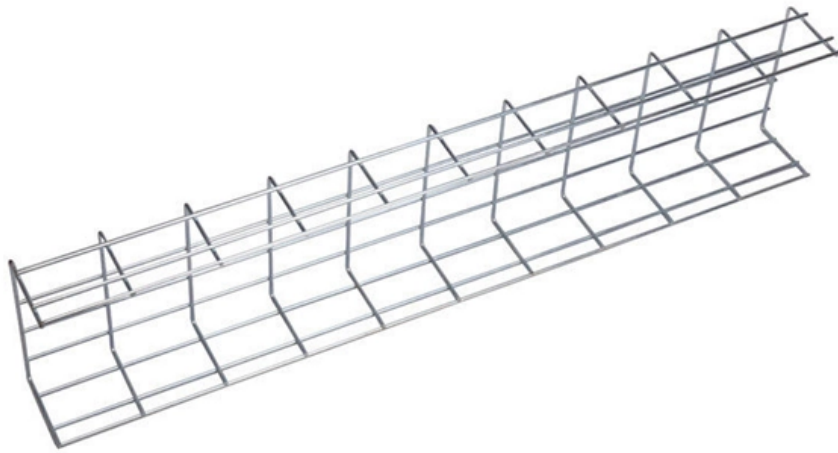


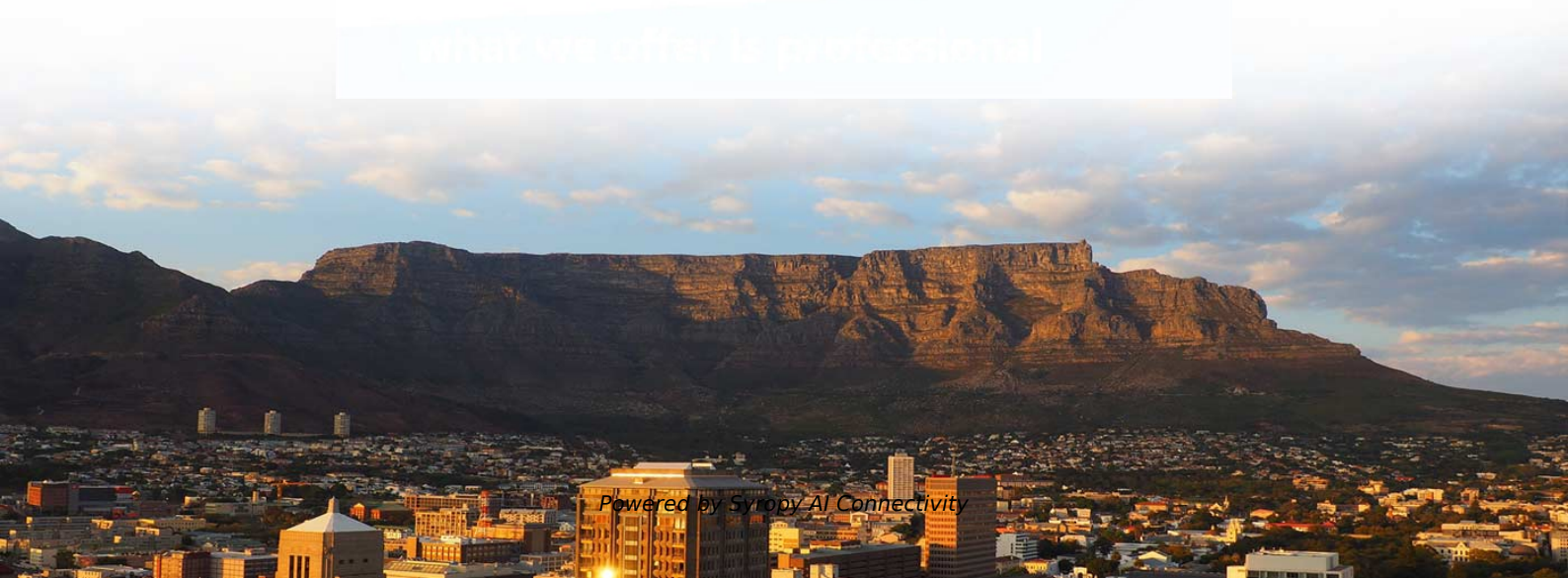


Syropy AI Connectivity

High-precision optoelectronic fusion for rail transit applications



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Overview

This paper proposes a real-time fusion algorithm of Ultra-Wideband (UWB) and Inertial Measurement Unit (IMU) information based on the Error-State Kalman Filter (ESKF) algorithm, aiming to achieve high-precision train positioning throughout the entire railway, particularly in tunnel. Moreover, accurate localization paves the way for a variety of advanced key applications such as Automated Train Operation (ATO), making it a prerequisite positioning at all times. Three core improvements were integrated: 1) AVCStem module with variable convolution kernels to dynamically adapt to defects of different shapes and scales; 2) ADSPPF module using multi-scale pooling and multi-branch attention mechanisms to preserve fine-grained features across scales; 3) MSF.



