



interaction models

talking generally

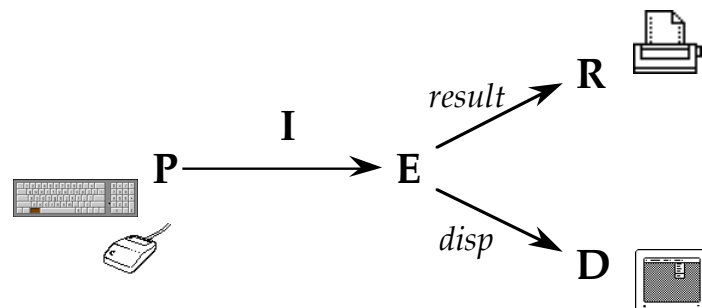
From Formalism to Physicality, Alan Dix, UPC North, 30 April 2008

interaction models

- generic models of classes of system
- mainly to aid understanding of general issues
- e.g. undo and 'back' button

the PIE model

- 'minimal' model of interactive system
- focused on external observable aspects of interaction



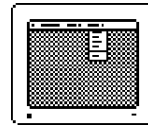
PIE model - user input

- sequence of commands
- commands include:
 - keyboard, mouse movement, mouse click
- call the set of commands C
- call the sequence P
 $P = \text{seq } C$



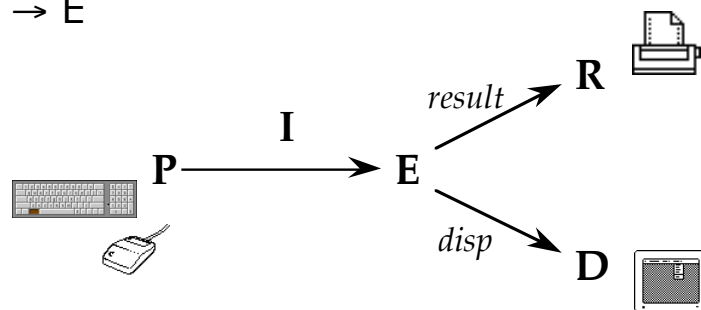
PIE model - system response

- the 'effect'
- effect composed of:
 - ephemeral display
 - the final result
 - (e.g printout, changed file)
- call the set of effects E

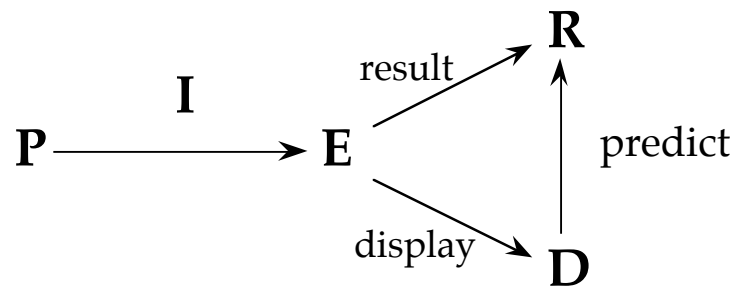


PIE model - the connection

- given any history of commands (P)
- there is some current effect
- call the mapping the interpretation (I)
 $I: P \rightarrow E$



properties - WYSIWYG



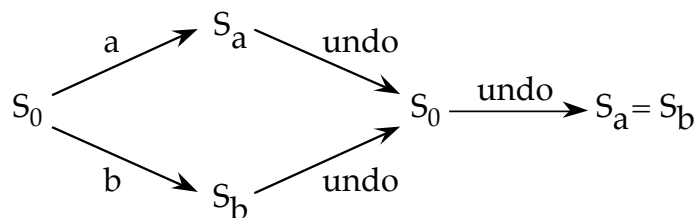
$\exists \text{ predict} \in (D \rightarrow R) \text{ s.t. } \text{predict} \circ \text{display} = \text{result}$

- but really not quite the full meaning

proving things - undo

$\forall c : c \text{ undo} \sim \text{null} ?$

only for $c \neq \text{undo}$



lesson

- undo is no ordinary command!
 - other meta-commands:
 - back/forward in browsers
 - history window
- later analysis of 'back' button and history
in hypertext and web browsers ...
'back' was different in them all!

... another domain ...

