

# A Case Study on Merging Strategies for Authoring QoE-based Adaptive Hypermedia

Joshua Scotton, S. Moebs, J. McManis, A. I. Cristea

[jscotton@dcs.warwick.ac.uk](mailto:jscotton@dcs.warwick.ac.uk)  
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- Multiple Adaptation Behaviours
- Combining Multiple Adaptation Strategies
- Ease of Reuse and further Modification

- Overview of the Technology
- General Problems with Combining Strategies
- A Proposed Method
- Application to the Case Study

Presentation Model

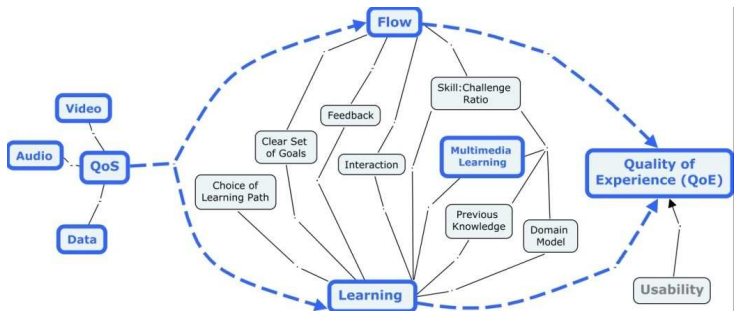
Adaptation Model

User Model

Goal Model

Domain Model

# Quality of Experience (QoE)



## Adaptation of content based on Network Conditions

- 1 Assess network conditions
- 2 Map these to a performance profile
- 3 Use the profile to select the content

# Strategy for Quality of Service (QoS)

```
implementation(  
  if(enough(PM.bandwidth_profile <= PM.loss_profile  
    PM.bandwidth_profile <= PM.delay_profile  
    PM.bandwidth_profile <= PM.jitter_profile,3))  
  then (PM.QOS = 0)  
  else (PM.QOS = (0.5 * PM.bandwidth_profile) + (0.5*((0.4*(PM.loss_profile + PM.delay_profile))  
    + (0.2 * PM.jitter_profile))))  
  
  if (PM.QOS <= 0.2) then (  
    if (GM.Concept.label LIKE *text*)      then ( PM.GM.Concept.show = True )  
  ) else if (PM.QOS <= 0.5) then (  
    if (GM.Concept.label LIKE *audio*)     then ( PM.GM.Concept.show = True )  
  ) else if (PM.QOS <= 0.8) then (  
    if (GM.Concept.label LIKE *video-low*) then ( PM.GM.Concept.show = True )  
  ) else (  
    if (GM.Concept.label LIKE *video-high*) then ( PM.GM.Concept.show = True )  
  )  
)  
)
```

## Continual variation of Media Content displayed to the Learner

- 1 Track the history of the Learner in a User Model
- 2 Alternate the Multimedia type based on the last accessed type

```
if (UM.history == video)
then ( if (GM.Concept.label LIKE *audio*)
      then ( PM.GM.Concept.show = True ))
else if (UM.history == audio)
then ( if (GM.Concept.label LIKE *text*)
      then ( PM.GM.Concept.show = True ))
....
```



## Some problems...

- Execution Order
- Variable Clashes

```
UM.GM.Concept.beenthere += 1
```

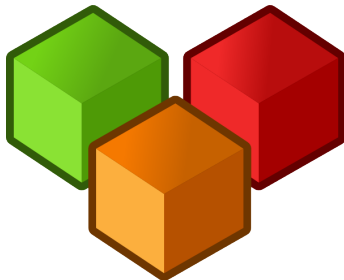
- Type Conflicts

```
Strategy 1: UM.GM.Concept.accessed = True
```

```
Strategy 2: if (UM.GM.Concept.accessed > 2) then (...)
```

# Why Not One Big Strategy???

- Limited Reuse
- Difficult to Modify
- Complexity



## Meta Strategies

- Reuse
- Simplicity
- Modularity

# A Proposed Method

- ① Identify the Adaptation Behaviour Tasks
- ② Identify areas where the tasks might cause problems
- ③ Create an adaptation strategy for each task
- ④ Create the controlling meta-strategy

The main tasks for the Case Study are:

- ① Initialise the Course Content
- ② Create a default state for the lesson being viewed
- ③ Show or hide content to ensure the best quality for the current network
- ④ Show or hide content so that only one media type is viewable based on the MediaMix rules

# Problems Areas in the Case Study

- 1 Too much content
- 2 Duplicate content
- 3 Showing wrong content

# Strategy for the Case Study - Setup Strategy

```
initialization(  
  while true (  
    if(GM.Concept.label==introduction OR GM.Concept.label==conclusion)  
    then (PM.GM.Concept.show = True)  
  )  
)  
  
implementation(  
  if (GM.Concept.label LIKE *video-high*) then ( PM.GM.Concept.show = True )  
  else if (GM.Concept.label LIKE *text*) then ( PM.GM.Concept.show = True )  
  else if (GM.Concept.label LIKE *audio*) then ( PM.GM.Concept.show = True )  
  else if (GM.Concept.label==introduction OR GM.Concept.label==conclusion)  
    then ( PM.GM.Concept.show = True )  
  else ( PM.GM.Concept.show = False )  
)
```

```
if (GM.Concept.label LIKE *video-low*)  
  then ( PM.GM.Concept.show = True )  
else if (GM.Concept.label LIKE *video-high*)  
  then ( PM.GM.Concept.show = False )
```

```
if (UM.history == video) then (  
  if (GM.Concept.label LIKE *video* OR  
      GM.Concept.label LIKE *text*)  
  then ( PM.GM.Concept.show = False )  
  else ( PM.GM.Concept.show = True )  
)
```

- Identification of Adaptation Behaviour in a Strategy
- Problem Detection and Resolution
- Automatic Creation of Output Strategies from Multiple Input Strategies

- Combining and reusing strategies can be problematic
- Proposed a generic method for combining strategies
- Further research is to investigate automating the method

## A Case Study on Merging Strategies for Authoring QoE-based Adaptive Hypermedia

Joshua Scotton, Sabine Moebs, Jennifer McManis, Alexandra I. Cristea

The University of Warwick and Dublin City University



Slides will be available from [www.joshuascotton.com](http://www.joshuascotton.com) later today