Modelling of Users' Capabilities

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Outline

Motivations I

Motivations I

- No such thing as “the average user” [Keates and Clarkson, 2003]

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- Information overload [Ho and Tang, 2001, Mulder et al., 2006]
- Learning style
- Capabilities and impairments
- Device capabilities and limitations
- User preference

Motivations II

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- Access Technology (AT)

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- Retrofitted [Barnicle, 2000, Mazrui, 2005]

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- Disparate [Jefferson and Harvey, 2007, Gajos et al., 2007]

Goals

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A user modelling and content adaptation system that...

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- ...is a generic process that can be applied in many domains

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- ...is a generic process that can be applied in many domains
- ...allows **integration** of existing solutions

Modelling of Users' Capabilities

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- Low(est!?) level; "Intelligence"

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- **This** user + **this** device

Modelling of Users' Capabilities

- Low(est!?) level; "Intelligence"
- **This** user + **this** device
- Problem-centred

Basic Concepts

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- Channels

Basic Concepts

- Channels
- Capability Maps

Basic Concepts

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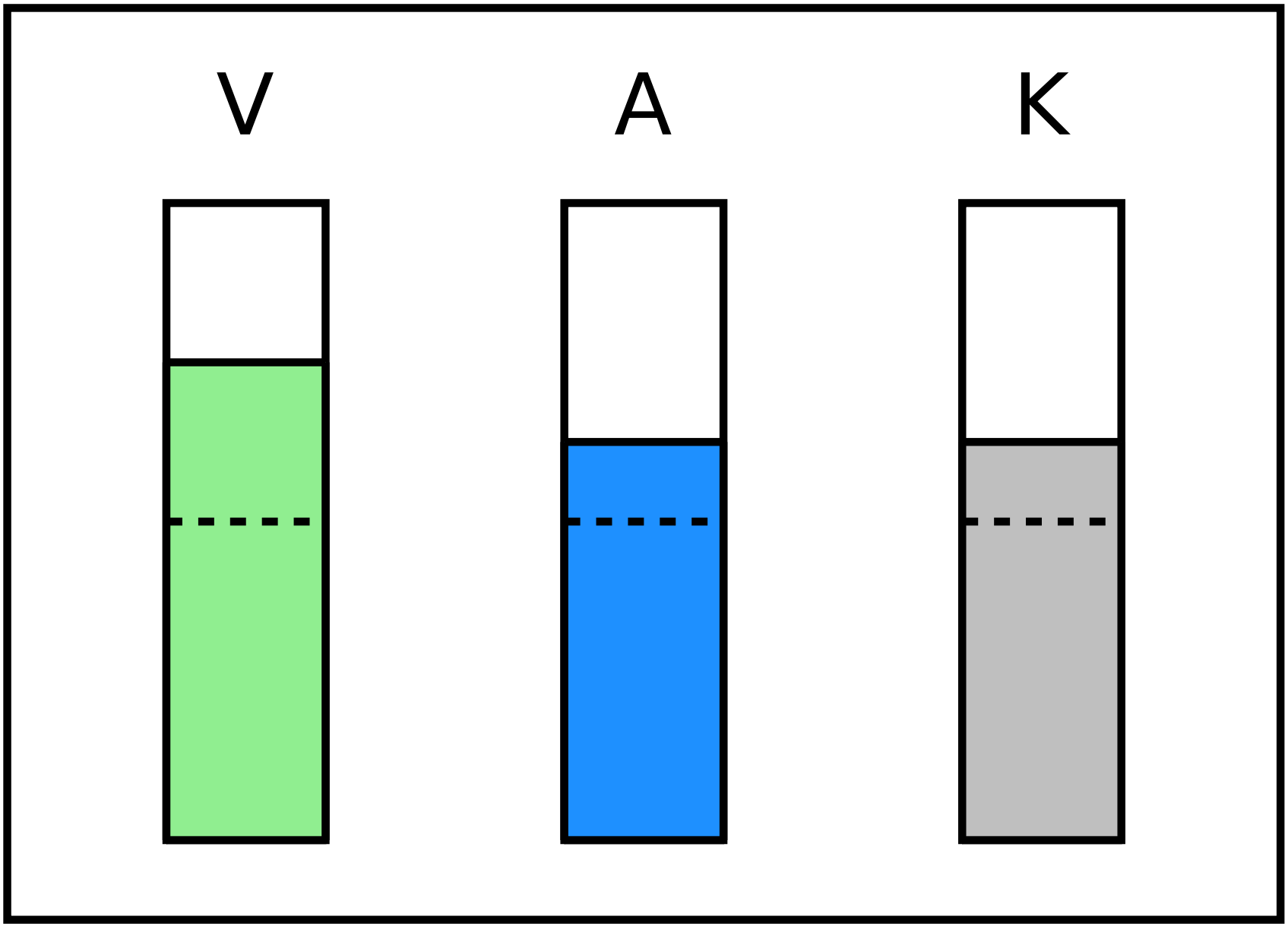
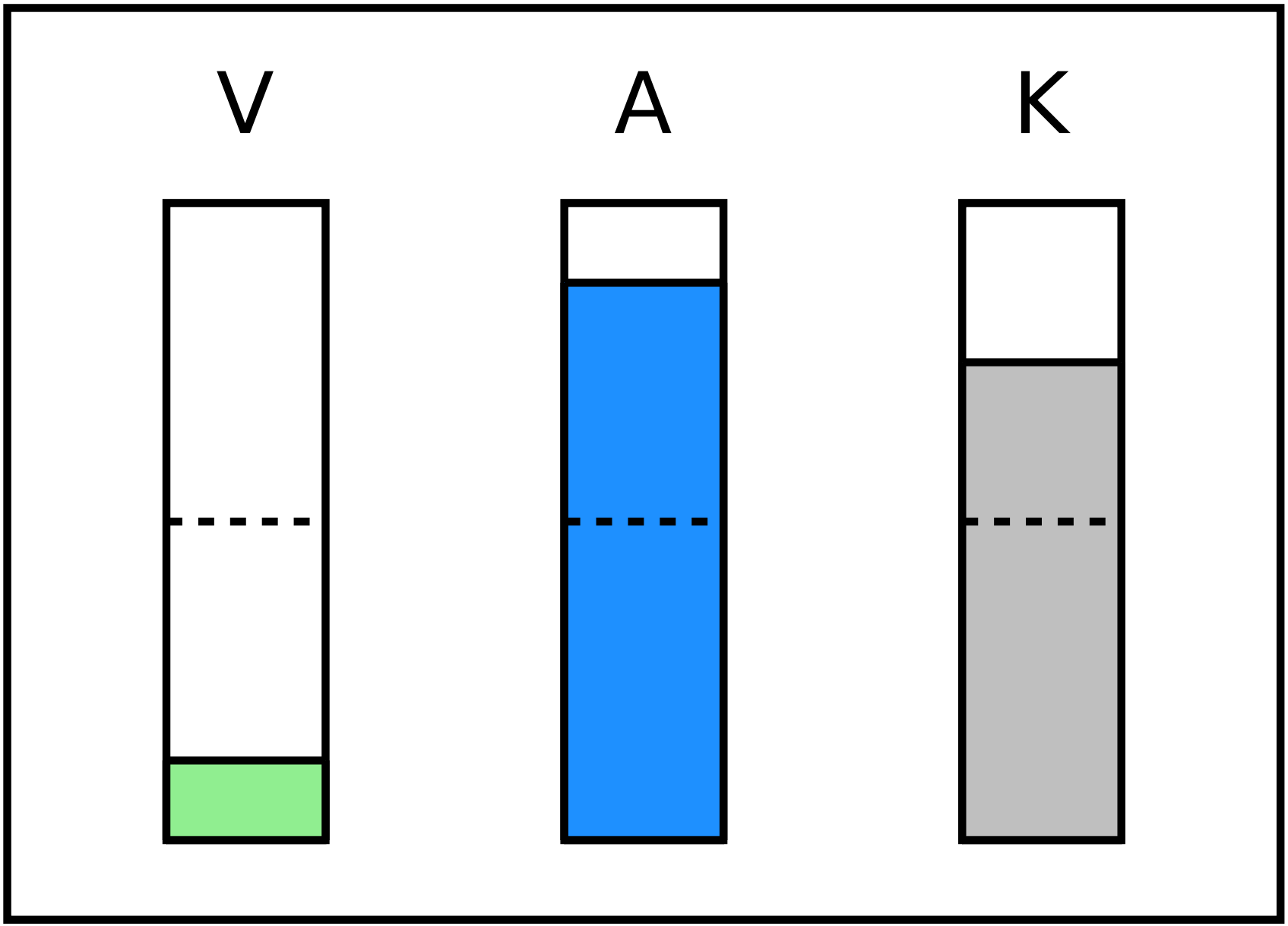