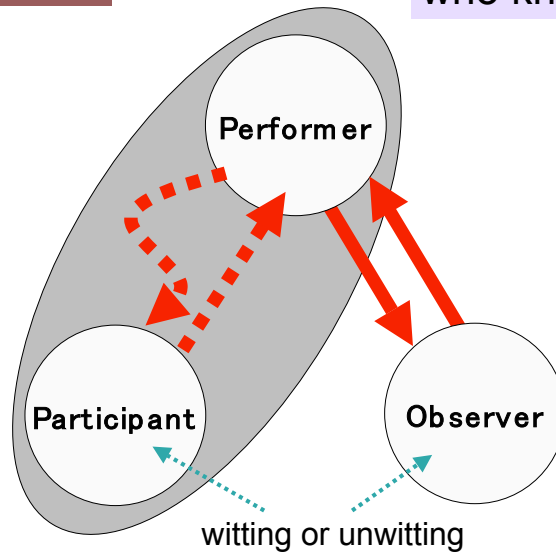
work with Jenn Sheridan Stuart Reeves,
Steve Benford, and Claire O'Malley

... artistic performance

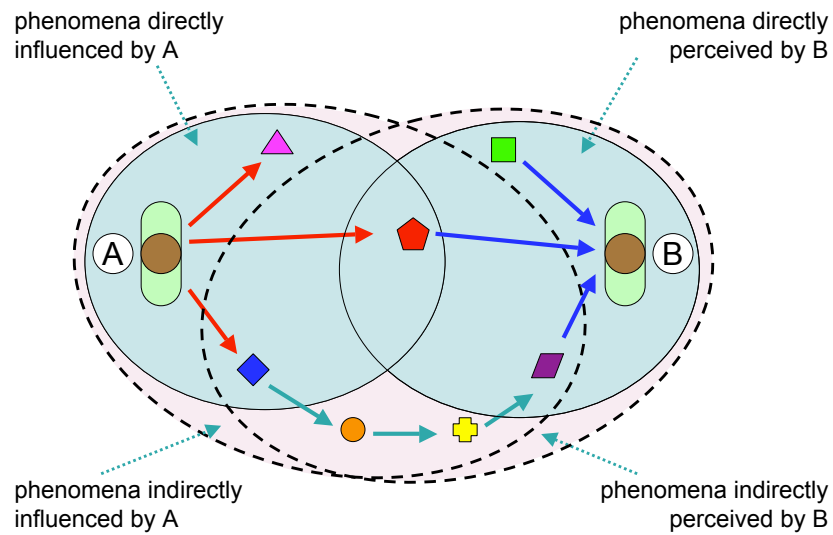
yes formal methods meets art!!

tripartite interaction

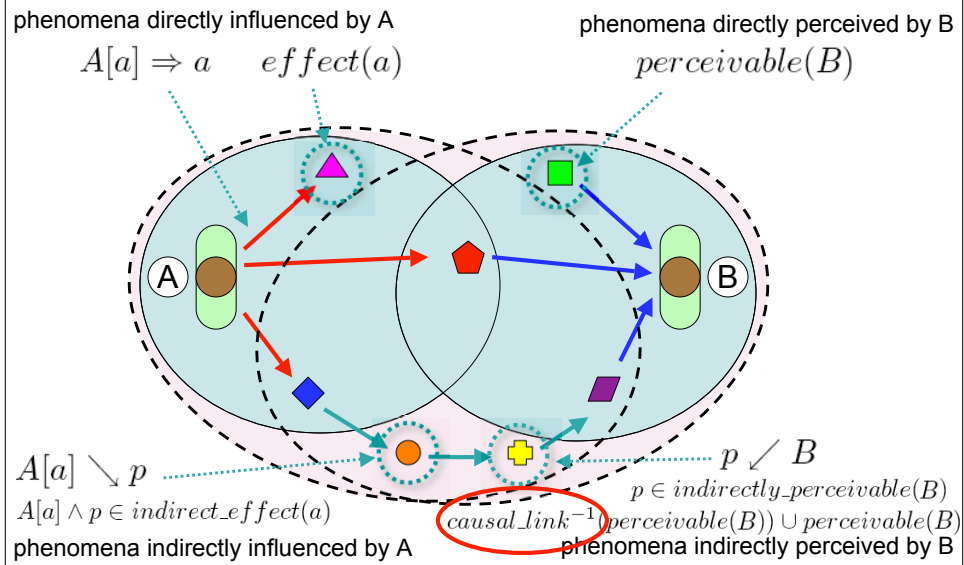
who knows what?



