WaveSense Develops GPR as Alternative to Lidar for Autonomous Vehicles

Boston-based start-up company WaveSense is developing Ground Penetrating Radar (GPR) for autonomous vehicles to help keep them on track during adverse weather conditions, or if the primary sensor system were to fail.

By sending a pulse of electromagnetic radiation into the ground and measuring reflections that originate from scattering points – such as pipes, roots, and rocks in the surrounding "dirt", but most importantly, soil layers and variations in moisture content – below the surface, WaveSense's Localising GPR (LGPR) is capable of creating a 3D map of the subsurface environment. According to WaveSense, "the premise of GPR localisation is that these subsurface features are sufficiently unique and static to permit their use as identifiers of the precise location at which their reflections were collected."

After developing a map of the environment below the road, WaveSense collects the GPR data of subterranean "objects," along with GPS tags, to form the initial database of subsurface features. This subsurface map is then used as a reference data set that helps estimate vehicle location on subsequent visits. To keep track of the vehicle, data is periodically fetched from the database for matching.

Since camera, radar, and lidar-equipped vehicles rely on road markings and prior maps for localisation to stay in their lanes, severe-weather conditions can cause various issues in the process. At 60mph, WaveSense GPR technology achieves in-lane accuracy of 4cm not only on a sunny day, but also during low-light, snowy, foggy, rainy and dusty conditions, resulting in a safer and more reliable vehicle. However, WaveSense points out its technology isn't a replacement for current solutions, but a complement.

WaveSense is currently running pilots and is open to applications through a pilot contact form available online, for those interested in participating.

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