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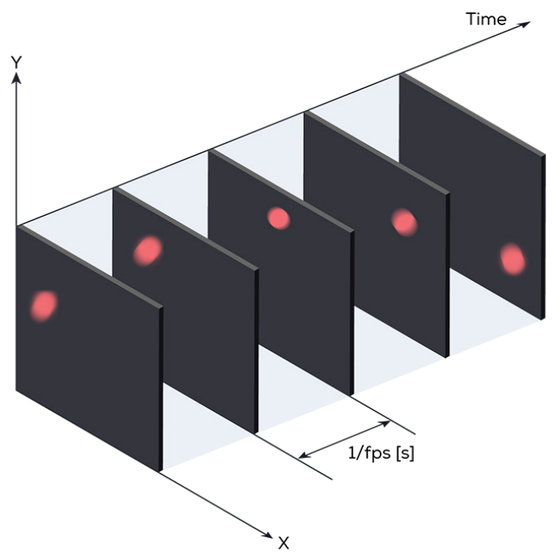
Underwater SLAM with Dynamic Vision Sensor

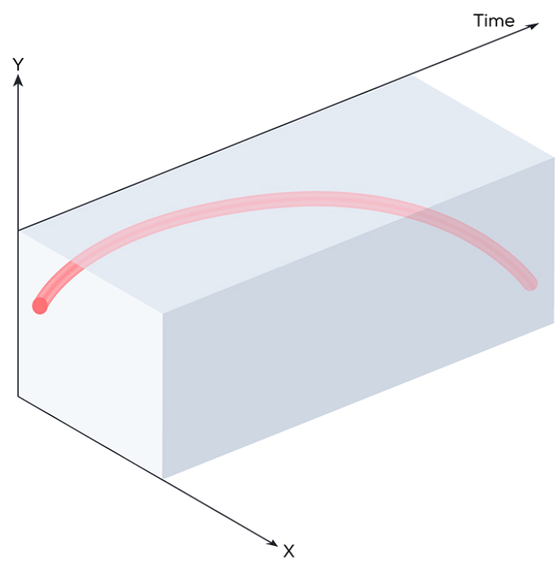
In an attempt to further the advancement in underwater navigation, we propose the use of a high dynamic range Event Camera for SLAM. This approach could potentially outperform traditional cameras, particularly in environments with limited visibility.

Event Camera

Conventional cameras create frames by exposing all pixels simultaneously. The Event Camera detects pixel-level brightness changes, and returns binary events asynchronously. Exceptionally adaptable to varied lighting conditions, from bright light to near-darkness, this technology seems promising in aiding underwater navigation, a largely untapped area of study.



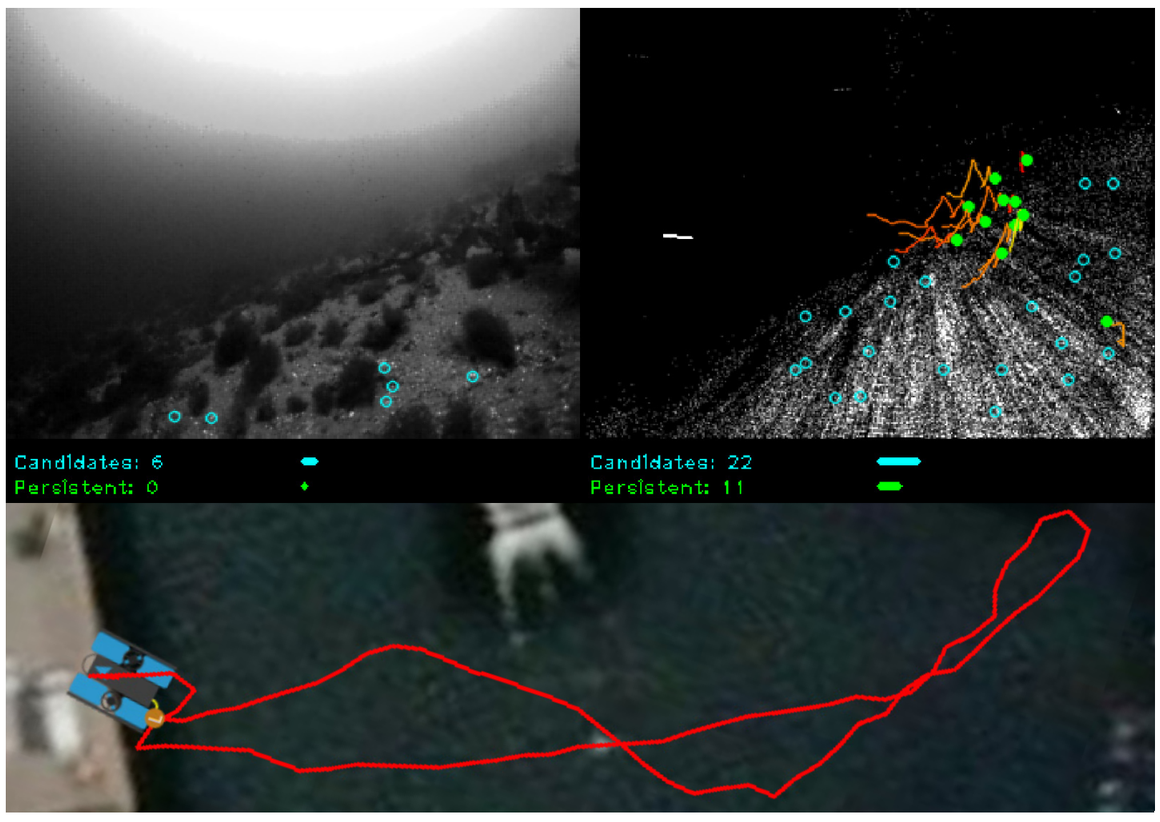
Conventional camera



Event camera

SLAM

Simultaneous Localization and Mapping (SLAM) is the process by which an agent builds a map of its surroundings while simultaneously positioning itself within it. This is similar to how your robot vacuum cleaner operates. Event-aided SLAM has been proven to significantly increase performance compared to standard-frames-only visual-inertial systems.



Remotely Operated Vehicle (ROV)

This is the BlueROV2 from Blue Robotics hosting our event camera and other key instruments. This customizable ROV is our primary tool for collecting data.

Group 9:

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Contribution

Beyond our initial exploration, we aim to increase the access to this high-tech field, fueling advancements in underwater navigation. Get access to our dataset along with instructions on how to replicate our setup and even contribute: