

Task-7

By Group-6

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(a) Prepare your own use case report for any of the given ICs (FPGA/ASIC/SoC) and its application in a real-time application scenario

Real time edge Detection using FPGA

Introduction

Edge detection of an image is done in FPGA boards, now well popular AI-based applications are using Computer vision for image-related applications. This Computer Vision is now possible in FPGA through Python compatibility in PYNQ boards.

Abstract

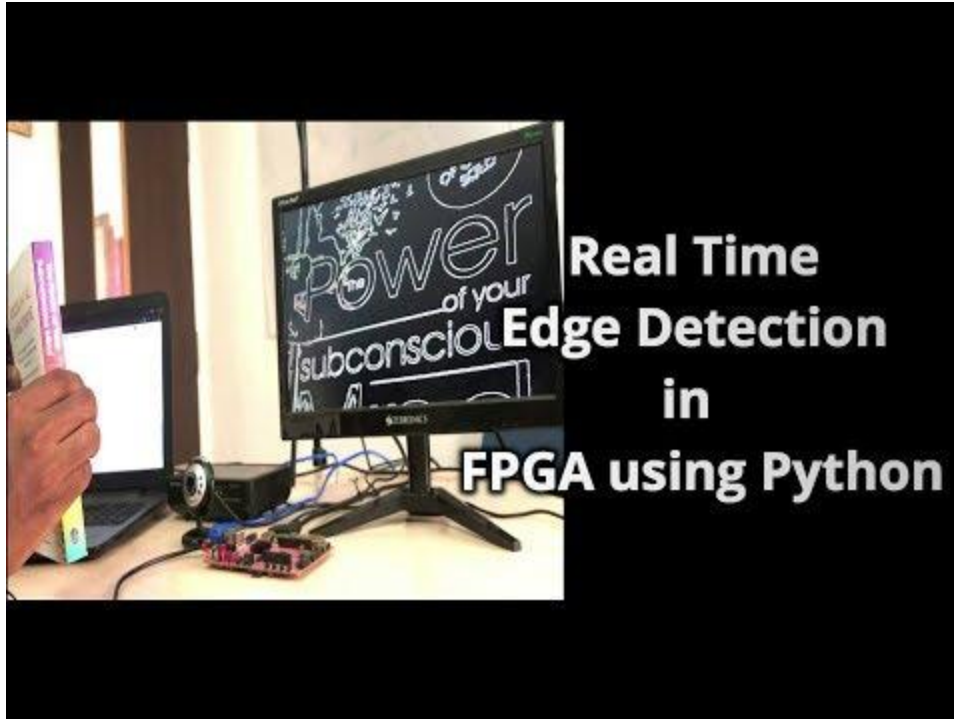
In this project, USB Camera is connected with the PYNQ Z2 board. Video is streamed to the monitor connected to the HDMI OUT port of PYNQ board. Edge detection technique like Canny edge detection is developed using Computer vision by using Jupyter notebook, it applies to that video frames to result and display the edge detected video stream to the Monitor.

Existing System

In the existing system, programming in FPGA is difficult to apply edge detection to the camera feed.

Proposed System

In this proposed system, through the python programming, developing the image related application becomes easy, when PYNQ FPGA is compatible with Python. It becomes easy to develop Computervision-based application in the PYNQ.



Connection description

USB Camera is connected to the USB port of the PYNQ Z2. HDMI Monitor is connected to the HDMI output port of the PYNQ Z2.

Project description

In this project, ComputerVision-based edge detection algorithm is applied to the real-time video using Python Programming. The result will be displayed on the monitor as a video stream with edge detection applied.

Hardware required

- PYNQ Z2
- Router
- Laptop/PC
- USB Camera

Software required

- PYNQ Z2 boot image
- SD Card Formatter
- Etcher/Win32 disk imager

Result

In this project, you will see the computation of PYNQ FPGA performs real-time video processing with High frame rate the computer needs to be connected to the router using a wired connection (Ethernet cable). The router can be connected to the internet wirelessly (Wi-Fi) .he discuss real-time extraction using OpenCV and Python