Efficient Video Streaming for DSP

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Abstract

Digital Signal Processor and Real-Time Streaming are two very hot topics in engineering field. This project aims at implementing and optimizing an efficient video recording and streaming system on DSP platform.

To implement the project, the old codec was first ported onto the DSP (TMS320DM642) after if was analyzed and improved.
I optimized the program using several methods ranging from the very high level algorithm optimization, pure C language optimization, compiler optimization to very low level assembly language optimization and memory optimization.

Proposed User Interface
Results

<table>
<thead>
<tr>
<th></th>
<th>After Optimization</th>
<th>Before Optimization</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Frames</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Clock Cycles</td>
<td>240820394</td>
<td>1100141322</td>
<td>- 859320928</td>
</tr>
<tr>
<td>Frame Rate</td>
<td>29.9</td>
<td>6.5</td>
<td>+ 23.4</td>
</tr>
</tbody>
</table>

The encoder has been successfully optimized. The resulting frame rate for particular video sequences can be as high as **40 fps** in CIF format. In average, this figure would be **30 fps** compared with about 10 fps of previous project.

Conclusion & Further Work

The final result has successfully met the goal set at the very beginning of the project which is to optimize the H.264 encoder on TMS320DM642 so that the overall frame rate can reach 30fps in CIF format.

Further work can be explored especially in the algorithm level.