# Baseline Methods for Automated Fictional Ideation

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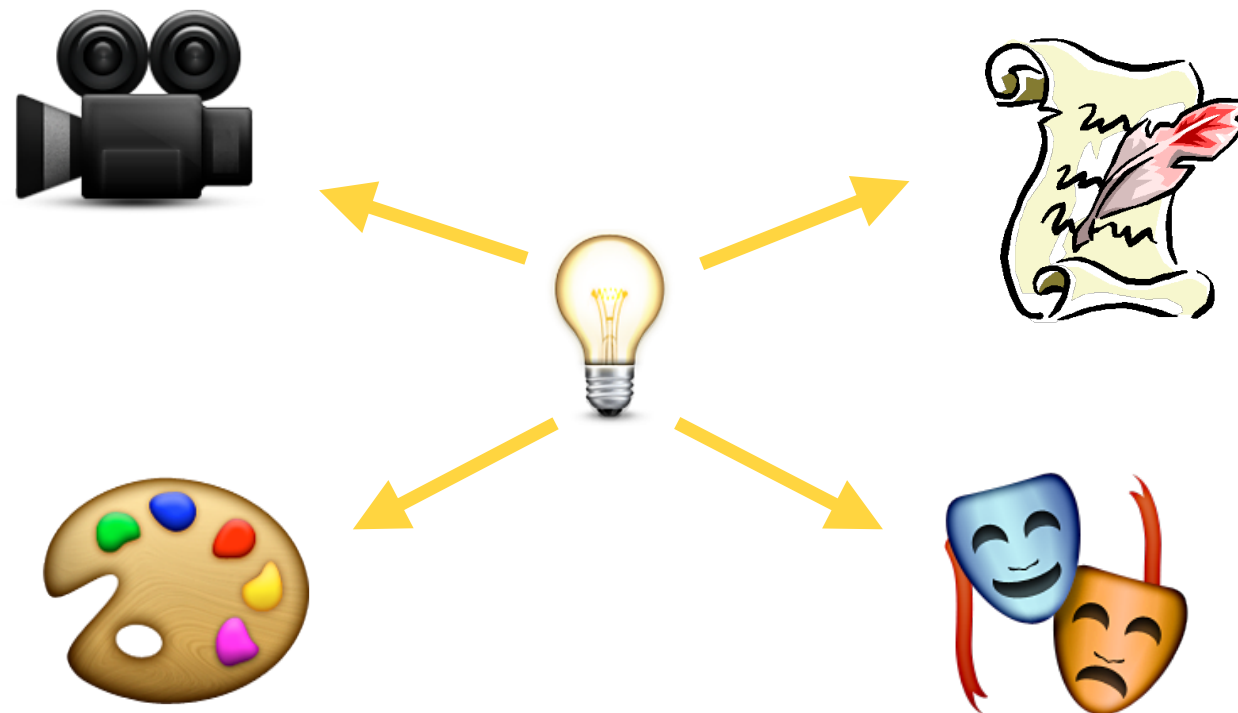Goldsmiths, University of London

Nada Lavrač, Martin Žnidaršič and Matic Perovšek
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University of Cambridge
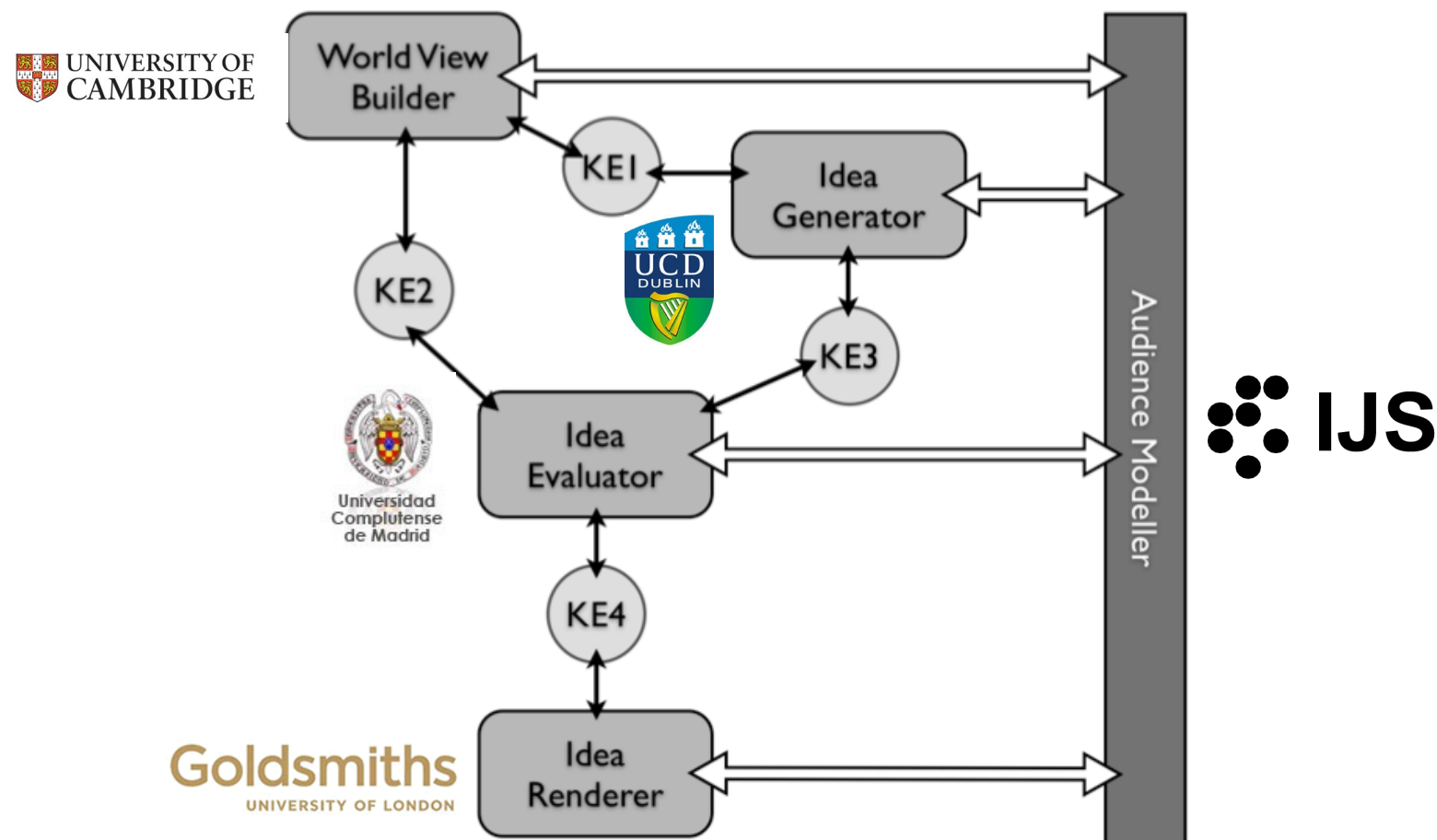
**ICCC'14**

# Idea Generation (Ideation)

Ideation is central to creativity

Fictional ideation is the process of creating new ideas which are not meant to describe a current truth about the world.

# The What-If Machine

- The WHIM project aims at investigating fictional ideation from a computational perspective.



- Today we present 3 baseline methods (against which to compare more sophisticated approaches later on).

# ConceptNet Approach

- ConceptNet is a semantic network of common sense knowledge from the MIT media Lab.

- Facts: [LHS_Concept, Relation, RHS_Concept, Score]



- Fictional ideas are obtained by altering facts from ConceptNet:

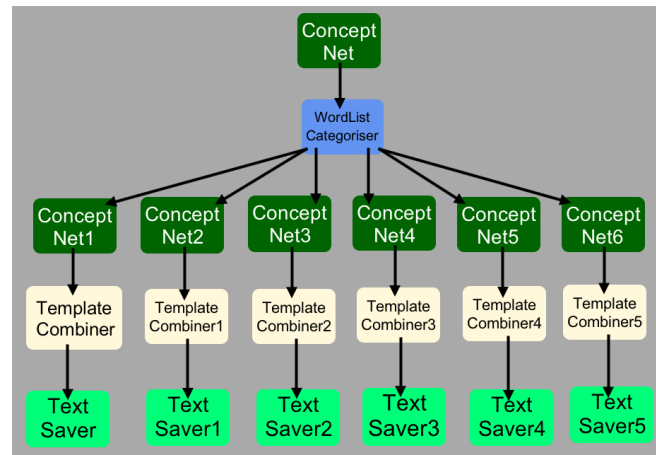*[X, R, Y]  becomes  [X, R', Y], e.g., R' = ¬R*

*[bee,CapableOf,make_honey]*

*becomes [bee,NotCapableOf,make_honey]*

**"What if there was a little bee who couldn't make honey?"**
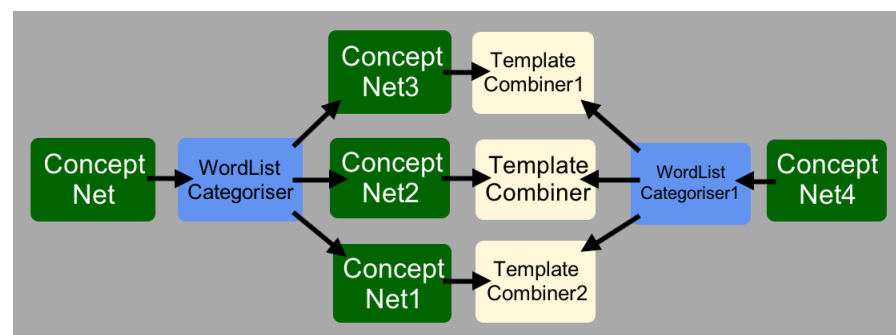
- Inference chaining used to evaluate fictional ideas.

# ConceptNet Approach Examples

## Disney Characters
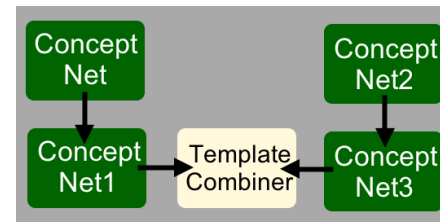


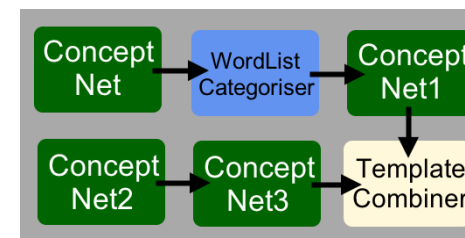What if there was a little cat who learned how to ride a bike?

## Surrealist



What if you painted a dolphin that was made out of gold?

**\* See John's Talk about the FloWr Framework on Friday!**

## Consequences



## Kafkaesque



What if there was a woman who woke up in the sky as a bird, but could still speak?

## Superheroes



What if there was a police officer who had feather wings like a bird?

What if there was an old dog, who couldn't run anymore, which he used to do for fun, so decided instead to ride a horse?
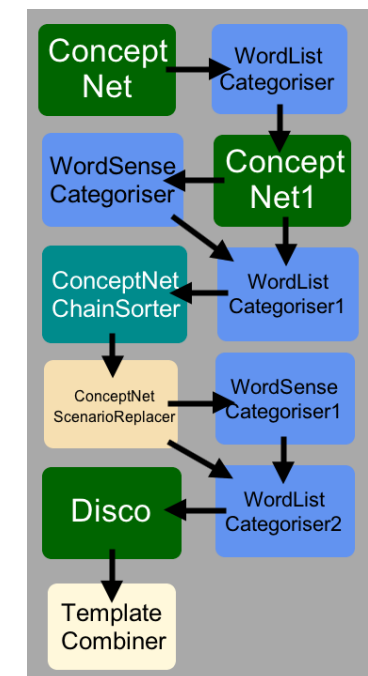
# Reverb Approach

- Reverb is an open information extraction software which obtains facts from raw text.

- Open set of entities and relations.

- Fictional ideation achieved by substituting an argument of a selected fact for an alternative entity.