Basic Concepts



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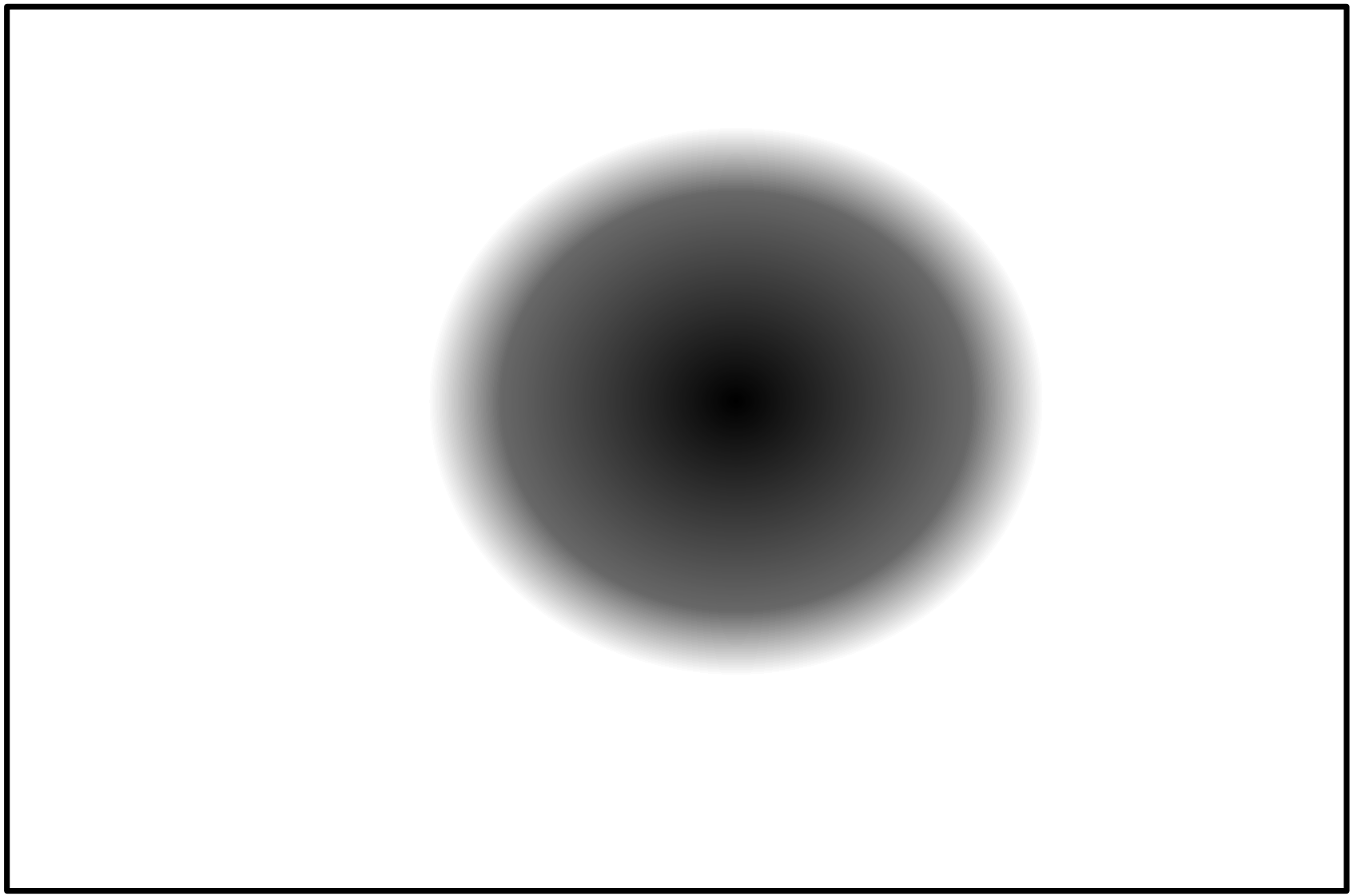

