



**EXPERT PANEL MMEDIA/MOPAS**  
**Tuesday, May 1st 2012 Chamonix**

# **Advances in Content Building and Retrieval**

**Moderator**

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**Panelists**

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**David Newell, Bournemouth University, UK**

# The Design of an Adaptive Multimedia Presentation System

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# Structure of Presentation



- Nature of *adaptivity*
- Learning objects (Segments)
- Linking Learning Objects
- Practical Design
- Structure of an E-Learning Prototype
- Segment Relationships
- Mechanisms for Adapting Presentation Content
- Segment and Segment Level Entities
- Segment Level Entity Data
- Authorship of Content
- Structure of Learning Segments
- Demonstration of the Prototype
- Questions

# Nature of Adaptivity



- Adapt the presentation based on learner characteristics
- Divides into two main mechanisms:
  - Link-level Adaptivity, (Navigational)
  - Content-level Adaptivity
- Canned Text Adaption, (Brusilovsky, 2001)
- Can be used with segments of AV material
- Requires splitting up content into objects

# Learning Objects (Segments)

- *any entity, digital or non-digital, which can be used, re-used and referenced during technology-supported learning*
- Based on a learning objective or goal
- Allows Re-use, (depending on context)
- Allows content to be wrapped in additional information, (meta-data)
- Allows accurate linking

# Linking Learning Objects

PRE-REQUISITE LINKS	
Listing the VLSM Networks(3)	
CO-REQUISITE LINKS	
VLSM NetworkTopology(7)	
Network Addressing(5)	

# Practical Design

Introduction to VLSM Example  
 VLSM NetworkTopology  
 Number of IP Addresses  
 Listing the VLSM Networks

**(A)**

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PRE-REQUISITE LINKS  
 Listing the VLSM Networks(3)

**(B)**

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CO-REQUISITE LINKS  
 VLSM NetworkTopology(7)  
 Network Addressing(5)

**(C)**

more  
 less  
 menu

N.H.Rowe (C) 2009-2011

Network ↔ Subnetting and Hosts

192.168.10.0 | 00000000

8 + 8 + 8 + 1 → 7 → 2<sup>7</sup> → 128

25

13

14 → 16 **(D)**

192.168.10.0/25

53 51

50

2 4

2 4

2 4

2 4

2 4

2 4

2 4

2 4

2 4

2 4

13 12

15

2 1

4

3 4

6

**(E)**

**(F)**

04:34 / 05:51

?

What happens if the total hosts exceed 128?

VLSM Addressing Example

An example is considered where a network is addressed using the VLSM addressing method

