Description

Title of the Invention: System and Method for Learning a Generalized Model for Anomaly Detection in High-Resolution Radar

In this patent, a method and system for learning a generalized model is devised for multipath detection in high resolution radar. The system and method consist of the following components.

First, a diversified dataset was built that includes data from various and diverse sensor setups, various and diverse places, various and diverse weather conditions, and various and diverse traffic scenarios. Second, a model design and training component that applies the domain adaptation to train the generalized model on the diversified dataset. Domain adaptation is the learning of a well performing model from a source data distribution on a different (but related) target data distribution.

Third, a model compression component that compresses the generalized model to a very light version i.e., the version which has significantly lower computation requirements without sacrificing the performance. Light version is the implementable model version over embedded platforms. Finally, a model deployment component that deploys the light model on an embedded platform.

Brief description of the drawing

Component-01 stands for the dataset consisting of multiple datasets from different scenarios and different sensors.

Component-02 stands for the model design and training using multiple dataset.
The model design may consists of multiple stages in order to gain the benefit of diversified dataset and at the same time to adapt to the use case.
In one exemplary illustration, the first stage may be a pre-training stage that takes all the data regardless of the final application case for training. Then, the pre-trained model will be fine-tuned on the data mainly from the application case.

Component-03 stands for the model compression. That is to reduce the size and complexity of the model trained in order to make it suitable for practical deployment.

Component-04 stands for the model deployment, where the model developed, usually with Python coding language, will be deployed on the targeted hardware in C or C++.

Claims

Claim 1: A system and method for learning a generalized model of multipath detection in high resolution radar point cloud especially are devised.

Claim 2: A method and subsystem from claim 1 of building the diverse dataset considering radar dataset from 1) various and diverse radar sensor setup such as various and diverse radar specifications, various and diverse configurations of the radar mountings or attachments to the vehicle body or the object to which the radar is attached; 2) various and diverse places or environments; 3) various and diverse weather conditions; 4) various and diverse traffic scenarios.

Claim 3: A model design and training method from claim 1 that applies the domain adaptation to the diverse dataset to learn general multipath representation across datasets and at the same time learn the specific representation in the target domain.

Claim 4: A model compression method from claim 1 to compress the generalized model into a model with bare minimum complexity.