Architecture

Architecture

- Modelling Components

Architecture

- Modelling Components
- Adaptation and Interaction Components

Architecture

- Modelling Components
- Adaptation and Interaction Components
- (Meta-?)Architecture

Modelling Components

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- User (and device and data) profiles

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- Channels, Properties and Maps

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- User (and device and data) profiles
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- Data analysis

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- Links to Adaptations

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- User (and device and data) profiles
- Channels, Properties and Maps
- Data analysis
- Links to Adaptations
- Constraint Satisfaction (and other reasoning)

Adaptation and Interaction Components

Adaptation and Interaction Components

- Calibration

Adaptation and Interaction Components

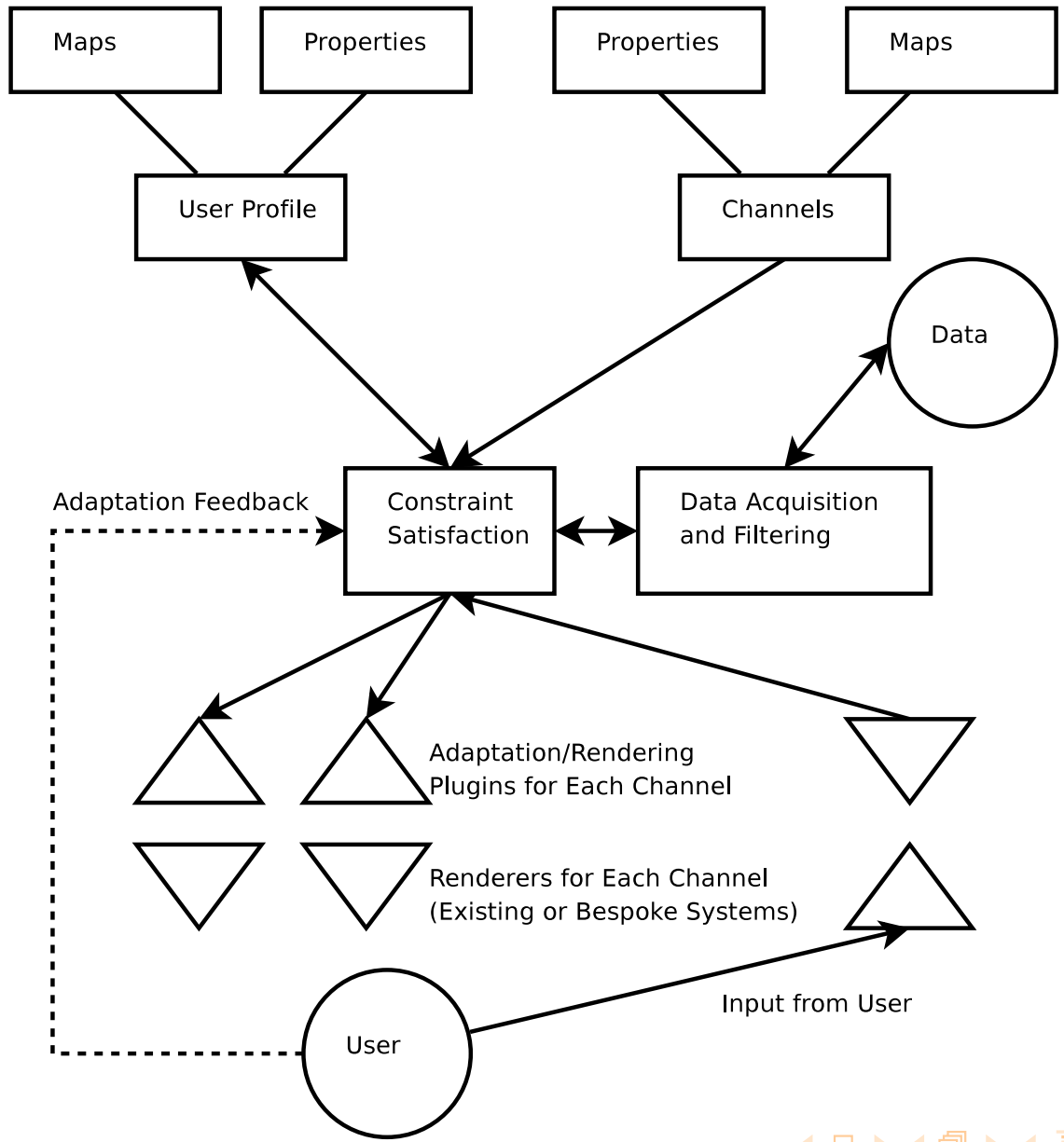
- Calibration
- Renderers

Adaptation and Interaction Components

- Calibration
- Renderers
- Feedback Loop

Architecture

Architecture



Proof-of-Concept

Proof-of-Concept

- Tests

Proof-of-Concept

- Tests
- Results

Tests

Tests

- Proof-of-concept

Tests

- Proof-of-concept
- Adaptations to documents

Tests

- Proof-of-concept
- Adaptations to documents
- Simulated impairments

Tests

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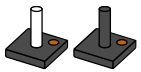
The AGRIP project was founded in May 2003 to see if it was possible for a mainstream game to be made accessible for blind and vision-impaired players. The game chosen was Quake, by id Software.

By July 2004, beta version 0.2.0 of AccessibleQuake (formerly known as just AGRIP) was released and was demonstrated at Sight Village that year.