VLSM stands for Variable Length Subnet Masking

Uses address more efficiently than fixed length subnet masking

Example considers a large number of small networks

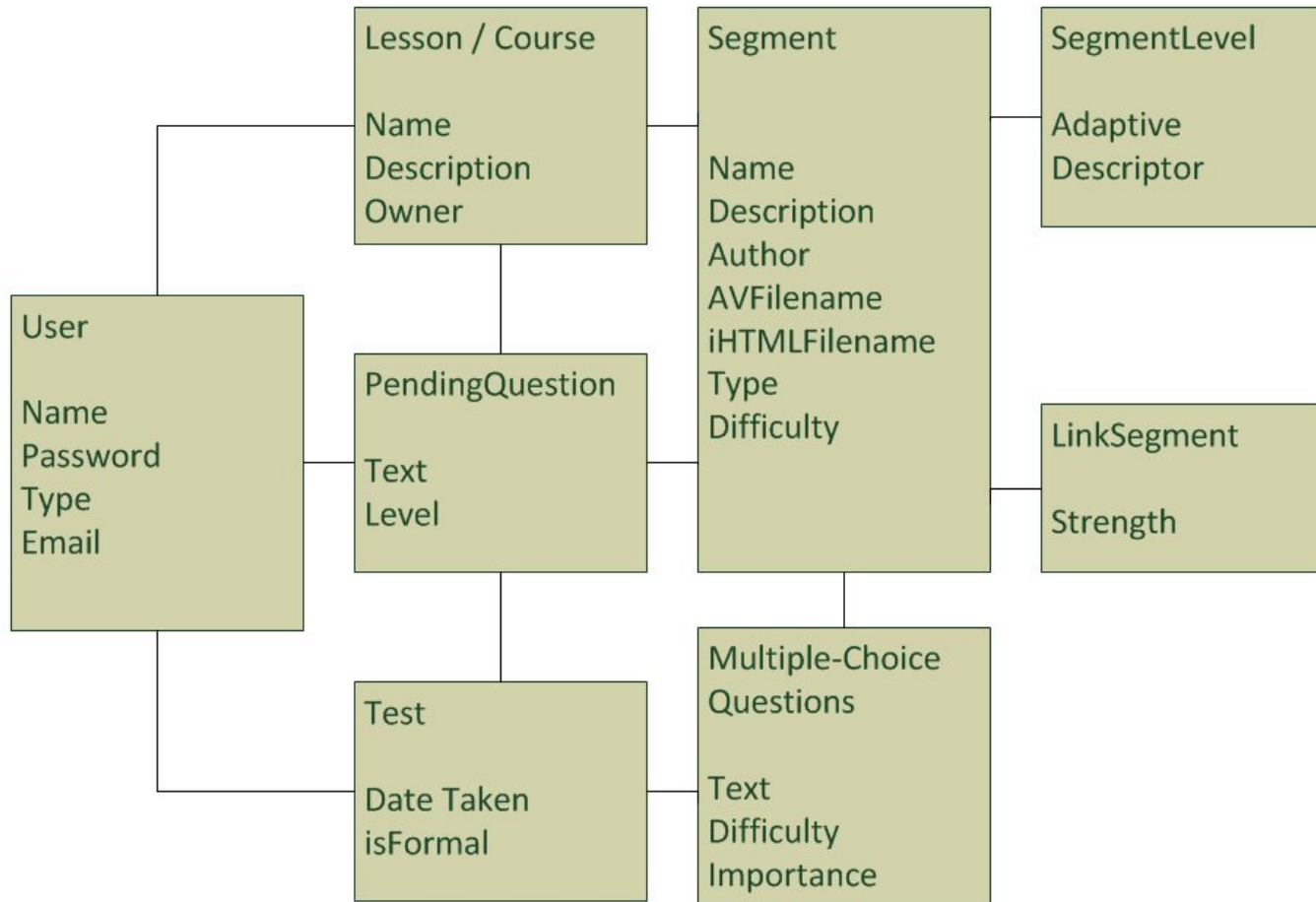
Network Addressing

Address: 192.168.10.0 / 25

2 to the power 7 is 2x2x2x2x2x2x2 = 128

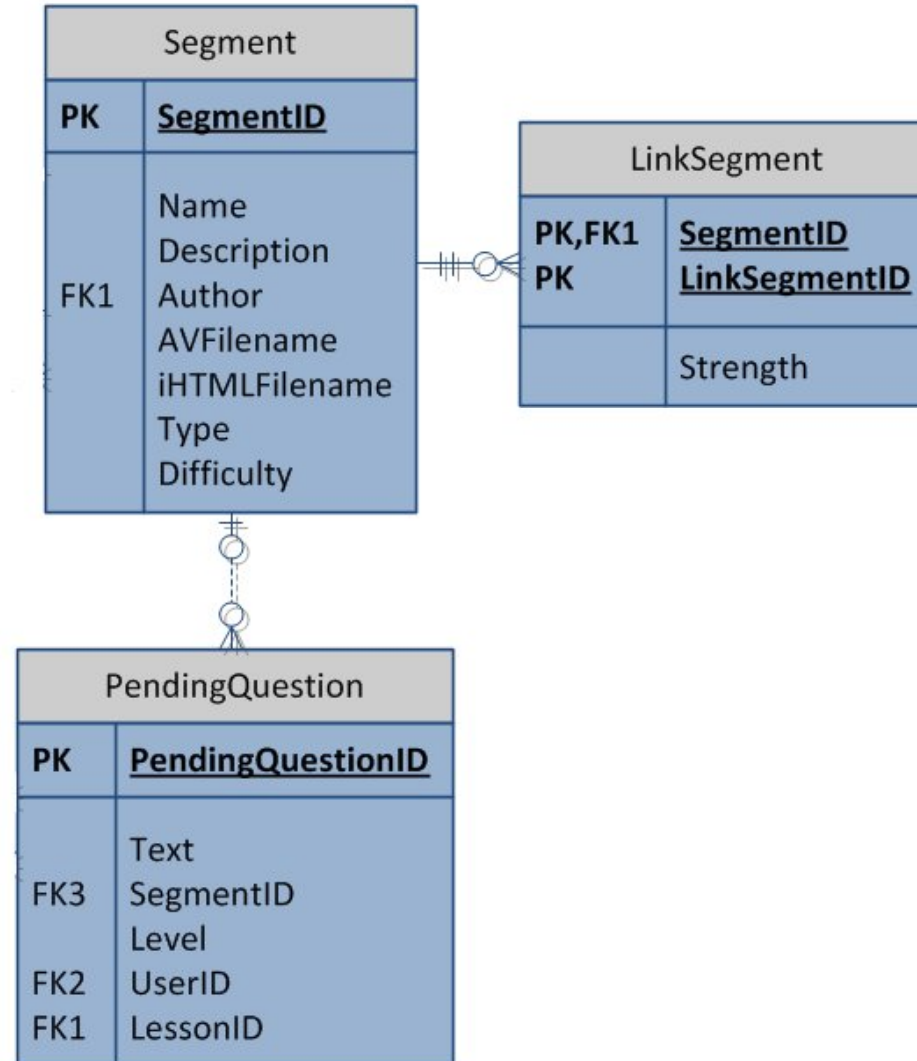
**(G)**

# Structure of an E-Learning Prototype



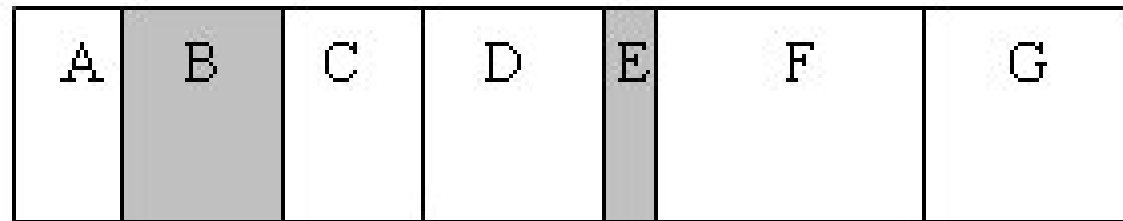


# Segment Relationships



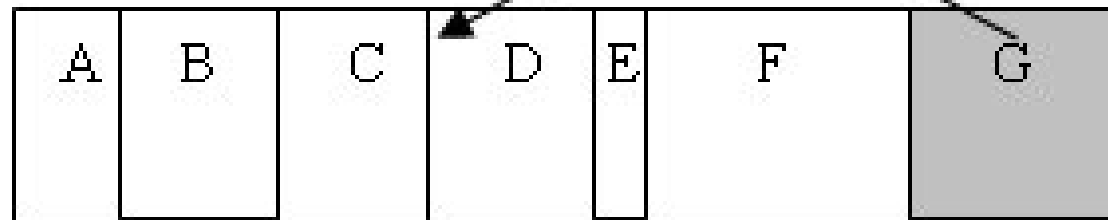
# Mechanisms for Adapting Presentation Content

