Building a knowledge system to synthesize and use evidence from behaviour change intervention evaluations

Robert West

On behalf of the Human Behaviour Change project Team

Topics

ibtn
international
behavioural
trials network

Why an automated knowledge system?

What kind of knowledge system?

Ingesting study findings

Synthesising study findings

Using study findings

Why an automated knowledge system?

ibtn
international
behavioural
trials network

Scale

Reliability

Trainability

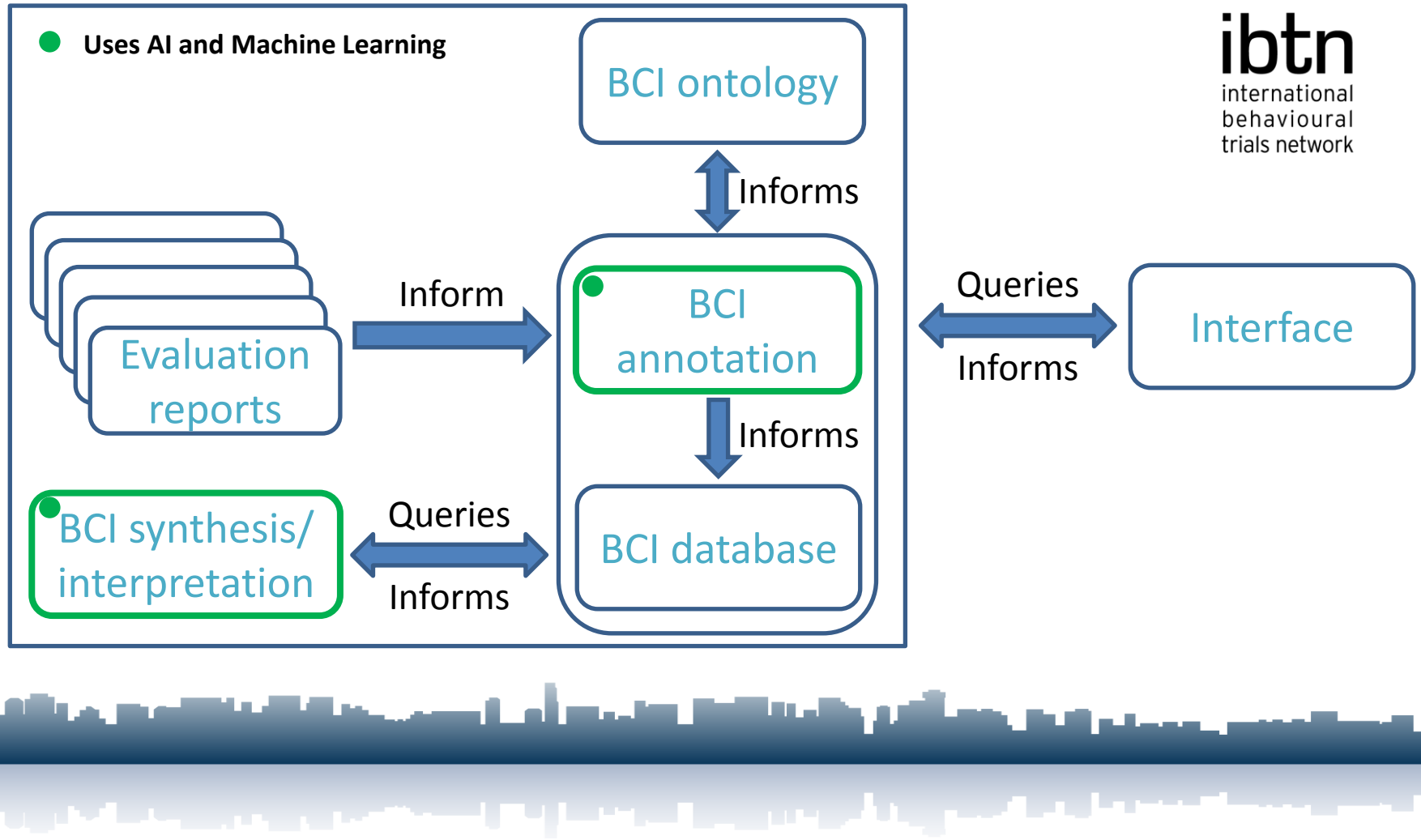
Accuracy

Scope

What kind of system?

