Sensor fusion with Deep Learning

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***Abstract*—**

I. Motivation

Over the years the advancement in transistors technology made it possible to build computers with greater processing power.This also helped to solve more complex issues related to artificial intelligence.AI can be divided in two subsections which are machine learning and deep learning.The decision to use either of this two algorithm or to combine both in a project depend on the type of problem we are trying to solve. In this paper we will focus on deep learning with its application in the field of sensor fusion.We will define what sensor fusion is,explore the architecture of a multi-modal sensor fusion network.We will also use a practical example for illustration purpose and give advantages of DL in sensor fusion

II. Foundation

Deep learning extract patterns from data using neural networks with the aim to teach a computer how to learn a task using raw data[1]

The application of DL can be found in image recognition,speech recognition,big data and natural language processing.Autonomous vehicles use sensor fusion with a DL algorithm to be able to identify objects in their surroundings.Sensor fusion consist of combining data coming from multiple sensors.The aim of the is to get the highest possible accuracy of the parameters being measured or the environment that we are trying to monitor.Amongst all the DL achitecture available at the moment, we will be focusing on convolutional neural network.

DL for multimodal sensor fusion can be devided into two section

The achitecture of the multimodal network is as follow:[2]

- Unimodal neural network to process the different sensors input separately.
- Fusion network(combines the different features extracted)
- Classifier network(use the classified data to make decisions)

III. Convolutional neural network

A. *early fusion*

B. *intermediate fusion*

C. *late fusion*

IV. Practical case

V. Advantages Of using DL in Sensor fusion

Systems that use sensor fusion with DL are more consistent and accurate.

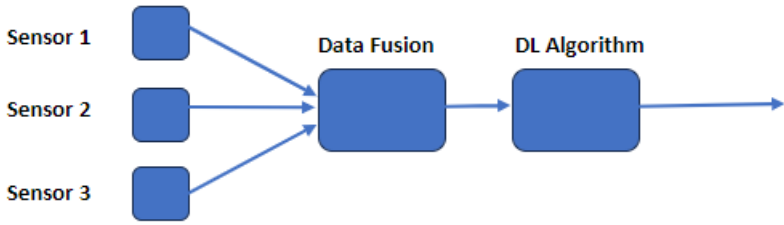

Fig. 1.

VI. Conclusion

References

References

[1] https://de.mathworks.com/videos/sensor-fusion-part-1-what-is-sensor-fusion-1569410785813.html