Computer Application for Sport: 
SMART-system
A Video Database for Sports

Chikara Miyaji
Associate Director of Sports Sciences,
Japan Institute of Sports Sciences
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Why I created a video database?

- Coaches and staffs have thousands of videos
- Video is the main tool for training
- Coaches and athletes want to share videos
SMART-system is a Video database For Sports

- Sports Oriented Viewing
- Easy searching method
Distributed Streaming servers

- Streaming server
- Authentication gateway

The Internet

Metadata servers in JISS

- Search server
- Movie server
- Logging server

The Internet

Client: SMART-viewer
Brief history of SMART-system

- 2002: A commercial software was used
- 2003: Modify the commercial software
- 2004: We need our software!
- 2005: Video database Project was started
- 2006: Trial use with several NSF
- 2007: Public Announce of SMART-system
- 2008: Used for Beijing Olympic
- 2009: New SMART 2.0 project was started
- 2010: Used for Vancouver Winter Olympic
- 2011: SMART 1.5 was released
Who archives the Content?

- JISS provides the system
- Federation puts videos
### The slide I used for the last Forum in Beijing

**2007.3.31**

<table>
<thead>
<tr>
<th>Sports</th>
<th>Movie</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judo</td>
<td>1312</td>
</tr>
<tr>
<td>Synchronised Swimming</td>
<td>2140</td>
</tr>
<tr>
<td>Mogul</td>
<td>625</td>
</tr>
<tr>
<td>Volleyball</td>
<td>159</td>
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<tr>
<td>Aerial</td>
<td>43</td>
</tr>
<tr>
<td>Table Tennis</td>
<td>86</td>
</tr>
<tr>
<td>Training</td>
<td>134</td>
</tr>
<tr>
<td>Tokyo Olympic</td>
<td>30</td>
</tr>
<tr>
<td>Sapporo Winter Olympic</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4536</strong></td>
</tr>
</tbody>
</table>
How SMART grows?

- Users: 1765
- Archived files: 96360

The last Forum  This ASPC Forum
## Customers of SMART-system

<table>
<thead>
<tr>
<th>Sport</th>
<th>Archived Files</th>
<th>Registered Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judo</td>
<td>24732</td>
<td>101</td>
</tr>
<tr>
<td>Artistic Gymnastics</td>
<td>11426</td>
<td>42</td>
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<tr>
<td>Speed Skate</td>
<td>10960</td>
<td>274</td>
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<tr>
<td>Synchronised Swimming</td>
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<td>102</td>
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<tr>
<td>Moguls</td>
<td>7497</td>
<td>64</td>
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<td>Canoe</td>
<td>3687</td>
<td>38</td>
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<tr>
<td>Wrestling</td>
<td>1003</td>
<td>28</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Total</td>
<td>96360</td>
<td>1765</td>
</tr>
</tbody>
</table>
SMART-system is used

- Archiving world class competitions
- Giving quick feedback at the competition
- Recording daily training
A topic on Judo:
This Log tells one judo club used SMART extensively just before Beijing Olympic.
The club’s top player: Ms. Ueno explains how they use SMART.
| ナメル | 順 | 特徴 | 後 | 陸 \(\times\)
|---|---|---|---|---
| エマネ・ギブリス | フランス | 基本は右組だが面組を絞る。絞を決めた後、背負、背負＋背負を絞る | 南方の逆方向を、背負、背負＋背負を絞る | 
| ローカー・ロンド | アメリカ | 左組を持ち、グネネをしている | 逆方向を、背負＋背負を絞る | 
| ダスケ・アレット | ハンガリー | 左組を絞る。背負＋背負を絞ると背負＋背負を絞る | 外組、背負、背負＋背負を絞る |
She uses SMART for

- Checking all her rival’s video
  - List up all their techniques
  - Train with her partner to overcome rival’s techniques

She said
“I know how to react to the opponent because of the simulation training.”
Her coach told

- Video is very useful when athlete watch it with purposes.
Synchronized Swimming:
SMART-system was started from the video support for Synchronized Swimming

- 2002 Japan Open (Use a commercial soft)
- 2003 Japan Open (Use the commercial soft)
- 2004 Japan Open (Use the commercial soft)
- 2004 World Grandprix (modify the commercial soft)
- 2005 Japan Open (modify the commercial soft)
- 2006 Japan Open (Start using SMART-system)
- 2006 FINA World-Cup (SMART-system)
- 2007 Japan Open (SMART-system)
- 2008 Japan Open (SMART-system with the Internet)
- 2009 Japan Open (SMART-system with HD video)
- 2010 Japan Open (SMART-system with TWINS CAM)
- 2011 Japan Open was Cancelled
On a video feedback booth
On a video feedback booth
On a video feedback booth
TWINS CAM Project with NHK
TWINS CAM: an experimental cameras by NHK
TWINS CAM has two remote cameras
Concept of TWINS CAM

Above water camera

Under water camera
Combine two views

Above water camera

Under water camera
Service to Athletes just after their performance

SMART system

PCs
All TWINS CAM videos are on SMART
TWINS CAM will appear on London Olympic TV
How SMART is managed and developed?

– We have SMART management team
  • 3 engineers
  • 1 manager from a sports federation
– We have projects for new development
  • Direct video uploading project
  • SMART 1.5 project
  • SMART 2.0 project
– SMART on HKSI project
SMART 1.0

SMART 1.0 Core

SMART-viewer
SMART 1.5

1.5 Wrapping

SMART 1.0 Core

Web Browser

SMART-viewer

iPhone/iPad
SMART 1.5 on iPhone
SMART 1.5 on iPad
Now Judo Federation uses 40 iPads for their top players.
SMART 2.0 Features

- Advanced Research Project for new SMART
- SMART 2.0 has
  - New video browsing capabilities
  - New server construction
  - New mechanism for synchronizing video with web page
Current video browsing (like YouTube) is limited

- only play and pause
SMART 2.0: Trick Plays
SMART 2.0: Special browsing

Like “MATRIX”
Where SMART goes?

- SMART will be an Open Source

- Share system with other Sports Institute
  - A project with Hong Kong Sports Institute

- SMART will be the base of other video applications
  - Motion analysis tool, tactical analysis tool etc.
Where sports video archives goes?

Each Institute or Sport foundation archives world class competitions

Share videos with several Institutes and Federations
- Reduce cost
- No secret on videos

IF will organize world class competition videos
- National Sports Institutes will help archiving
video archives of world class competitions will be

- Archives all matches and events.
- Anybody can access these archives.
- Archives should be more than 10 to 20 years span.
Summaries:

- Video support requires integrated solution such as camera, archiving, and browsing.
- Each Sport has different needs on video.
- Technology can contribute for better support.
- Now is the start to archive sports movements.

Thank you