0 20 60 80 110 120 200 250



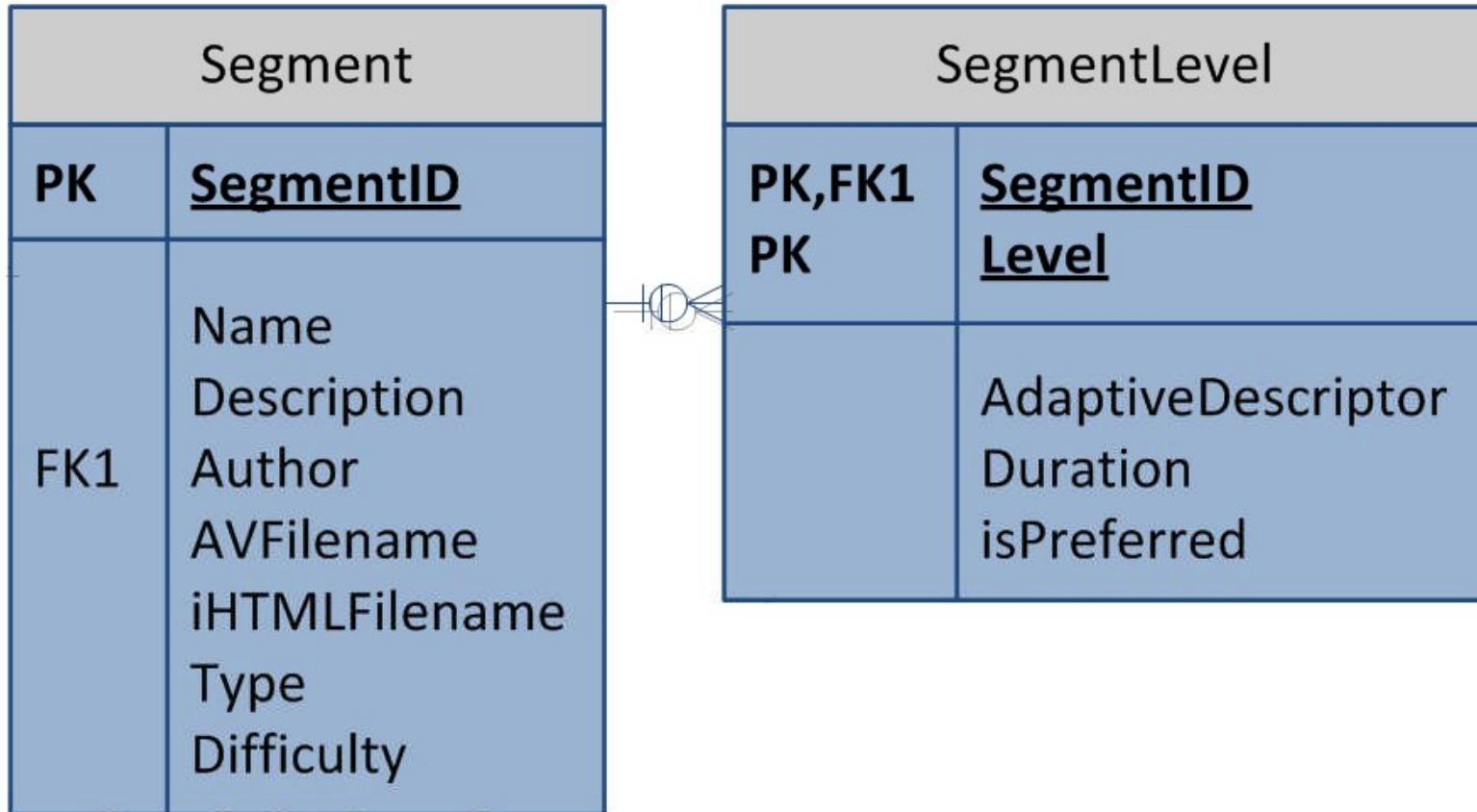
Text: S0;D20,60;D110,120;E200  
END

0 20 60 80 110 120 200 250



Text: S0;180,200,250;E200  
END

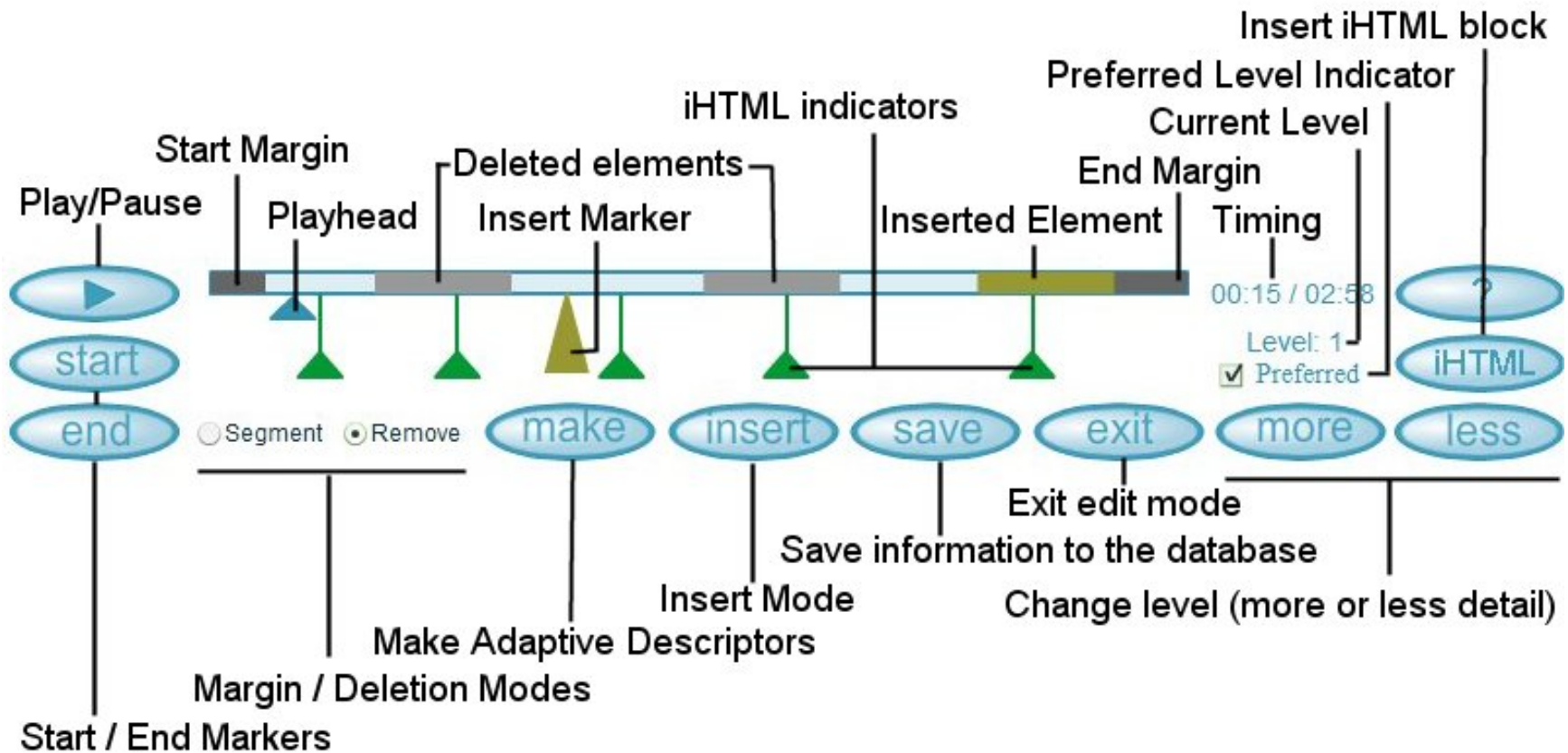
# Segment and Segment Level Entities



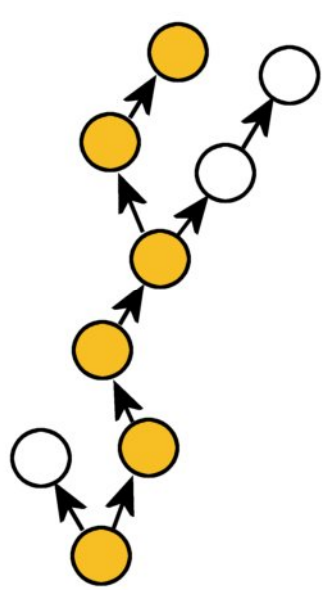
# Segment Level Entity Data

SegmentID	Level	AdaptiveDescriptor	Duration	isPreferred
1	0	S10;H20,0;H30,1;H80,2;I120,150,175;E150	165	0
1	1	S10;H20,0;D25,55;H80,2;E150	110	1
1	2	S10;H20,0;D25,55;H80,2;D85,110;E150	85	0
2	0	S5;E55	50	1
2	1	S5;D40,50;E55	40	0
3	0	S0;H10,0;H25,1;H115,2;E150	150	1
3	1	S0;H10,0;D15,45;H115,2;E150	120	0
