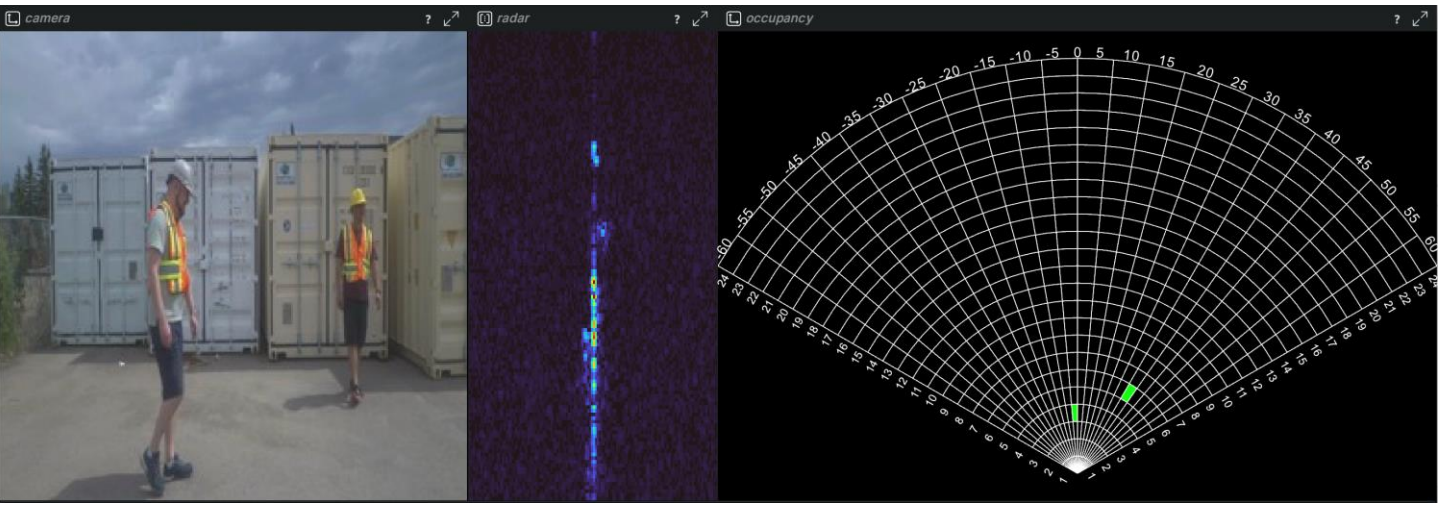
EdgeFirst Fusion Perception Engine - *Edge-Ready Software*

EdgeFirst Fusion Perception Engine (FPE) is the edge ready embedded software of the **EdgeFirst Studio** technology suite. EdgeFirst FPE is pre-optimized embedded software on Linux that enables perception system engineers to rapidly embed a trained EdgeFirst fusion ML model on a resourced constrained edge System-on-Chip (SoC) devices. FPE delivers superior detection performance in all weather and vision (dust) challenged conditions as compared to single modal or object level fusion perception stacks.



Processed output from Raivin fusion module: people detection birds-eye distance position grid

Key Features

- Edge-optimized low-level radar-camera fusion ML model
- User specific data collection, annotation, and retraining of fusion ML model in less than two weeks. No programming or AI experience required.
- Generates known object target lists with location in meters and angle from the device
- Edge-optimized, modular code, rich API, multi-Linux & IDE support, SoC portable
- Portable to various SoC platforms, custom imaging sensors and radar modules
- Customizable rich ROS2 compliant output data formats (*segmentation masks, bounding boxes, occupancy grid, object detection & localization, azimuth and elevation, object velocity)*

Major Benefits

- Superior detection performance in all weather or camera challenged conditions as compared to object level fusion or camera or radar alone
- Significantly reduced development time, cost and risk
- Ability to differentiate system implementation by addressing unique perception use cases

