Teaching Deep Learning with Low-Cost Robots

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Deep Learning (DL) is a branch of machine learning in Artificial Intelligence which essentially takes advantage of a huge datasets to train neural networks. Then the algorithms developed in DL are, for instance, applied in self-driving cars, games to play go against top players or in face emotion recognition to mention but a few. The great impact of DL in recent years is also because of improvements in hardware development and mainly because of open source tools and libraries [MateLabs, 2017]. Additionally to that, there is a huge range of applications in areas such as robotics, transportation, medicine and last but not least in education. With this in mind, we propose to use a raspberry pi, a £30 board with GNU/Linux OS, connected with a mini arduino board, £2 board, servomotors and pi camera in order to create a simple low-cost educational robot where children can learn the basics concepts of deep learning [Durr et al., 2015]. Our general aim with the education robot is to perform some examples of convolutional neural networks to recognise six basic emotions: happy, sad, surprise, fear, anger and neutral [Ho, 2016, Ruiz-Garcia et al., 2016] in order to control the robot. For which, thought many didactic activities children can interact with the robot and learn concepts of robotics, linear algebra, machine learning, and deep learning.

We believe that teaching deep learning with low-cost robots can create both economical and pedagogical impact and children will be persuaded to work towards the creation of better living conditions to anyone, anywhere in the world.

References

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