

GSOC 2020 Ideas

We have started 2021 GSOC application. Please check the ideas here: <https://01.org/linuxmedia/news/gsoc-2021-ideas>

Projects that we maintain:

- SOF: <https://github.com/thesofproject>
- FFmpeg-QSV, FFmpeg-NN: QSV and DNN in <https://ffmpeg.org/>
- gstreamer-vaapi: <https://cgit.freedesktop.org/gstreamer/gstreamer-vaapi/>
- gstreamer-MediaSDK: <https://cgit.freedesktop.org/gstreamer/gst-plugins-bad/tree/sys/msdk>
- libxcam: <https://github.com/intel/libxcam>

Projects where we actively participate:

- FFmpeg vaapi and filters
- Gstreamer plugins

LIST OF PROJECT IDEAS:

SOF

Improve SOF topology generator usability

Description: To optimize or design a more user friendly topology generator. At this time, the topology generator (<https://github.com/thesofproject/sof/tree/master/tools/topology>) is written by M4 and the macro language is hard to debug and use. Writing some scripts to make a generator would make generating a topology more easy to debug and user friendly.

Difficulty: Medium

Skill Required: C, Python, Bash, or other scripts language.

Optional Skills: Familiar with ALSA topology (https://www.alsa-project.org/main/index.php/ALSA_topology)

Hardware required: SOF support Intel PC

Possible mentor:

Sridharan, Ranjani (ranjani.sridharan@intel.com)

Pan, Xiuli (xiuli.pan@intel.com)

Port SOF to the ESP32 SoC

Description: ESP32 is a popular SoC, featuring WiFi and Bluetooth Low Energy for connectivity, as well as a number of additional peripherals and audio DSP functionality. The SoC is produced by Espressif and is based on the Xtensa LX6 dual-core CPU from Cadence. It belongs to the same architecture as all other DSPs, on which SOF is already running. The result of this project should be running SOF on one of ESP32-based audio kits like <https://www.espressif.com/en/products/hardware/esp32-lyratd-msc> and enabling as much of its functionality as possible.

Difficulty: Medium

Skill Required: C, embedded

Optional Skills: assembly, hardware

Hardware requirement: one of ESP32-based audio kits, can be purchased upon project begin

Possible Mentor: Liakhovetski, Guennadi (guennadi.liakhovetski@intel.com)

LibXCam

General depthmap based on 360 dual/stereo camera (eg. Kandao)

Description: To generate depth map based on 360 dual/stereo camera.

Difficulty: Medium

Skill Required: C/C++

Optional Skills: OpenCL/OpenCV/Image processing algorithm.

Hardware Requirement: Intel based PC

Possible mentor: Zong, Wei (wei.zong@intel.com)

Enable HDR10+/HDR10/HLG based on different exposure images

Description: To investigate HDR algorithms based on 2 or 3 Low, (mid), long exposure images into one clear image. Enable the HDR feature into libxcam (<https://github.com/01org/libxcam>). Performance improvements based on Intel CPU/GPU also need to be considered.

Difficulty: Medium

Skill Required: C/C++/OpenCL

Optional Skills: OpenCL/OpenCV/Image processing algorithm.

Hardware Requirement: Intel Skylake+ based PC

Possible mentor: Zong, Wei (wei.zong@intel.com)

Title: Add face anti-spoofing 3D Mask function for libxcam

Description: Design and implement an face anti-spoofing solution by using DNN technique and Intel RealSense camera. Add related APIs into libxcam. Cook a sample program to use anti-spoofing API.

Difficulty: Medium

Skill Required: C/C++/python

Optional Skills: OpenCL/OpenCV/Image processing algorithm.

Requirement: Intel Skylake+ based PC, Intel RealSense camera

Possible mentor: Wu, Zhiwen (zhiwen.wu@intel.com) Zong, Wei (wei.zong@intel.com)

Gstreamer

Enable vaapi based hw decoder on gst-libav

Description: Gst-libav is an important component in gstreamer. Gstreamer use it to decode/encode almost all video formats in world. However, after many years development, gst-libav still can't support hw codec. Let us identify the gap and provide necessary patch to fill this gap. The student need modify the gst-libav/gstreamer code to enable hw decoder in gst-libav. The implementation must not copy memory from decoder to renderer(zero copy)

Difficulty: Hard

Skill Required: C, gstreamer

Optional Skills: git

Hardware requirement: Intel CPU with integrated GPU since Haswell

Possible Mentor:

Xu Guangxin <Guangxin.Xu@intel.com>

Xiang, Haihao <Haihao.Xiang@intel.com>