Developing an Industrial Machine Vision Application using Mentor Embedded Linux on AMD R-series SOC with Qtechnology Cameras

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Agenda

- Qtec Camera
- Sensors
- Show me the money!!
- Sourcery Analyzer
- Q & A
Camera Architecture

HEAD

Sensor

LVDS

FPGA

PCle

BODY

APU

PCle

GPU

User Application

Open Source APIs

Mentor Embedded Linux

SOFTWARE

Video4Linux2

Linux

OpenCL

Qtec.com
Software

User Application
User Application
User Application
User Application
User Application
OpenCV
Python™
Gstreamer
Third Party libs
libv4l2
Video4Linux2
Kernel
Sensors
Bio-Sensor

Image Credit: Wikipedia CC BY-SA 3.0
Sensor

Image Credit: Wikipedia CC BY-SA 3.0
Other sensors

Image Credit: Wikipedia CC BY-SA 3.0
Show me the money!
Sensor Selection:
Sensor Selection:

FAKE

FAKE

FAKE

FAKE
Sensor Selection:

REAL

FAKE
Various security features have been incorporated into all euro banknotes to protect them against counterfeiting. It is very easy to check a euro banknote of either series by using the simple FEEL, LOOK and TILT method.

1. Infrared properties
Under infrared light, on the front of the banknote, only the emerald number, the right side of the main image and the shiny strips are visible. On the back, only the value numeral and the horizontal serial number are visible.
Live demo!
Gstreamer

- Pipeline Based
- Hundreds of plugins
- Multithreaded pipelines
- Low overhead
- Good debugging system
int main (int argc, char *argv[])
{
    GError *error = NULL;
    GstBus *bus;
    GMainLoop *loop;
    GstElement *pipeline;
    guint bus_watch_id;

    gst_init (&argc, &argv);
    loop = g_main_loop_new (NULL, FALSE);
    pipeline = gst_parse_launch ("v4l2src num-buffers=600 ! video/x-raw,width=2040,height=1080,framerate=100/1 ! euronote ! videoscale ! video/x-raw,width=1024,height=768 ! videoconvert ! video/x-raw,format=I420 ! fakesink", &error);
    bus = gst_pipeline_get_bus (GST_PIPELINE (pipeline));
    bus_watch_id = gst_bus_add_watch (bus, bus_call, loop);
    gst_object_unref (bus);
    gst_element_set_state (pipeline, GST_STATE_PLAYING);
    g_main_loop_run (loop);
    gst_element_set_state (pipeline, GST_STATE_NULL);
    gst_object_unref (GST_OBJECT (pipeline));
    g_source_remove (bus_watch_id);
    g_main_loop_unref (loop);
    return 0;
}
Sourcery Analyzer
Live demo!
## Results

<table>
<thead>
<tr>
<th></th>
<th>FPS</th>
<th>Latency</th>
<th>Gstreamer change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base</strong></td>
<td>20 FPS</td>
<td>45 ms</td>
<td></td>
</tr>
<tr>
<td><strong>Resized</strong></td>
<td>50 FPS</td>
<td>20 ms</td>
<td>videoscale ! video/x-raw,width=800,height=600</td>
</tr>
<tr>
<td><strong>Queue</strong></td>
<td>60 FPS</td>
<td>400 ms</td>
<td>queue</td>
</tr>
<tr>
<td><strong>Size=1</strong></td>
<td>100 FPS</td>
<td>35 ms</td>
<td>queue max-size-buffers=1</td>
</tr>
</tbody>
</table>
More Information

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