  - Find facts of the form [X,r,Y]

  - Find facts of the form [X',r,Y']

  - Fact of the form [X,r,Y'] not seen before

| X | r | Y |
|---|---|---|
| Cattle | evolved to | eat grass |

| X' | r | Y' |
|----|---|----|
| __ | evolved to | eat meat |

*"What if Cattle evolved to eat meat?"*

# Reverb Approach
# Examples

Cattle occupy a unique role in human history

↓

**What if Cattle occupy a unique role in modern distributed?**

Scotland is steeped in history

↓

**What if Scotland is steeped in tradition?**

Scotland is a part of the United Kingdom
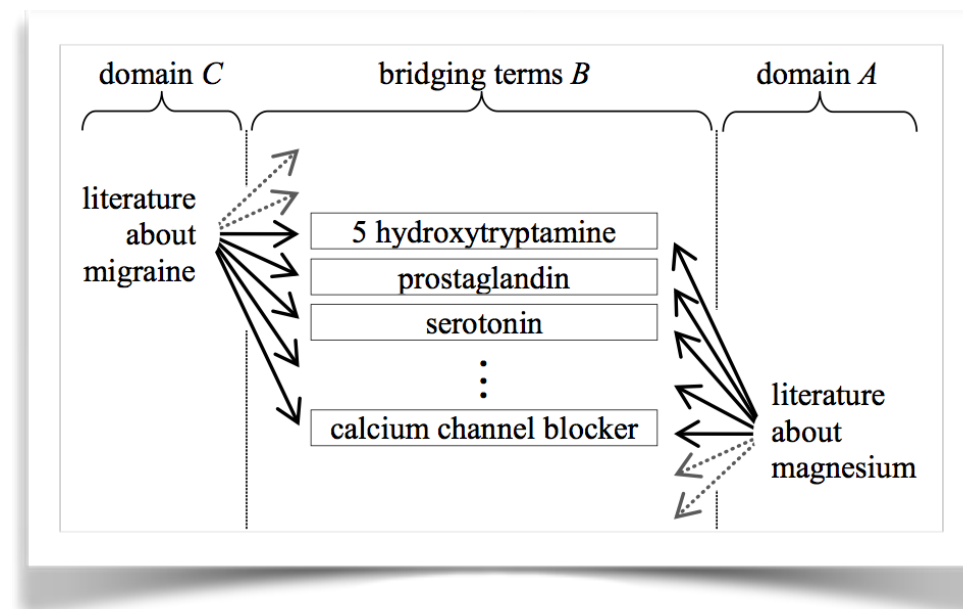
↓

**What if Scotland is a part of life?**

Scotland is in Britain

↓

**What if Scotland is in trouble?**

# Bisociative Discovery Approach

- Bisociation: when a problem, idea, event or situation is perceived simultaneously in two or more domains.

- B-terms: terms which relate different domains.



- The CrossBee system: used for b-term ranking.

- Here b-term potential is used as a measure to rank compound sentence pairs that form creative combinations of statements from two domains:
  - linked what-if tweets and moral statements (Aesop's fables).

# Bisociative Discovery Approach Examples

What if a called myself the pope then charged into the vatican and demanded a duel to the death with an old **man**. Every man should be content to mind his own business.

What if I was not actually a short sixteen year old girl but a 6'2 49 year old **man**. One man's pleasure may be another's pain.

What if the most **troubled** time is now. Trouble comes from the direction we least expect it.

# Baseline Curation Analyses

Team members selected the proportion of ideas that were both understandable and fictional:

| Flowchart | T1 | T2 | Yield | C-Coeff (%) |
|-----------|-----|-----|-------|-------------|
| A | 1 | - | 97 | 72 |
|   | 3 | - | 21 | 90 |
|   | 5 | - | 14 | 93 |
| B | 5 | 1 | 453 | 78 |
|   | 5 | 2 | 94 | 88 |
|   | 5 | 5 | 27 | 100 |
| C | 5 | 1 | 48 | 88 |
|   | 5 | 3 | 7 | 100 |
| D | - | - | 272 | 56 |
| E | - | - | 871 | 76 |
| **Average** | | | **190.4** | **84.1** |