4	0	S10;H25,0;H80,1;I115,150,165;E150	155	1
5	0	S5;H40,0;E145	140	1
7	0	S0;H1,0;H5.172,1;H14.994,2;H20.819,3;H26.383,4;E33...	33.3844	1
7	1	S0;H5.172,1;H14.994,2;H20.819,3;D21.916,33.266;E33...	22.0344	0
7	2	S0;H5.172,1;D10.84,33.266;E33.3844273	10.9584	0
8	0	S0;H16.718,0;H41,1;H64,2;E112.0389737	112.039	1
9	0	S0;H9.133,0;H13.035,1;H37.666,2;H81.136,3;H109.478...	260.806	0
9	1	S0;H9.133,0;H13.035,1;D14.341,97.541;H109.478,4;D1...	111.256	1

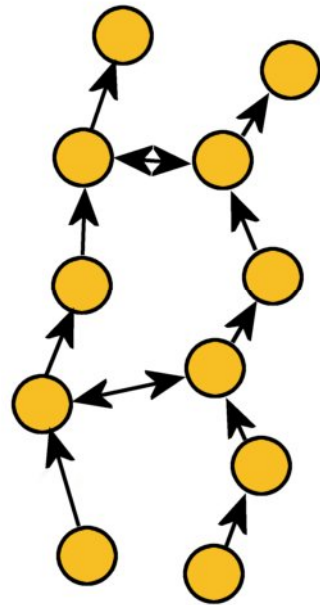
# Authorship of Content



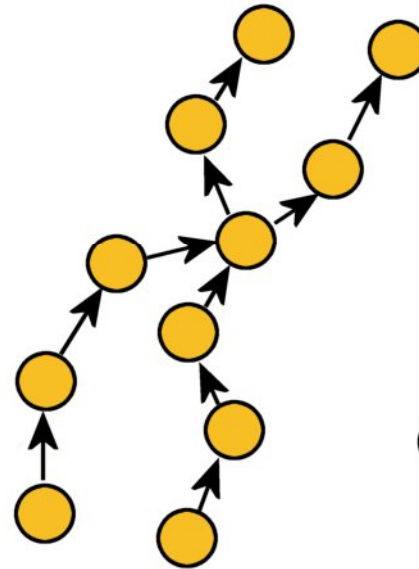
# Structure of Learning Segments



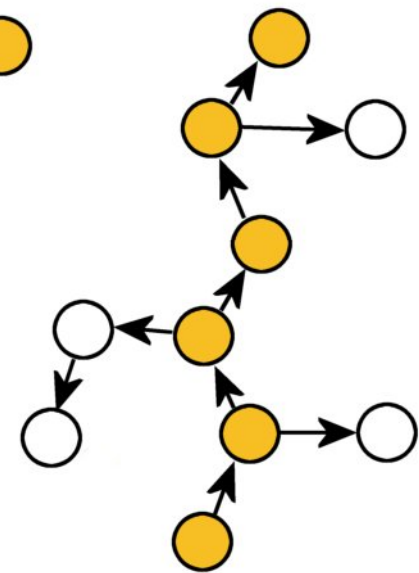
(a)