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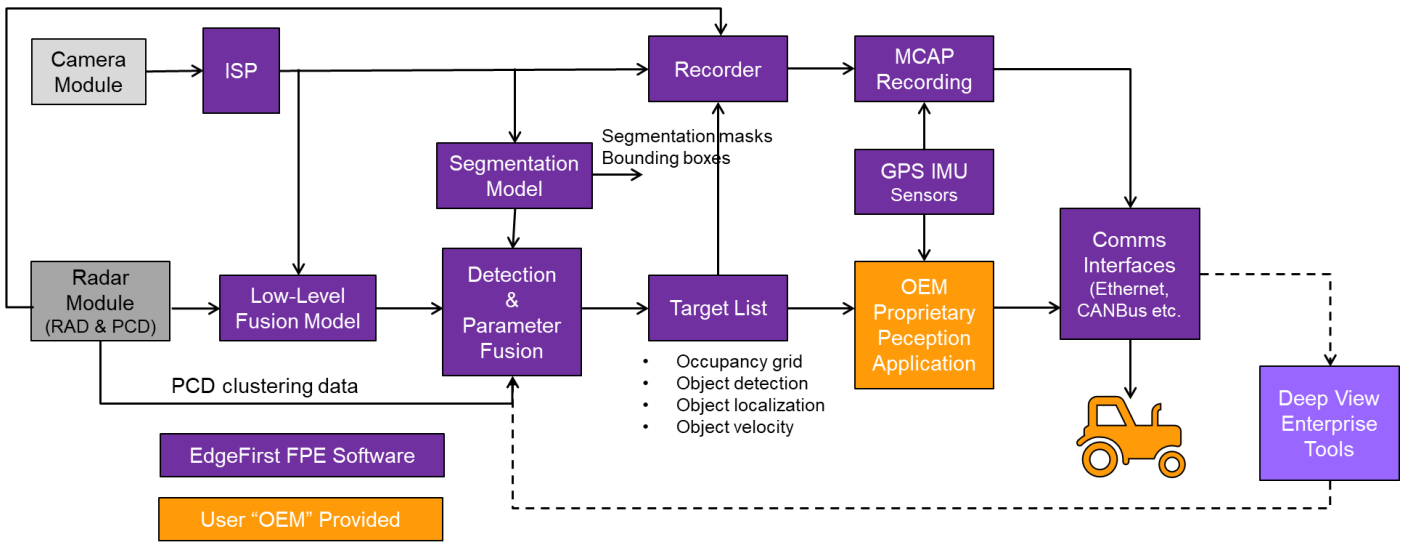
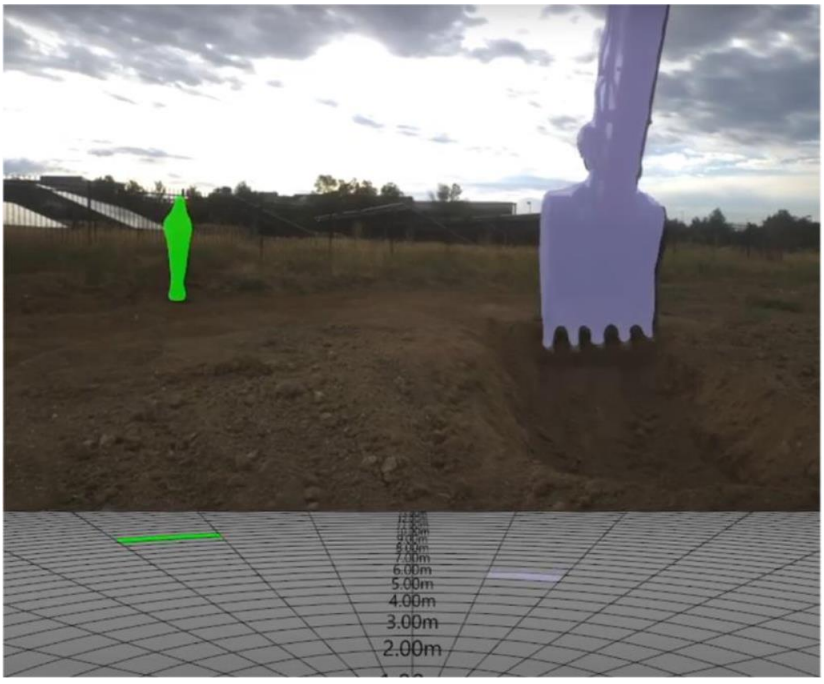
EdgeFirst Fusion Perception Engine – *Edge-Optimized*

EdgeFirst Fusion Perception Architecture- the major software functional blocks included in the licensed embedded software (APIs, object code and source) are illustrated below.



ISP: Image Signal Processing RAD: Range Azimuth Doppler data PCD: Point Cloud Data



Processed output from Raivin fusion module with model trained on people & excavator equipment. Pixel-level segmentation in camera view (top) Birds-eye view with distance and angle grid (bottom)

Messaging Protocols

- Zenoh
- HTTP + WebSocket
- ROS2 Bridge

Message Interfaces

- Camera H.264
- Radar PCD & RD
- Segmentation Masks
- Occupancy Grid
- Camera Pose
- Global Position GNSS

User Interfaces

- Web UI
- Foxglove
- Rerun