An Access Control Model for Video Database Systems

As a joint work of:
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Video Data Model

- Video Stream
- Video Object Occurrence
- Video Segment
- Frame Sequence
- Video Object
Video Data Model (Cont.)

(A Scene from Jurassic Park II):

Video Object

video stream (sequence of frames)

video segment (sequence of frames)
Authorization Model for Video Databases

Consists of:

- Authorization rules,
  - who is allowed to access what in the database.
- control procedures,
  - enforcing the rules while transactions proceed.

Authorization rule specification entails:

- Subject (who), object (what), and mode (of access) specification.
Authorization Model (Cont..)

- Subjects are specified using credentials.
  - Example: (Name: John, Age: 8, Job: student,……).
  - Credential type, credential, and credential expression.
  - E.g (Viewer(x) ^ (x.age > 18))

- Object are specified by using their contents and following the previous video model.
  - video content (e.g. the annotation associated with the video)
  - Object expression
    - E.g. (x.annot contain 'Charles De Gaulle') DURING (y.annot contain 'World War II')
  - Protected and restricted objects

- Mode represents the operation on video:
  - view(annotation),
  - play (period, quality),
  - edit (annotation, video)
System Architecture

End User

Authorization rules base
Authorization Manager
GUI
Security Administrator

Application Programs

Access Control Manager
Credentials base
Filtering Effect Manager

VDBMS

Video Data Manager
Contents Manager
Other Components of VDBMS
Conclusion and future work

- Provide access control based on video semantic not only physical features.
- Support for different video granularity access control.
- Provide categories of video privileges.
- Use of credentials instead of just identifiers.
- The model can be adapted to video models that provide content description mechanisms (MPEG-7).
- We consider the following as future work:
  - Distributed implementation.
  - Interaction with blocking standards (PICS - *Platform for Internet Content Selection*).