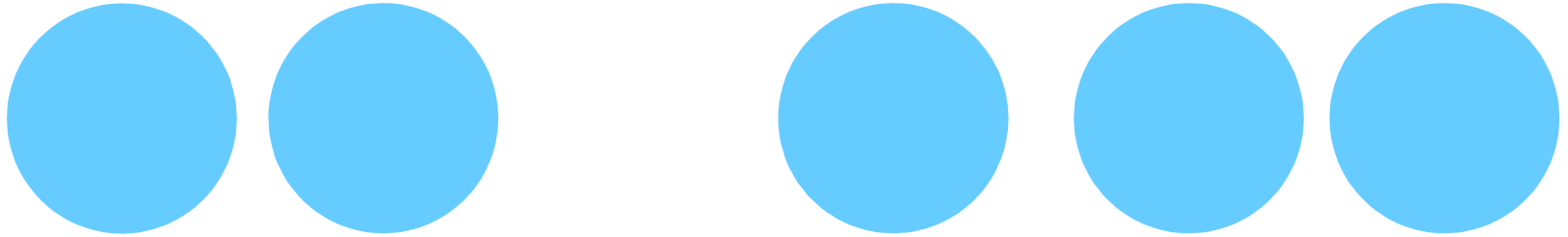
(b)



(c)



(d)



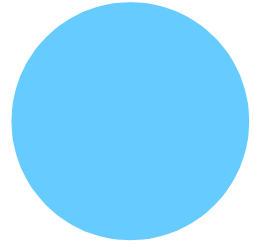
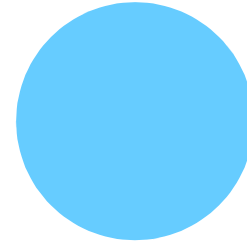
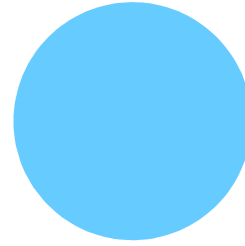
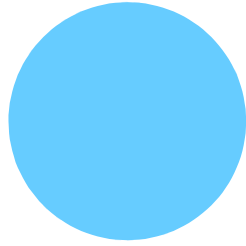
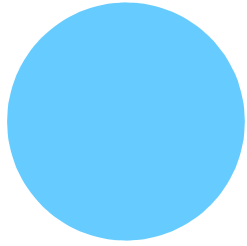
Demonstration of the Prototype

# Future Issues



- Automating the generation of meta-data
  - Object Splitting
  - iHTML generation
  - Link creation
- Time to generate materials manually
- Evaluation of the system
- Generation of working materials





Questions



# Content Building for Virtual & Augmented Reality

from Mars to MARS

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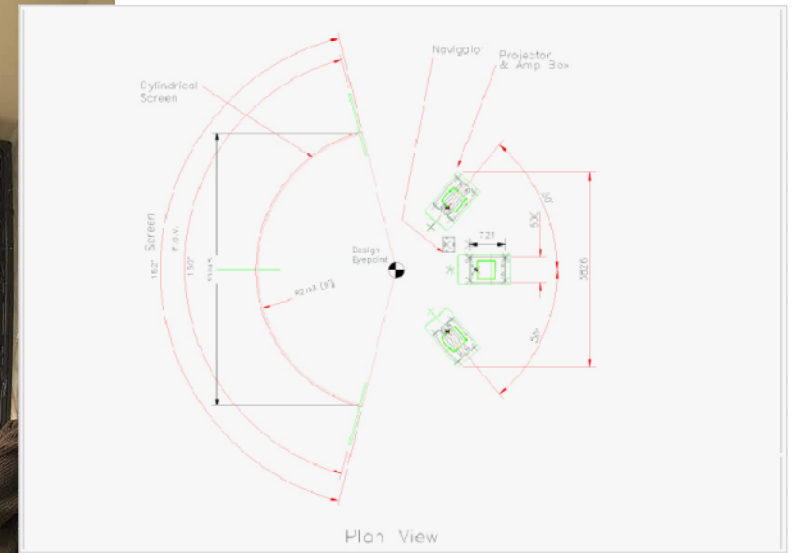
A/Prof Manolya Kavakli  
Department of Computing  
Macquarie University  
Sydney, Australia

# Virtual Reality

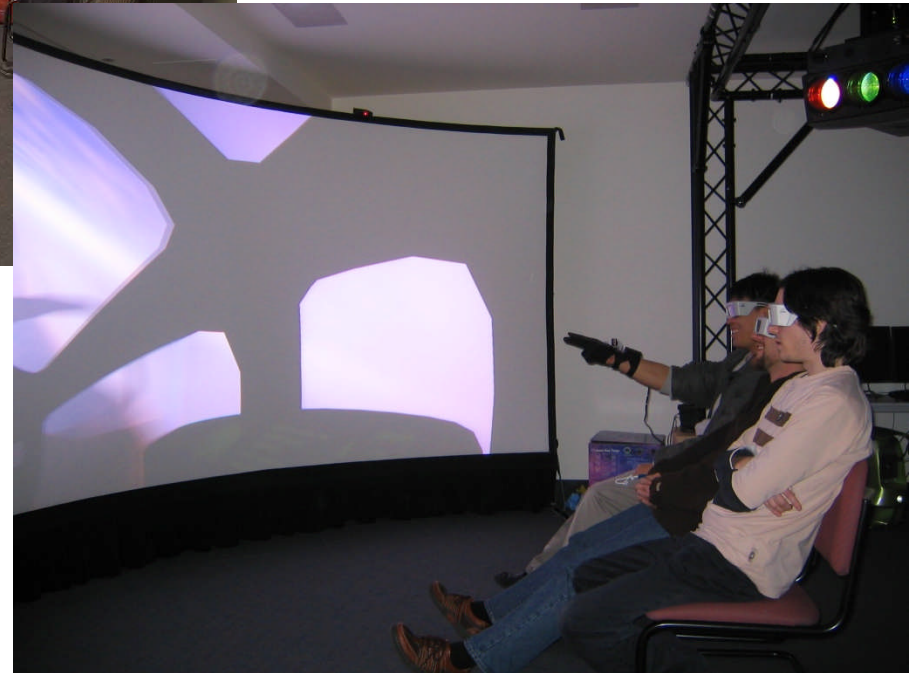
Jaron Lanier (1989)