High-precision optoelectronic fusion for rail transit applications



HIGH-PRECISION TRAIN LOCALIZATION

New on-board localization methods using high precision satellite navigation, advanced sensors and sensor fusion technology provide accurate real-time information on the position and speed of any

An advanced subway train localization system using a vision-based

It also shows that the proposed vision-aided multi-sensor fusion method can be used as an alternative to the existing wayside-transponder-based localization system to provide navigation



A cost effective real time rail track monitoring system

We introduce a novel approach for real-time identification of missing rail tracks, offering a promising solution to enhance railway safety and mitigate the devastating consequences of

The nexus of intelligent transportation: A lightweight Bi-input fusion

Request PDF , On Jan 1, 2025, Hongjie Tang and others published The nexus of intelligent transportation: A lightweight Bi-input fusion detection model for autonomous-rail rapid transit , Find



Artificial-intelligent-powered safety and efficiency improvement for

This improvement elevates the efficiency and precision of regional rail transit capacity matching, expanding the scope of network control and optimizing decision-making.



A cost effective real time rail track monitoring system

Sensing the rail tracks This research proposes a distributed sensor network for real-time monitoring of rail track conditions.



Real-Time UWB and IMU Fusion Positioning System for Urban Rail

Real-Time UWB and IMU Fusion Positioning System for Urban Rail Transit with High Mobility
Published in: 2024 IEEE 99th Vehicular Technology Conference (VTC2024-Spring)





A multiple spatio-temporal features fusion approach for

Abstract Timely and precise short-term passenger flow forecasting (STPFF) is a key to intelligent urban rail transit (URT) operation. The uncertainty



Intelligent Technologies in High-Speed Rail Transit Systems

The intelligent systems used in high-speed rail need sensors for their functioning. Thus, sensor technology is the backbone of all these intelligent technologies mentioned in earlier sections.

RAE3D: Multiscale Aggregation-Enhanced 3D Object Detection for Rail

Point cloud-based 3D object detection technology provides precise information for detecting obstacles in front of trains. In rail transit scenarios, obstacles are usually located at a distance, and the sparsity of



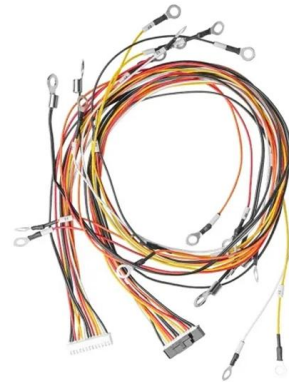
High-precision urban rail map construction based on multi-sensor

The key to building high-precision urban rail maps lies in the fusion of multiple sensors to identify and differentiate repetitive features while enhancing the recognition of sparse textures.



A Camera and LiDAR Data Fusion Method for Railway Object Detection

Object detection on railway tracks, which is crucial for train operational safety, face numerous challenges such as multiple types of objects and the complexity of train running environment. In this study, a



Research on speed sensor fusion of urban rail transit tra

In order to improve the operation safety and transportation efficiency of urban rail transit trains, a train speed ranging system based on embedded multi-sensor

Artificial intelligence in rail transit wireless communication systems

In the rail transit wireless communication scenario, resource management faces multiple challenges, including limited resource availability, high system complexity, and growing application



A Lightweight Camera and Lidar Fusion Framework for Railway Transit

In this paper, a LiDAR-camera-based fusion algorithm is proposed to improve the above-mentioned trade-off problems by constructing a Siamese network for object detection.



Research on speed sensor fusion of urban rail transit

In order to improve the operation safety and transportation efficiency of urban rail transit trains, a train speed ranging system based on embedded



Research on Highly Real-Time and High Precision Localization

In order to address the real-time high-precision localization needs in open-air and tunnel scenarios within the rail transit sector, this paper proposes a real-time matching localization method based on

Research on speed sensor fusion of urban rail transit

Abstract The speed sensor fusion of urban rail transit train speed ranging based on deep learning builds a user-friendly structure but it in-turn



High-precision urban rail map construction based on multi-sensor fusion

However, the repetitive features and sparse textures in urban rail environments pose challenges for map construction with high-precision. Motivated by this, this paper proposes a high-precision urban rail



An improved YOLOv8n with multi-scale feature fusion

Railway transportation is increasingly critical for modern urban and intercity mobility. However, the expanding scale and intensifying operational



Information fusion early warning of rail transit signal operation and

Abstract In order to improve the information fusion and early warning of rail transit signal operation and maintenance, this paper proposes a method based on big data of Internet of Things.

Rail Surface Defect Detection Based on Dual-Path

This study proposes a steel rail surface defect detection model based on dual-path feature fusion (DPF). The model is designed with two distinct paths



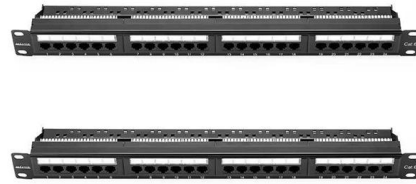
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Lightweight rail surface defect detection algorithm based on an

Existing deep learning methods for rail surface defect detection face issues such as poor compatibility with embedded detection systems, high computational resource consumption, and slow



Sustainable and smart rail transit based on advanced self-powered

Rail transit, which includes high-speed railways, subways, light rail, and other urban rail networks, plays an essential role in daily transportation activities. The enclosed tracks of rail

An Efficient Foreign Object Recognition Model in Rail Transit Based

The existing foreign object recognition methods have some limitations, such as imprecise extraction of railway regions and limited real-time performance. This study proposes a efficient



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