

# FPGA accelerator fo Gradient Boosting Decision Trees (GBDT)

Access the repository [at this link](#)

**This repository contains the GBDT models and the source codes of the accelerator developed and described in the paper "FPGA Accelerator for Gradient Boosting Decision Trees", available on <https://doi.org/10.3390/electronics10030314>**

## FPGA Accelerator for Gradient Boosting Decision Trees

A decision tree is a well-known machine learning technique. Recently their popularity has increased due to the powerful Gradient Boosting ensemble method that allows to gradually increasing accuracy at the cost of executing a large number of decision trees. In this paper we present an accelerator designed to optimize the execution of these trees while reducing the energy consumption. We have implemented it in an FPGA for embedded systems, and we have tested it with a relevant case-study: pixel classification of hyperspectral images. In our experiments with different images our accelerator can process the hyperspectral images at the same speed at which they are generated by the hyperspectral sensors. Compared to a high-performance processor running optimized software, on average our design is twice as fast and consumes 72 times less energy. Compared to an embedded processor, it is 30 times faster and consumes 23 times less energy.