- *a medium composed of interactive computer simulations*
  - *sense the participant's position and*
  - *replace or augment the feedback to one or more senses*
  - *giving the feeling of*
    - *being immersed or*
    - *being present in the simulation.*





The immersive projection system (VISOR) consists of three projectors which display the virtual world onto a 6m wide semi-cylindrical screen canvas



VisoR: Virtual and  
Interactive Simulation  
of Reality Research  
Group 2008



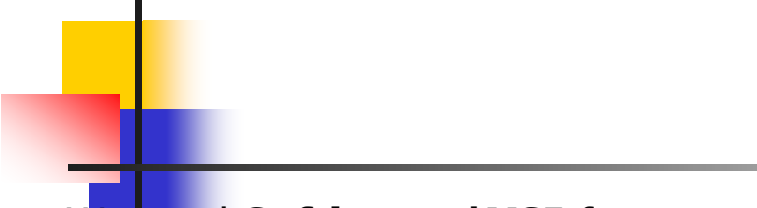
- The digital content, created in Blender, was integrated into Vizard VR Toolkit including a Python scripting language.

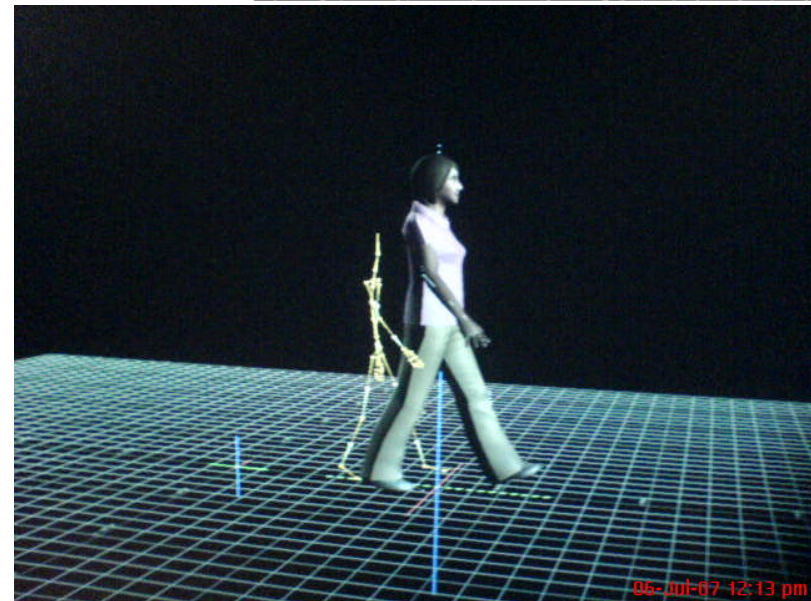
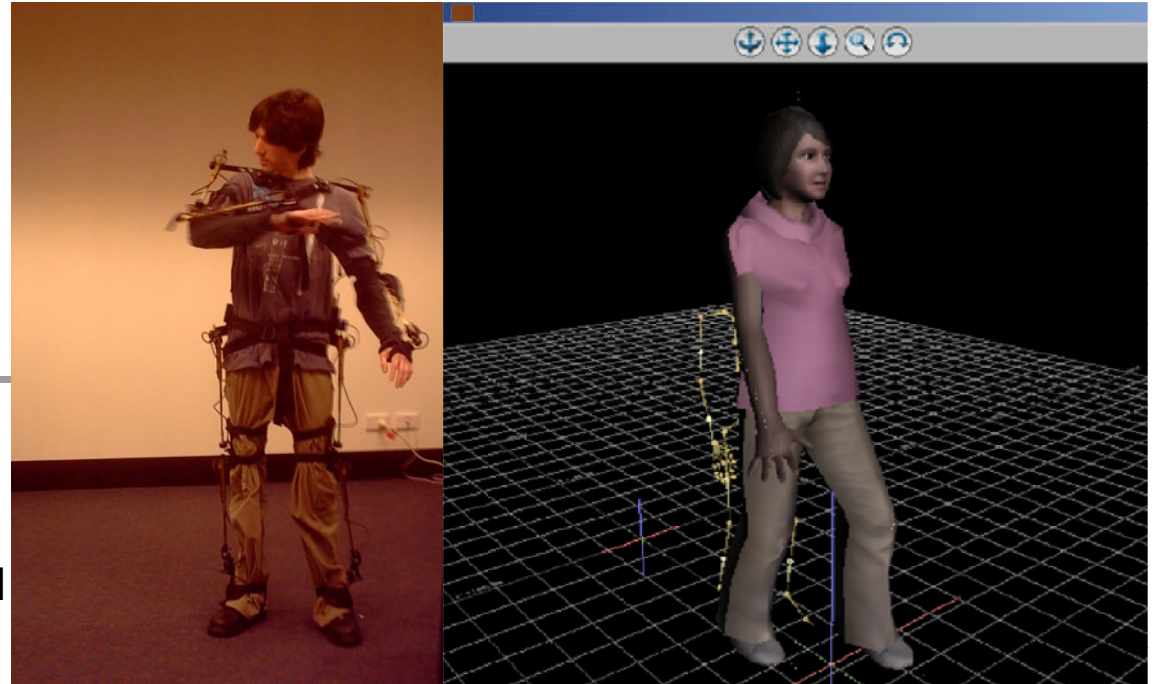


VisoR: Virtual and  
Interactive Simulation  
of Reality Research  
Group 2008



# Gesture Recognition System

- 
- We used **Softimage | XSI** for creating a 3D landscape and an airport model.
  - We modified the layout of the digital world in **Blender**. We exported the digital world to Vizard file format. We used **3D Studio Max** and Softimage|XSI with FBX plug-ins for 3D modelling. 3D Studio Max has a built in exporter for .FBX format which **MotionBuilder** reads. In MotionBuilder, we set up the rig of the character and applied the Motion-Capture (mocap) animation onto the character's skeleton. The animation footage is produced by **Vizard Virtual Reality software**.





