

# **Analogies: from Theory to Applications (ATA)**

ICCBR 2022 Workshop

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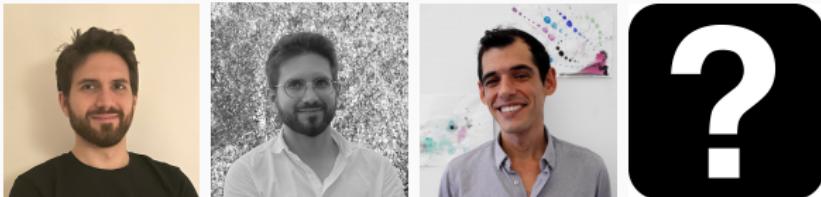
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# Analogies & analogical reasoning (AR)



**Two key cognitive processes:** Inference and Creativity

**Detecting/mining analogies:** Given  $a, b, c$ , and  $d$ ,

- is  $(a, b, c, d)$  a valid analogy?

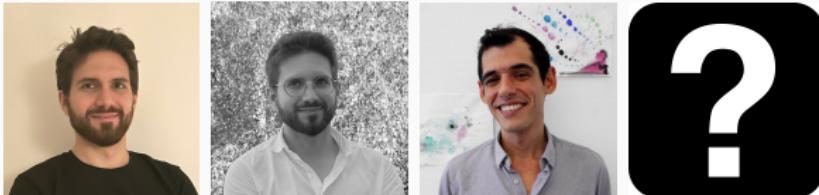
**Solving analogies:** Given  $a, b, c$

- find  $x$  s.t.  $(a, b, c, x)$  a valid analogy

**Reasoning and integrating analogical reasoning:**

- Depending on the concrete application and ML&AI task

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# Different views on AR and ATA goals

**Axiomatic:** As 4-ary relations satisfying certain postulates

**Examples:** reflexivity, (certain) permutations, etc.

**Relational:**  $R(a, b, c, d) \equiv P(P_1(a, b), P_1(c, d))$ , for  $P, P_1$  predicates

**Example:**  $R(\text{wine}, \text{France}, \text{beer}, \text{Germany})$

**Functional:**  $R(a, b, c, d)$  if  $b = T(a)$  and  $d = T(c)$ , for some  $T$

**Example:**  $R(\text{go}, \text{went}, \text{make}, \text{made})$

**Model Theoretic:** Relying on structural transformations and “rewriting”

**Examples:** *Structure mapping theory* and *Justifications*

**Goals:** ATA seeks to explore both **foundational and applicative** aspects of AR in ML & AI, NLP & NLU, KDD & KRR, and real-world applicat.s, as well as bridge gaps with other reasoning frameworks.

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# Program: Morning sessions

**9h00-9h15:** Welcome and opening presentation

**9h15-10h15:** Plenary Talk by **Stergos Afantinos** (Chair: M. Couceiro)

*Analogies: a brief attempt at understanding what they are and an even briefer one at detecting analogies between pairs of sentences.*

**Contributed talks** (Chair: P.-A. Murena)

**10h15-10h40:** Interactions between KG and AR (P. Monnin)

**10h40-11h00:** Break

**11h00-11h25:** Sentence Analogies for text Morphing (Z. Pan?)

**11h30-11h55:** Transferring learned models ... (E. Marquer)

**12h00-12h25:** Extraction of Analogies between sentences (Y. Zhou)

**12h30-12h55:** CoAT-APC (F. Badra)

## Program: Afternoon sessions

**14h30-15h30:** Plenary Talk by **Claire Gardent** (Chair: E. Marquer)  
TBA

**Contributed talks** (Chair: P. Monnin)

**15h30-15h55:** Analogy based framework for patient-stay... (S. Alsaidi)

**16h00-16h25:** Efficient scoring of student analogies in STEM  
(T. Wijesiriwardene)

**16h30-17h00:** Break

**17h00-18h00:** Plenary Talk by **David Raggett** (Chair: P. Monnin)  
*The application of qualitative metadata to analogical reasoning*

**18h00-18h30:** Closing discussion

*We hope for a productive and enjoyable ATA...  
...and let us stay in contact!*

**News:** Elsevier issue in *Annals of Mathematics and Artificial Intelligence*

**Please:** send us your slides to add to our page

**URL:** <https://iccbra-ata2022.loria.fr/>

**Schedule & Papers:** <https://iccbra-ata2022.loria.fr/schedule>