Objective:

The objective of this project is to implement and evaluate performance of various profiles of AVS china [1]: Jizhun (base) profile, Jiben (basic) profile, Shenzhan (extended) profile and Jiaqiang (enhanced) profile. These profiles are evaluated on the basis of the following parameters for various quantization parameter values.

- PSNR (Peak signal to noise ratio)
- MSE (Mean squared error)
- SSIM (Structural similarity index metric) [2,3]
- MSSSIM (Multi-Scale SSIM) [4]
- 3-SSIM [5]

Theory:

The Audio Video Coding Standard of China (AVS) video standard is a streamlined, highly efficient video coder employing the latest video coding tools and dedicated to coding HDTV content. All video coding algorithms comprise an optimization between absolute coding performance and complexity of implementation. Compared with other standards, AVS has been designed to provide near optimum performance and a considerable reduction in complexity. AVS will therefore provide low-cost implementations. [6]

AVS-China consists of four profiles namely: Jizhun (base) profile, Jiben (basic) profile, Shenzhan (extended) profile and Jiaqiang (enhanced) profile, defined in AVS-video targeting to different applications.

**AVS-video Jizhun profile (base profile)**

Jizhun profile [6] is defined as the first profile in the national standard of AVS Part, approved as national standard in 2006, which mainly focuses on digital video applications like commercial broadcasting and storage media, including high-definition applications. Typically, it is preferable for high coding efficiency on video sequences of higher resolutions, at the expense of moderate computational complexity.

**AVS-video Jiben profile (basic profile)**

Jiben profile [6] is defined in AVS-Part 7 targeting to mobility video applications featured with smaller picture resolution. Thus, computational complexity becomes a critical issue. In
addition, the ability on error resilience is needed due to the wireless transporting environment. AVS Part 7 reached to final committee draft at the end of 2004.

AVS-Shenzhen profile (extended profile)
The standard of AVS-Shenzhen [6] focuses exclusively on solutions of standardizing the surveillance applications. Especially, there are special features of sequences from surveillance, i.e. the random noise appearing in pictures, relatively lower encoding complexity affordable, and friendliness to events detection and searching required, so corresponding techniques considering a proper process on these special features will be encouraged in the condition of compatibility to AVS-Part 2.

AVS-Jiaqiang profile (enhanced profile)
To fulfill the needs of multimedia entertainment, one of the major concerns of Jiaqiang profile [6] is movie compression for high-density storage. Relatively higher computational complexity
can be tolerated at the encoder side to provide higher video quality, with compatibility to AVS Part 2 as well.

Fig 2. AVS decoder [9]

<table>
<thead>
<tr>
<th>Profiles</th>
<th>Key Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jizhun profile</td>
<td>Television broadcasting, HDTV, etc.</td>
</tr>
<tr>
<td>Jiben profile</td>
<td>Mobility applications, etc.</td>
</tr>
<tr>
<td>Shenzhen profile</td>
<td>Video surveillance, etc.</td>
</tr>
<tr>
<td>Jiaqiang profile</td>
<td>Multimedia entertainment, etc.</td>
</tr>
</tbody>
</table>

Table 1. AVS China profile applications

References:

2. [http://www.ee.uta.edu/dip/courses/ee5356/ssimzhouwang.pdf](http://www.ee.uta.edu/dip/courses/ee5356/ssimzhouwang.pdf) : SSIM PPT by Dr. Zhou Wang
3. [https://ece.uwaterloo.ca/~z70wang/research/ssim/](https://ece.uwaterloo.ca/~z70wang/research/ssim/) : SSIM Website