ibtn
international
behavioural
trials network

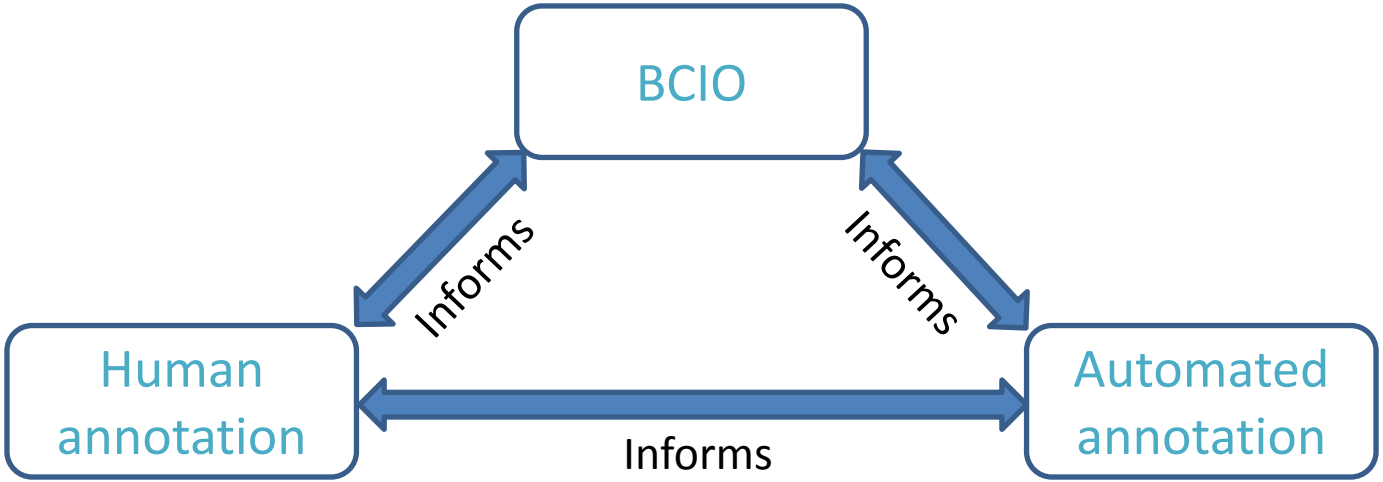
- Actively and continually ingests information from behaviour change intervention evaluations
- Extracts key information structured according to the BCIO
- Undertakes some synthesis on an ongoing basis
- Responds to queries



ibtn
international behavioural trials network

Ingesting study findings

ibtn
international
behavioural
trials network



Challenges

ibtn
international
behavioural
trials network

- >500 entities to be annotated per report
- >1000 types of entity to be annotated
- Variability in language used
- Multiple occurrences of same type of entity
- Variability in where entities are described in reports
- Tables and figures!

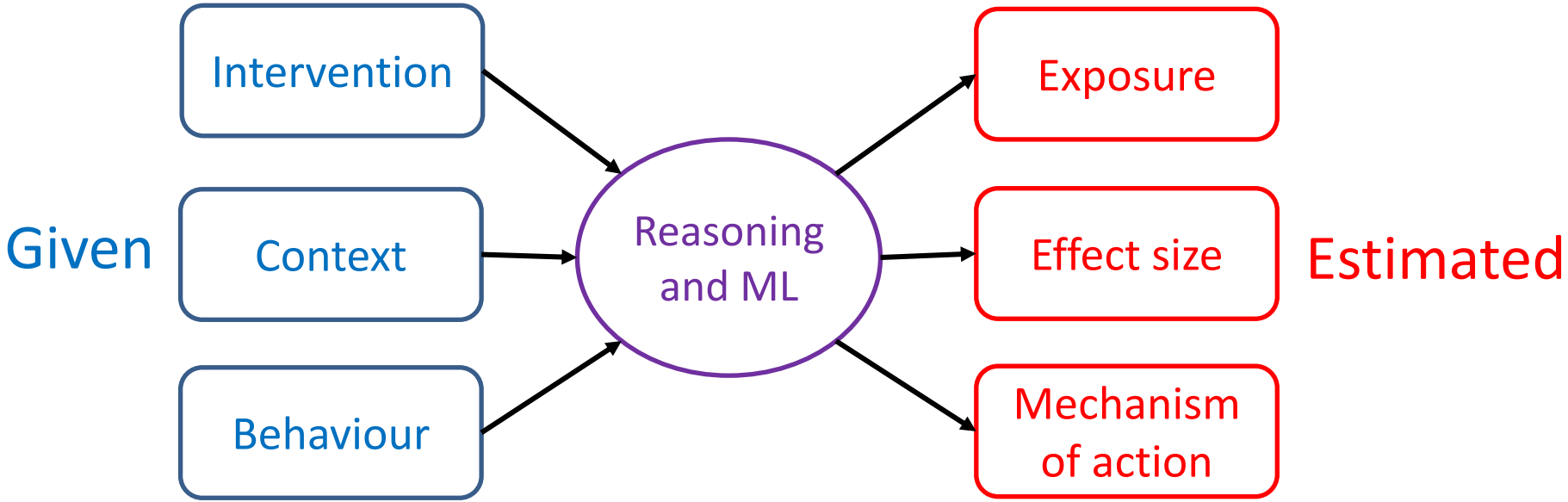
Approach adopted

ibtn
international
behavioural
trials network

- Rather than train individually on every entity, use ‘question and answer’ approach to locate and code
- Create bespoke system for tables and figures
- Refine the system continually using expanding corpus of human-annotated reports

Synthesising study findings

ibtn
international
behavioural
trials network



Combining reasoning and ML

ibtn
international
behavioural
trials network

- Reasoning through axioms attaching to relationships
  - ‘Type of’ permits inheritance of attributes
  - ‘influences’ builds causal networks
- Estimating through predictive ML
  - Statistical inference through regression
  - Interactional inference through ‘deep learning’ etc

Challenges

ibtn
international
behavioural
trials network

Data

- scarcity, reliability, bias

Real world

- complexity, temporal fluidity

Using study findings

ibtn
international
behavioural
trials network

- Better searching
- More timely, complete and accurate meta-analyses
- Identification of information gaps
- Hypothesis generation
- Informing policy and practice

Challenges

ibtn
international
behavioural
trials network

- Asking intelligent questions
- Comprehensible answers
- Trusted answers
- Reality checks