New Solution for Precise Autonomous Vehicle Localisation and Navigation

Civil Maps, a leading developer of cognition software for autonomous vehicles, has announced the availability of Fingerprint Base Map, a scalable solution for precise autonomous vehicle localisation and navigation. Architected from the ground up to meet the demands of production-scale vehicle autonomy, Fingerprint Base Map allows self-driving cars to precisely determine their location in six degrees of freedom (6DoF), while evaluating the safest route to travel. This technology serves as the localisation layer in the company's HD Semantic Map.

For self-driving automakers and mobility companies, Fingerprint Base Map leverages Civil Maps' proprietary fingerprinting process to tackle some of the most significant obstacles related to operating autonomous driving programs at scale. Using the company's novel algorithms, raw point cloud data collected from self-driving cars is transformed into lightweight voxel-based fingerprints, which vehicles use to find their location within a map. Unlike conventional solutions that are dependent on costly processing hardware, large storage arrays, and third-party data centers, Civil Maps' Fingerprint Base Map is created and utilised entirely on-the-edge, in-vehicle.

Data footprint

With Fingerprint Base Map, developers now have a reliable, scalable solution for self-driving localisation and navigation that does not blow through AV operation budgets, said Sravan Puttagunta, CEO and co-founder of Civil Maps. With the compact map data format, what once required weeks and months to compile, can now be executed more efficiently, in-vehicle, in real-time, and while the car is driving.

Civil Maps' Fingerprint Base Map (FMB) is shown with the green grid. Green diamonds illustrate base map "fingerprints". Visualised in blue, the query grid and diamonds are created by the query vehicle in real-time. Localisation matches are achieved when query fingerprints match to the FBM, as illustrated with orange diamonds.

With a data footprint that is up to 10,000 times smaller than traditional base maps, Fingerprint Base Map enables autonomous vehicle developers to radically reduce the costs associated with data processing, computing power, data storage, bandwidth, and energy consumption. For example, a conventional base map of San Francisco requires as much as 4 TB of in-car storage, while a voxel-based Fingerprint Base Map of the same area comprises only 400 MB. Purpose-built for portability, fingerprinted data can easily be transmitted over existing 3G and 4G cellular network infrastructure, enabling Edge Mapping, Civil Maps' process for map creation, map usage, and crowdsourcing.