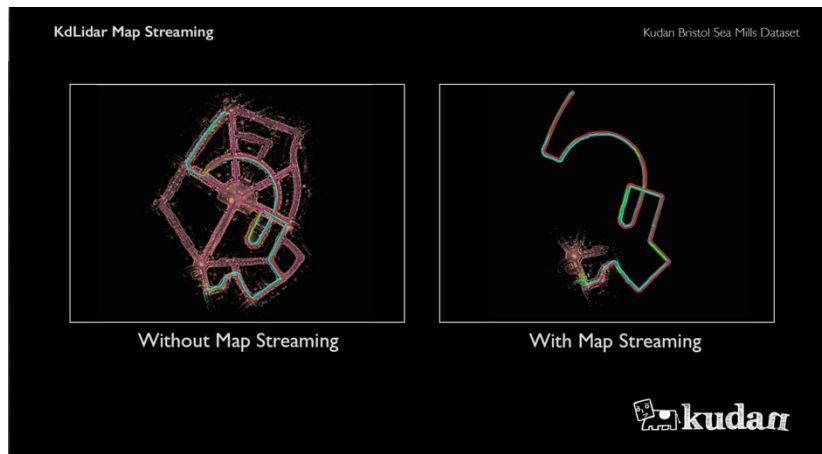
The second challenge is map maintenance. Under traditional models, each device needs to have the entire map locally, and operators need to update the map of each device every time there are some updates to the map. This update can be a tedious manual process, or at the least a very time-consuming process that may or may not benefit the practical operation of the device.

Map streaming: Optimize the memory usage for SLAM and maintain a single global map that is served to the device as needed

In order to overcome these challenges, Kudan's Map Streaming feature can play a powerful role in alleviating these challenges.

Let's take a look at map streaming in action:

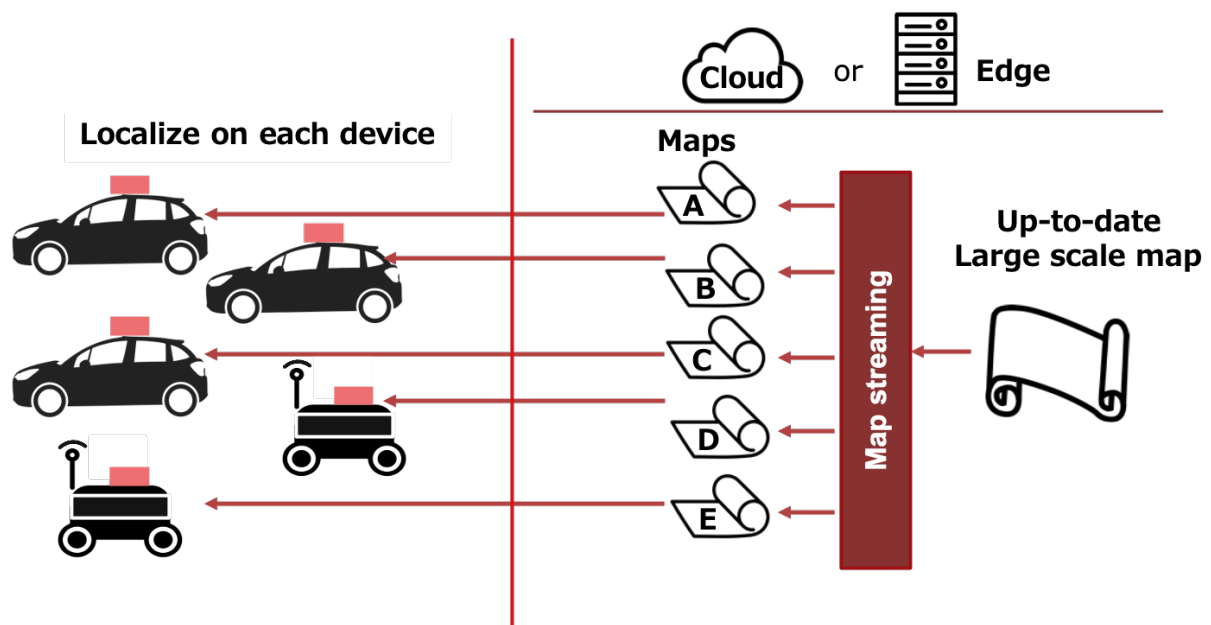
[Kudan 3D-Lidar SLAM \(KdLidar\) update: Map streaming](#)



As you can see in the video, the system only loads the necessary part of the whole map depending on the vehicle's location. As the vehicle continues to move beyond the current map, the system predicts and fetches new sections of the map and unloads parts of the map that are no longer in scope to optimize memory usage.

This video demonstration used a map streamed from a local disk, but it can be easily adapted for streaming from the cloud, which addresses the next challenge.

When we have fleets of devices, each device won't have to store a large map on the device and can download the map as needed from the cloud (see the image below). This feature makes map maintenance work easier, as each device will have the most up-to-date map and doesn't require individual device updates. This feature also can slash a significant amount of resources necessary for map maintenance for a large fleet of robots or vehicles.



We see this as a critical feature to enable many companies to scale up their operations. This feature has helped our customers, including auto OEMs, to make their autonomous solution more scalable. It is a great opportunity for telecom and 5G network related companies to leverage their network services to deliver a robust and scalable SLAM solution using these map merging and streaming functions.

About Kudan Inc.

Kudan (Tokyo Stock Exchange securities code: 4425) is a Deep Tech research and development company specializing in algorithms to enable artificial perception (AP). As a complement to artificial intelligence (AI), AP functions allow machines to develop autonomy. Currently, Kudan is using its high-level technical innovation to explore business areas based on its milestone models established for Deep Tech, which provide a wide-ranging impact on several major industrial fields. For more information, please refer to Kudan's website at <https://www.kudan.io/>.

■ Company Details

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■ For more details, please contact us from [here](#).