



FPGA FOR EDGE

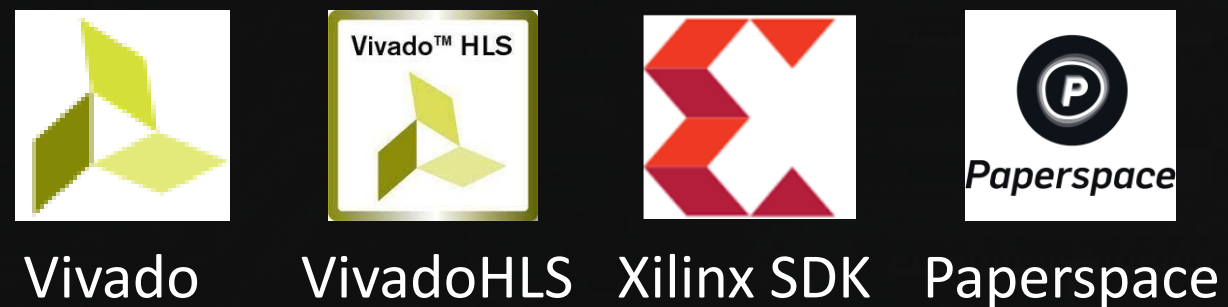
ANUPAM KURIEN MATHEW, DAN MANI BINU, HARI VIKINESH
MENTORS : ISHA KAMONE, LOHIT PENUBAKU



OBJECTIVES

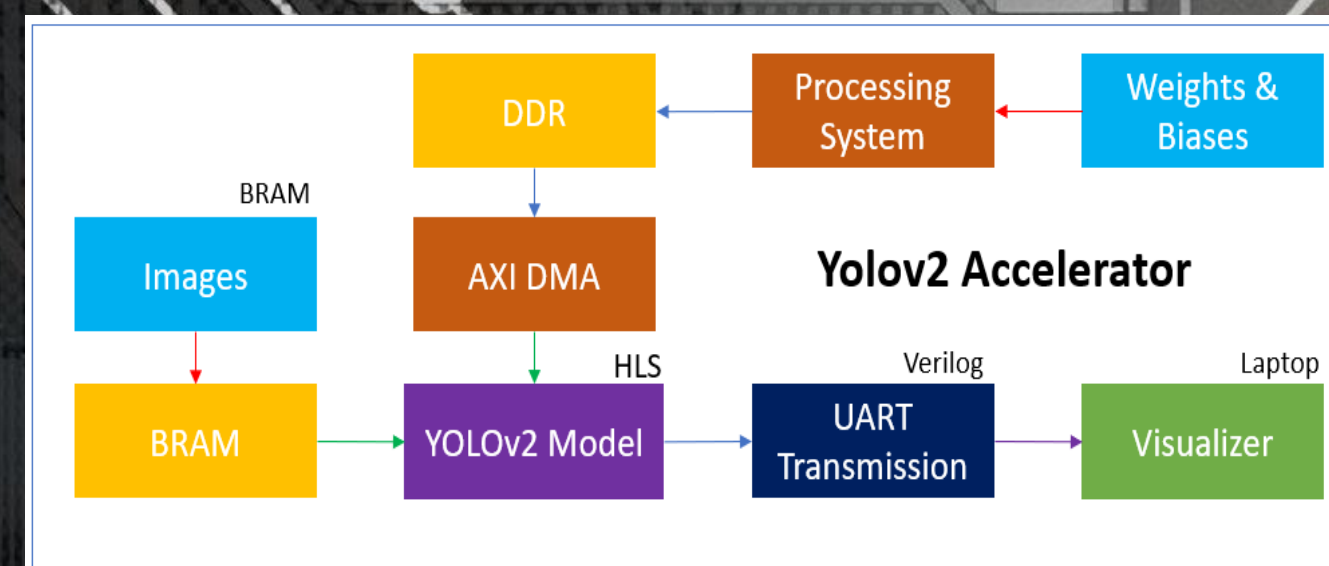
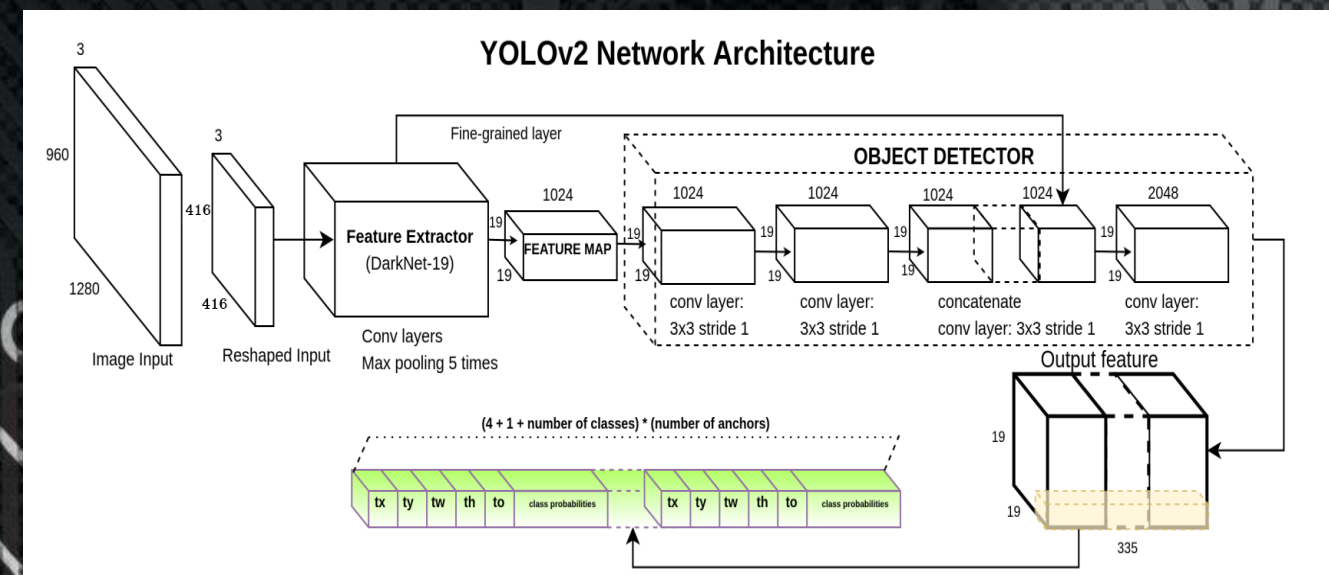
- To implement ML Model on FPGA for agricultural applications.
- To compare the performance of the FPGA with CPU and GPU.

