Towards Autonomous Driving Using Vision Based Intelligent Systems

Julkar Nine

Call for submission. This editorial introduces the third issue of 2021 for *Embedded Selforganising Systems (ESS)* journal. The focus of this issue is Situation Awareness and Autonomous Vehicles.

Our journal uses electronic publication, which provides a flexible way to submit and review contributions of authors from all of countries. The advantages of such an e-journal are multifarious. In comparison to traditional paper journals, we replace the classic review and creation process with a new Sliding Issue model. Each issue starts with an initial editorial and an official call for papers. The submitted articles will be reviewed and, if accepted, published as soon as the final version is received by the committee. Based on this process, each sliding issue can be filled successively until the maximum number of articles is reached. During this period, all accepted papers can, already be read by other researchers while other papers are still in the reviewing process. Accordingly, the time to publish shrinks to a minimum. In addition, multiple issues with different focus can co-exist at the same time, which provides completely new possibilities to react on latest research topics. The journal allows also the integration of discussions and other reactions on published articles in the same journal issue.

We are welcoming fresh ideas, on-going research technical reports and novel scientific works. We also intend to create a promising platform for creative and constructive discussions.

Towards Autonomous Driving Using Vision Based Intelligent Systems

Vision Based systems have become an integral part when it comes to autonomous driving. The autonomous industry has seen a made large progress in the perception of environment as a result of the improvements done towards vision-based systems. As the industry moves up the ladder of automation, safety features are coming more and more into the focus. Different safety measurements have to be taken into consideration based on different driving situations. One of the major concerns of the highest level of autonomy is to obtain the ability of understanding both internal and external situations. Most of the research made on vision-based systems are focused on image processing and artificial intelligence systems like machine learning and deep learning. Due to the current generation of technology being the generation of "Connected World", there is no lack of data any more. As a result of the introduction of internet of things, most of these connected devices are able to share and transfer data. Vision based techniques are techniques that are hugely depended on these vision-based data.

In order to make an accurate and efficient detection system, large amount of data is required to be trained and turned into a model. Then this model is used for the inference of the object that is supposed to be detected. It was not long ago that, data preparation played a vital role in the training of these models. Even after preparing data properly to fit a model, there are noticeable performance issues found. Along with this, it takes a lot of processing capabilities and time to train this large amount of data.

Hence, a lot of focus is given towards data optimization, even before the data gets trained. In this way, the amount data needed for training can be reduced and the much efficient result can be achieved. This is much more important when it revolves around autonomous driving. Autonomous driving focuses much more on safety then functionality. In order to have a safe and secure vision-based system, faster processing of data and accurate understanding of the surrounding environment is a must. Therefore, if data is optimized beforehand and then it is trained, it could result in such better performance and results.

This journal focuses on such systems and applications, which not only makes a vision-based detection but also highlights the evaluation that is needed for such systems.

Traditional computer vision is a combination of several image processing algorithms which utilizes different filters in order to detect or recognize an object. Although it is possible to detect or recognize multiple objects using computer vision, it increases the computation significantly and reduces the performance.

Artificial Intelligence techniques like Machine Learning and Deep Learning on the other hand, are widely used in the automotive industry. It is possible to train a machine learning model using "Support Vector Machines" for example, in order to inspect and recognize several objects in a frame as it serves as a feature extractor and a classifier. In contrast, deep learning neural networks like "Convolutional Neural Network (CNN)", it automatically identifies complicated patterns and perceives information from the frame and them classifies them into individual classes. Based on the performance requirements, any of these mentioned techniques can be used to perceive information from the environment.

The areas of vision based intelligent system has had a continuous and steady development over the past few years. This constant improvement has been intensified through the innovative research and contribution of researchers, developers, and practitioners from academia, industry, governmental and scientific organizations. The Embedded Selforganising Systems (ESS) journal aims to enable synergy between these areas and provides the premier venue to publish the latest research and developments related to research issues of the robust situation awareness in autonomous vehicles and its applications.

The Embedded Selforganising Systems (ESS) journal comprises a set of carefully selected tracks that focus on the particular challenges regarding deep learning and machine learning in computer vision applications. Topics of (ESS) journal include (but not limited to):

- Situation Awareness, Self-Awareness
- Computer Vision and Image Processing
- Machine learning and artificial intelligent systems analysis, modeling, simulation, and application in computer vision.
- Cloud Based Platform
- 3D computer vision.
- Image retrieval.
- Detection and Recognition.
- Machine learning for video and Image Processing.

SUBMISSION INSTRUCTIONS

Submissions for the journal must be made as complete papers (there is no abstract submission stage) submitted as PDF documents. Authors are requested to submit papers reporting original research results and experience. The page limit for regular papers is 4 to 6 pages and short papers are from 2 to 4 pages. Papers should be prepared using the IEEE two-column template. An MS Word template or ESS online journal is available here https://www.bibliothek.tu-chemnitz.de/ojs/index.php/cs/information/authors

Papers should submit following link of journal:

https://www.bibliothek.tu-chemnitz.de/ojs/index.php/cs/about/submissions

Submission Deadline: 11.12.2021

There is no charge for submission. Accepted papers are publishing free.

Review in 2 weeks after submission.

Camera ready paper for publication should be submit in 2 weeks after review notes.

Thanks in advance for Your Contribution!