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A Computational Model of Analogical Reasoning in Dementia Care

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What you'll hear

- How we view **computational creativity**
- Creativity in care for people with **dementia**
- **App** to support dementia care staff
- A computational creativity **service**
- **Demo!**





Computational Creativity

1. Construct program **capable** of **human-level creativity**
2. Formulate **algorithmic perspective** on **creative behaviour** in humans
3. Design program that can **enhance human creativity** without necessarily being creative themselves





Caring for People with Dementia

Dementia

- Condition related to ageing
- **35 million** people worldwide
- **750,000** people in UK
- **Two-thirds** of people in residential care homes

People with dementia

- Inhabit **own version** of the world
- Difficult for care staff to interpret
- More **person-centred care** adapted to individuals [MyHomeLife, 2012]
- Care that is **useful** and **novel**





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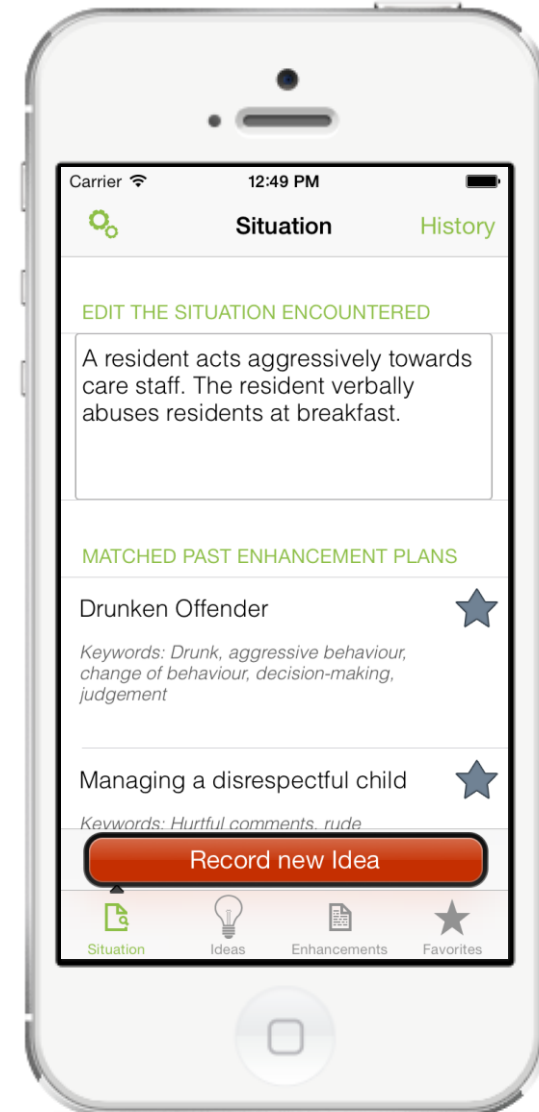
The Carer Mobile App

Support creative thinking to manage challenging behaviours with **Other worlds**

- iOS client app
- Server-side repository of good practices

Computational services

1. **Analogical reasoning** discovery service
good care practice in non-care domains
2. **Creative prompt** generation service
more concrete guidance





Analogical Reasoning Discovery Service

Retrieve matching non-dementia cases

- Domains such as **teaching** and **policing**
- Approximate analogical reasoning based on structure-mapping theory (SMT) [Gentner 1983]
- Constrained by natural language descriptions

1. Express as **relational** predicates

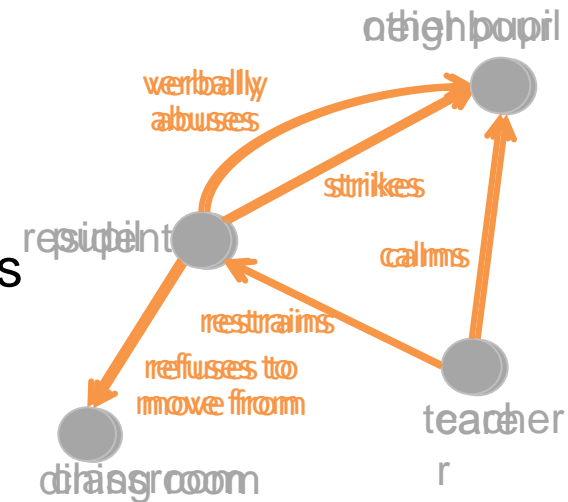
- 21 syntax structure rules, 7 lexical extraction rules: *abuse(resident, care-staff)*

2. Predicate expansion

- Exploit **VerbNet** class hierarchies
attack/assault/bully(resident, care-staff)

3. Predicate matching

- Refine with **Dependency Thesaurus**, **WordNet**



Judgement

Abuse

Attack

Bully

Assault



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Demo – Part 1

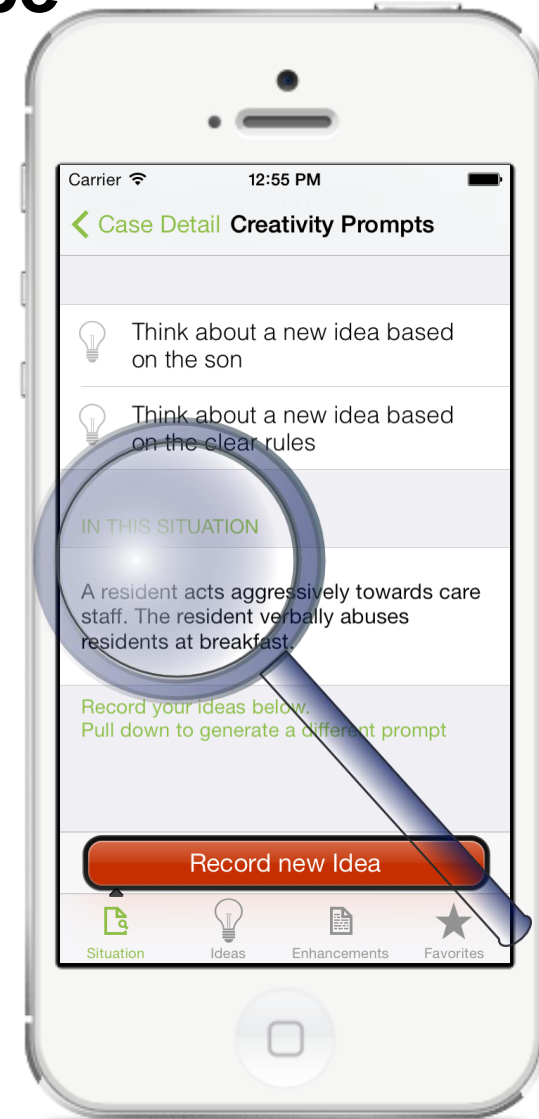
<http://screencast.com/t/U7kR5LLqXLT>



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Creativity Prompt Generation Service

- More directed creative thinking
 - Limited usability of text
 - Automatically extract triggers
- Trigger structure
 - Think about a new idea based on...
 - Mapped analogical objects
 - *Think about an idea based on the clear rules*
 - *Think about an idea based on the rude comments*
 - *Think about an idea based on the rewards*
- Exploits human knowledge about attributional predicates





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Demo – Part 2

<http://screencast.com/t/VjtNa7y2bPD>



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Talk to Us

Opportunities for collaboration

- k.zachos@city.ac.uk
- [@KosZachos](https://twitter.com/KosZachos)
- www.zachos.co.uk
- www.creativity.city.ac.uk
- www.mirror-project.eu