SOFTWARE USED



HARDWARE USED

- ZedBoard
- Nexys Video Board



APPROACH

- Develop object detection models using Paperspace.
- Compare the performance of the model to choose the ML model for deployment on the FPGA.
- Understanding HLS systems & Xilinx FPGA.
- Implementing Edge detection algorithms on FPGA.
- Implementing YOLOv2-tiny on FPGA
- Performance Analysis using python tools.

Platform	ZedBoard	Nexys Video	Xilinx Zynq ZC702
Frequency (MHz)	100	100	100
BRAMs (KB)	810	890	630
DSPs	139	148	140
LUTs	51.4K	40.2K	36.1K
FFs	31.4K	31.4K	36.8K
CNN Size	42.3	42.3	14.5
Precision	32-bit float	32-bit float	8-bit fixed
Image Size	64x64	64x64	-

RESULTS AND CONCLUSION

- Yolo algorithm has high learning capabilities, accuracy, speed, and a well-defined regressor.
- The performance of the model has an accuracy of more than 90%
- On comparing the FPGAs Nexys video outperforms the ZedBoard and ZC702.
- If a comparison between cost and power efficiency is calculated then FPGA suits better than CPU and GPU.

```

file or directory
2022-07-21 21:08:57.733105: I tensorflow/stream_executor/cuda/cudart_stub.cc:29] Ignore above cudart dlerror if you
Tensorflow version is 2.3.0
[105.12592302159987, 42.96117566242765, 361.96245188924513, 378.57403498600553, 0.9700815064775213, 'tomatoleaf']
21:08:58
Object Detection completed in 290 ms

```