# Augmented Reality

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- Imagine a VR head mounted display,
- but the display doesn't block out the regular view, it's just superimposed on it.
  - Imagine walking around a building and "seeing" inside the walls to the wiring, plumbing, and structure.
  - Or, seeing the tumor inside a patient's head as you hack away at it.
- Focuses on enriching the natural environment
- Extra information is displayed on a HMD
  - Currently mainly used in the military with few civilian applications



# MARS: Mobile Augmented Reality Systems



- In the Touring Machine scenario,
  - the MARS unit acts as a campus information system, assisting a user in finding places and allowing her to query information about items of interest, like buildings, statues, etc.



# The Layar Reality Browser

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- An augmented reality app
- (mobile phone application) that
  - shows you what is around you by displaying real time digital information (layers) on top of reality.
- This digital information is called a 'layer'.
  - Layers can provide services, such as finding ATMs, houses for sale and restaurants including reviews.
  - Layers can also provide an experience with interactivity, 3D objects and sounds for games and engaging guided tours. Many layers provide both.

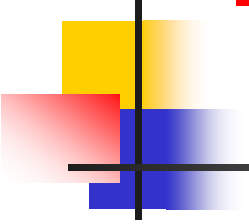


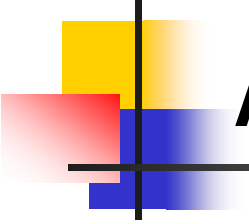
# AR platform?

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- Essentially you're using your phone like a camera
  - so you can see the real world as you pan around, but the application utilizes
- your GPS location and G-Sensor to determine exactly what your phone/camera is pointing towards and
  - provides you more information about it directly on your phone!
- But Layar technology isn't just an application... its a platform.

# Layar Reality Browser

- 
- [http://www.youtube.com/watch?src\\_vid=b64\\_16K2e08&v=HW9gU4AUCA&feature=iv&annotation\\_id=annotation\\_121798](http://www.youtube.com/watch?src_vid=b64_16K2e08&v=HW9gU4AUCA&feature=iv&annotation_id=annotation_121798)
  - [http://www.youtube.com/watch?v=b64\\_16K2e08](http://www.youtube.com/watch?v=b64_16K2e08)
  - <http://layar.pbworks.com/w/page/7783224/Creating%20the%203D%20objects>



# Augmented Reality Applications

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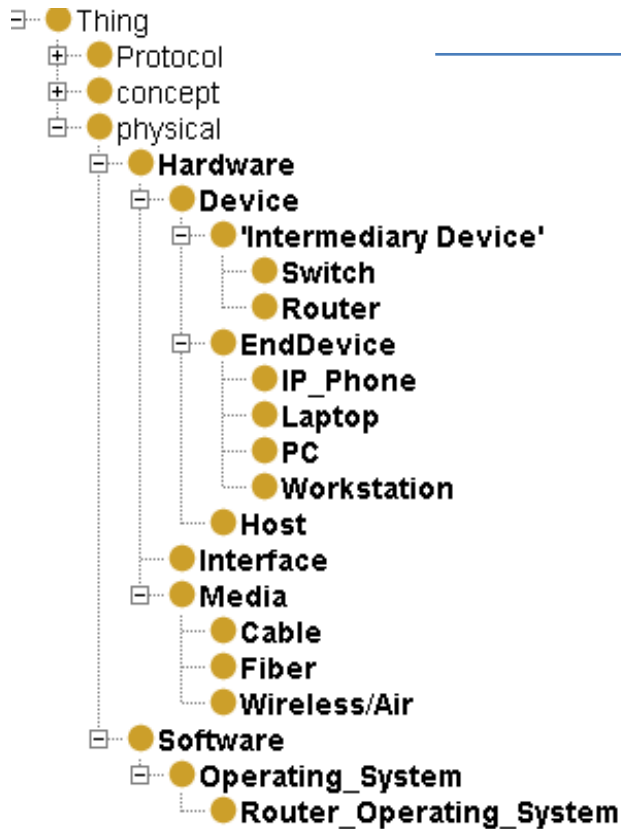
- Imagine that:
  - Signs could broadcast their message in several languages, being automatically picked up and displayed on the users phone in the appropriate language.
  - A map with GPS and/or building information could be projected on to the phone → No more getting lost.
  - Virtual tour guides could be downloaded for any country and location.
  - Multimodal support for visual-impaired, using brail...
  - The possibilities are endless...

