



Oxbotica

Experience Based Localisation

OXBOTICA

Summary

In 2017, Oxbotica successfully demonstrated off-road and on-road autonomous driving using just low cost stereo cameras for localisation and navigation.

The demonstration was the culmination of two successful phases of research, under DASA's **'Big Data & Autonomy'** programme, with the Oxford University spin-out. The work was based on a technique called Experience Based Localisation or EBL. EBL is a vision-only localisation system. Unlike many existing localisation systems it only requires a single stereo camera and does not rely on lasers or GPS. From a military perspective this has clear survivability benefits from the perspective of signature enabling covert operation.

EBL intelligently manages a local map of visual memories, and the prioritised recollection of past images to support time-constrained localisation. The first time a route is driven the on-board system captures the experience. Where locations appear different on subsequent occasions (e.g. time of day, weather, seasonal effects) the system selectively prioritises and adds experiences to the map.

Phase 1 analytically demonstrated that low cost vision based localisation system can work in off-road and unstructured environments and Phase 2 developed an off-road autonomous vehicle proving that the technology can operate in real-time vehicle control applications in unstructured environments.

DASA added value

- enabled Oxbotica to demonstrate the development and transfer of cutting edge autonomy research from the civilian market to military context
- helped grow domestic intellectual property
- supported further commercial exploitation

Did you know?

Despite the demonstrator being converted to full drive by wire it is still road legal. It can also operate autonomously in previously unmapped areas without relying on GPS.

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