Since then, we have begun work on making not just a game accessible, but gaining access for blind people to the entire community of an online game.



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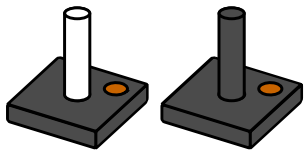

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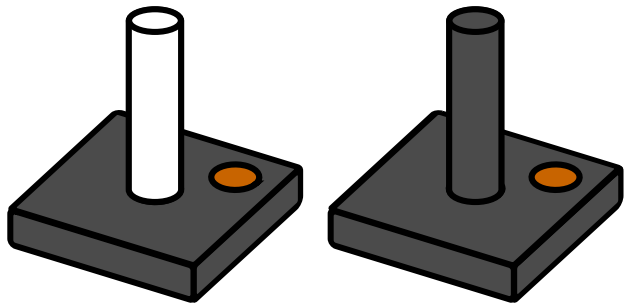
[SCROLL]



Tests

Tests

Tests

- Two groups

Tests

- Two groups
- Three documents (in different order)

Tests

- Two groups
- Three documents (in different order)
- Calibration

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- Ranking

Results

Results

- Range of capabilities

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- Range of capabilities
- Times and errors

Results

- Range of capabilities
- Times and errors
- Rankings

Results

	Capabilities		
Condition	Lowest	Highest	Mean
O	0.2	0.6	0.4
M	0.0	0.4	0.3

Results

Standard Documents (STD)

Con	Possible	Time (s)	Error (%)	ErrTime	Fig?	Useful?
O	2	135.0	80	29	5	0
M	2	105.7	90	74	6	0

Low-Adaptation Documents (STD)

Con	Possible	Time (s)	Error (%)	ErrTime	Fig?	Useful?
O	6	48.7	80	1	6	5
M	5	57.6	38	36	6	1

High-Adaptation Documents (HGH)

Con	Possible	Time (s)	Error (%)	ErrTime	Fig?	Useful?
O	6	38.9	0	0	6	6
M	6	43.7	1	2	3	6

Results

Condition	Rankings			Participants
	Worst	Medium	Best	
O	STD	LOW	HGH	5
O	STD		LOW, HGH	1
M	STD	LOW	HGH	5
M	STD	HGH	LOW	1

Final Thoughts

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- Conclusions

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Conclusions

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- Further properties (colour; contrast) would be useful
- Some adaptations expected to be useful only to group M were of use to group O
- Considerable variation of capabilities (particularly in group O)...
- ...suggesting this technique could be useful for many more than just those with disabilities when further developed