# MMEDIA 2012 Expert Panel

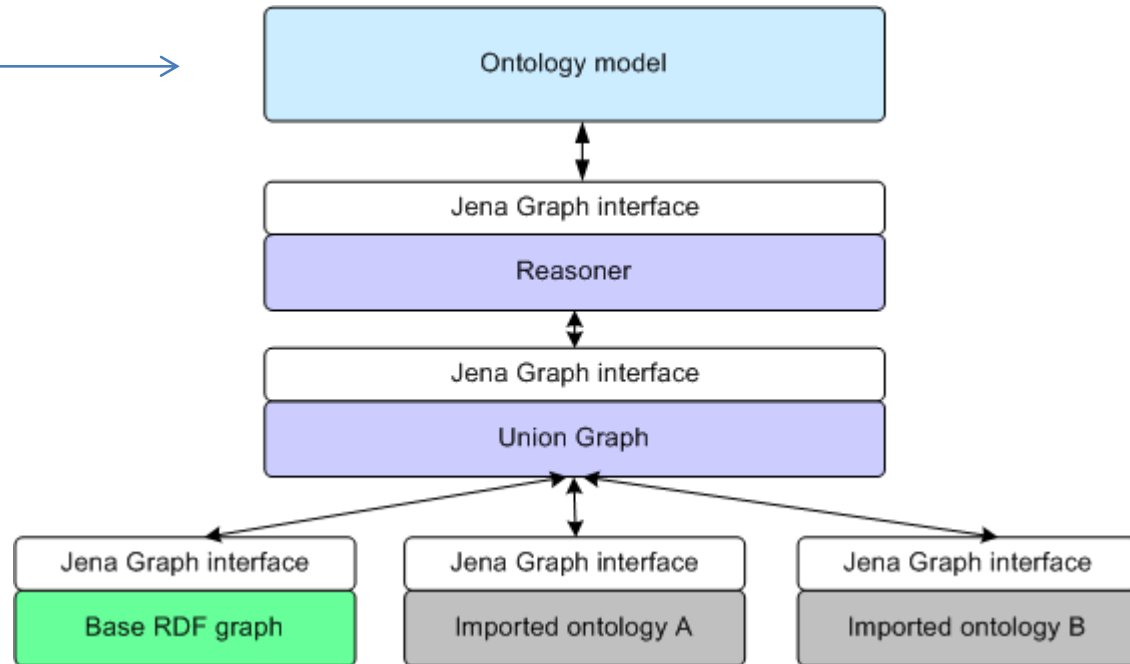
## Content Building & Retrieval

# Ontology Capture & Retrieval

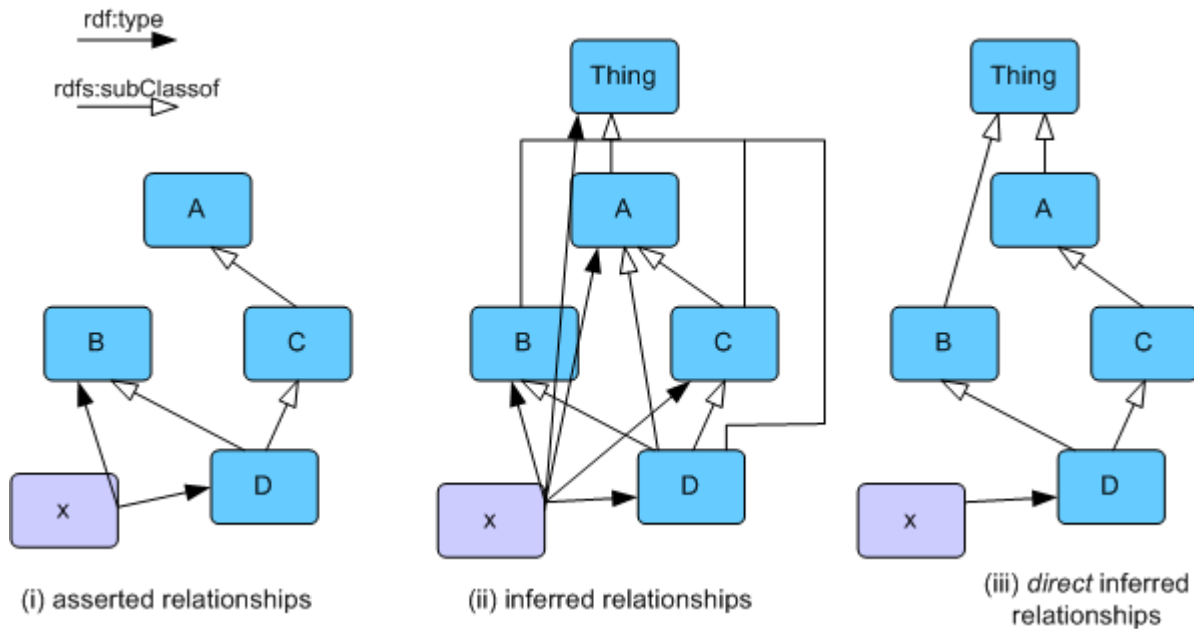
## Ontology Capture



## Retrieval

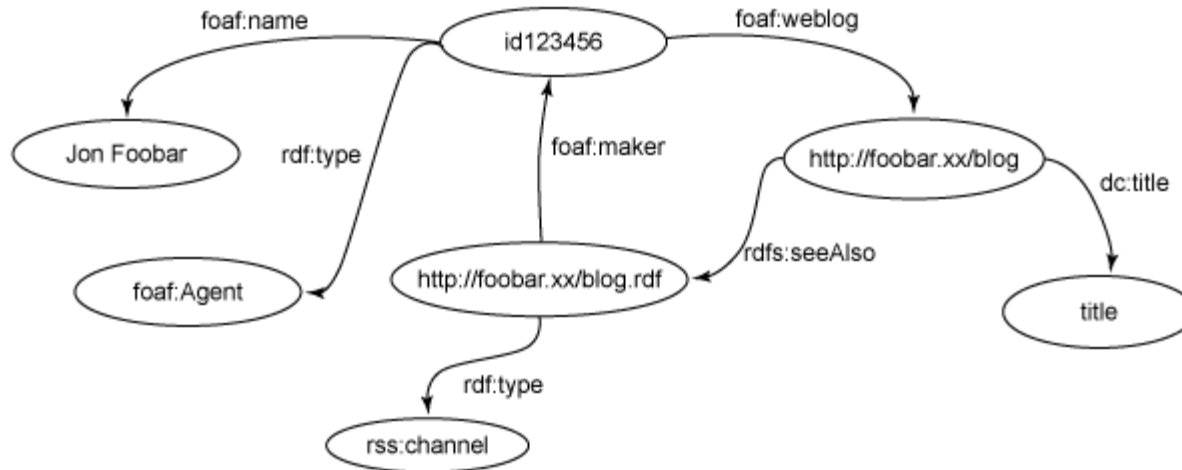


# Jena Relationship Types





# Retrieval with SPARQL



```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

```
SELECT ?url
```

```
FROM <bloggers.rdf>
```

```
WHERE { ?contributor foaf:name "Jon Foobar" . ?contributor foaf:weblog ?url .
```