ConceptNet Approach

| Criteria | Yield | C-Coeff (%) |
|----------|-------|-------------|
| Fictional | 500 | 90.9 |
| Understandable | 500 | 94.6 |
| Non-duplicate | 500 | 73.6 |
| **Overall** | **500** | **59.1** |

Reverb Approach

| Criteria | Yield | C-Coeff (%) |
|----------|-------|-------------|
| What-if + moral (b-term) | 32 | 28.1 |
| What-if + moral (random) | 16 | 6.25 |

Bisociative Discovery Approach

# Crowd-Sourcing Study Setup

- Disney characters theme.



Imagine you are suggesting a character to a Disney executive. The character is to be central in a new animated film. Please rank the following characters from best (1) to worst (14) according to your general impression of each.

- What if there was a little fish who couldn't find the underwater?
- What if there was a little bird who couldn't find the tree nest?
- What if there was a little pony who couldn't find the farm?
- …..

- 4 surveys: CapableOf (CO), Desires (D), LocatedNear (LN) and a Mixed survey (CO, D and LN ideas).

# Crowd-Sourcing Study Setup

- 2 classes of ideas:

  - ConceptNet Chaining (CC)

  - Non-Chaining (NC).

- 4 questions per survey:

  - General Impression (GI)

  - Emotional Response (ER)

  - Level of Expectation (LE)

  - Quality and Quantity of Plot Lines (PL)

# Crowd-Sourcing Study Results

- 138 participants: native and non-native English speakers (Minimum of 31 participants per survey).

- CC ideas were ranked around 1 position higher than the NC ideas.

  - Chaining provides a reliable quality measure of fictional ideas.

- Mixed survey: CapableOf ideas ranked higher, followed by Desires ideas and then LocatedNear ideas. Our interpretation:

  - D-ideas and LN-ideas failed with respect to feasibility of the fictional characters:

    - 'a little goat who is afraid of eating' (D-idea) ✖

    - 'a little oyster who couldn't find the half shell' (LN-idea). ✖

  - CO-ideas were found to be "reminiscent of existent cartoons":

    - 'a little bird who couldn't learn to fly' (Animated film Rio). ✔

# Crowd-Sourcing Study Results

- Positive correlations between:

  - Emotional Response (ER)

    Level of Expectation (LE) } General Impression (GI)

    Quality and Quantity of Plot Lines (PL)

  - Chaining scores and average participants' rankings.

  - ConceptNet relations scores (IsA, CapableOf, etc.) and the average participant's ranking.

- Predicting users preferences:

| | MCC | GI | ER | PL | LE |
|---|---|---|---|---|---|
| **Method** | ZeroR | Ridor | RandomTree | NBTree | RandomTree |
| **Accuracy %** | 35.08 | 49.12 | 56.14 | 43.85 | 54.38 |

Majority Class Classifier (MCC) vs Best Classifiers

# What-If Machine
# Online Prototype[1]



- **Category:** select topic/theme.
- **Relation:** type of facts to be transformed.
- **Result Selection:** best idea, top ideas or any idea.
- **Time and Effort:** be quick, try a little or try your hardest.

1. http://www.whim-project.eu/whatifmachine/

# Current and Future Work …

- Improving Inference Chaining Technique - focusing on temporal and causal properties as well as sentiment analysis.

- Application domains: new PhD project at Goldsmiths on *Idea Based Game*.

- Tie in the work from the different WHIM partners.

- Explore different types of renderings:

  [cat, desires, milk] : What if there was a **little** cat who was **afraid** of milk?

  addicted, hatred, obsessed, disappointed, etc…

  Also we are currently exploring the use of poems, riddles, nursery rhymes, stories…:

  **What if there was an animal that lost a body part?**

  *"What if there was a dog that lost his cold nose?*

  *What if there was a dog that lost his good nose?*

  *What if there was a dog that lost his wet nose?*

  *What if there was a monkey that lost his nose?"*

# Thanks!

## www.whim-project.eu
## www.whim-project.eu/whatifmachine/