Further Work

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- Multi-channel tests
- Integration with information filtering techniques [Atkinson et al., 2006]
- Application in different problem domains [Atkinson and Machin, 2007]

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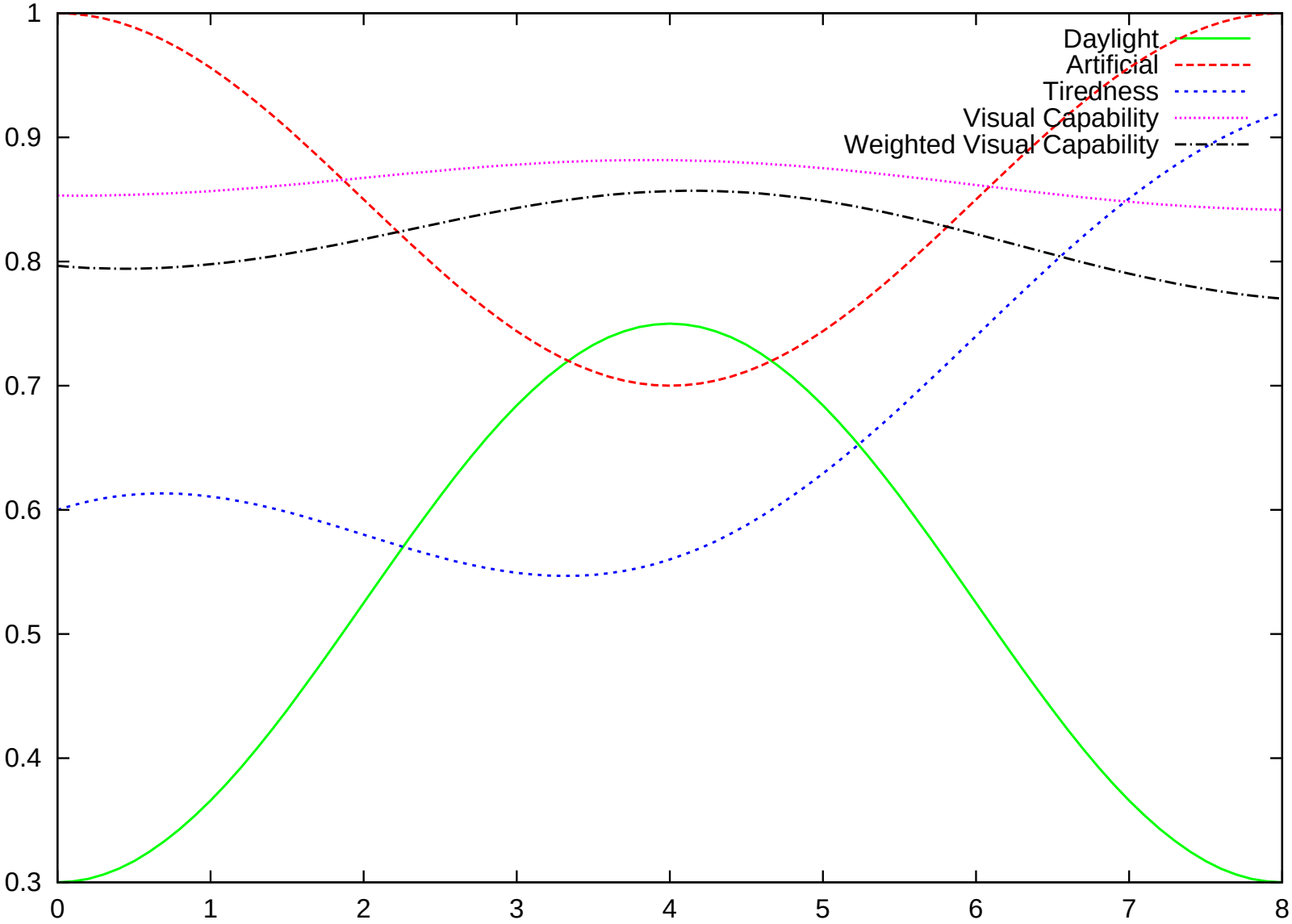

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- Loughborough-based NDA network `http://nda.lboro.ac.uk/`

Thanks for listening!
Any Questions?

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