spheres of influence and perception

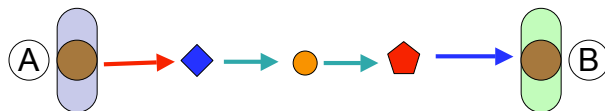


spheres of influence and perception



ordinary interaction

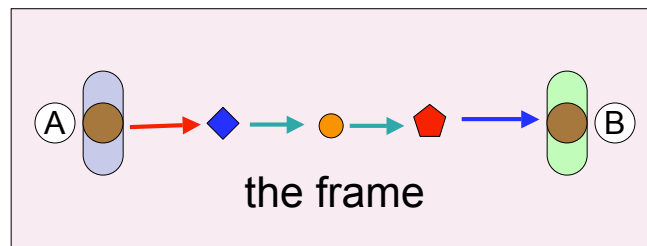
$$A \searrow B \iff \exists a, p \text{ s.t. } A[a] \searrow p \not\prec B$$



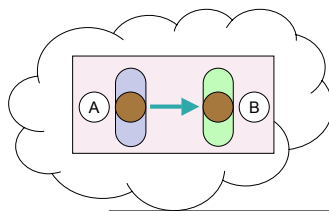
— performance?

in the frame

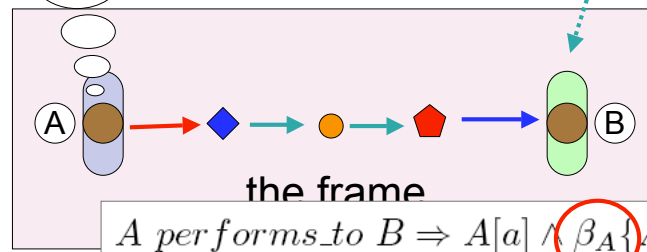
... but not sufficient



— the performer

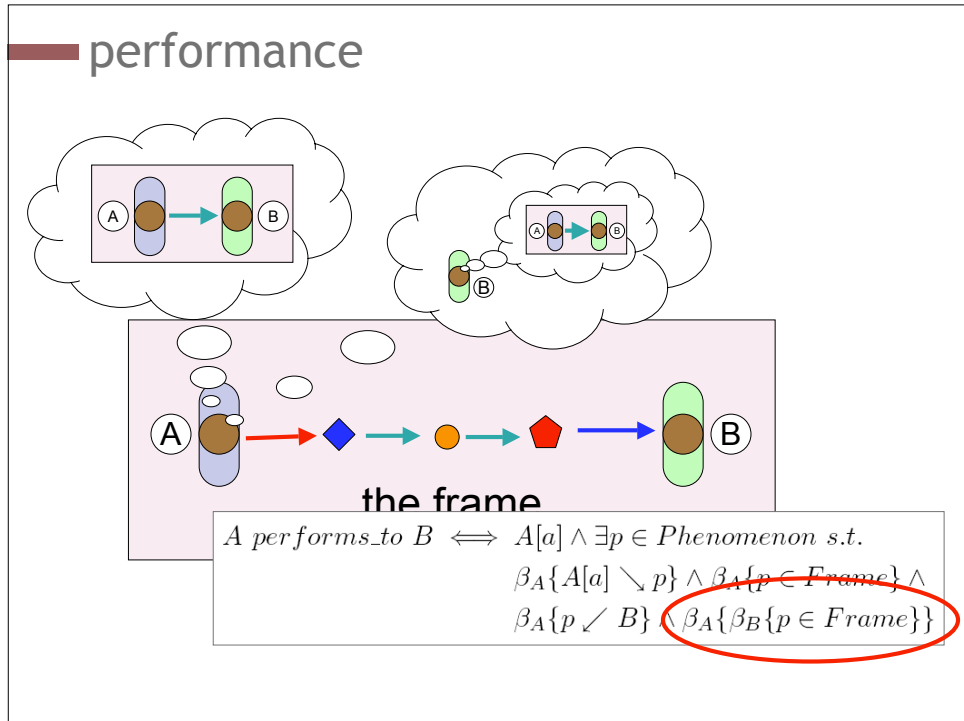
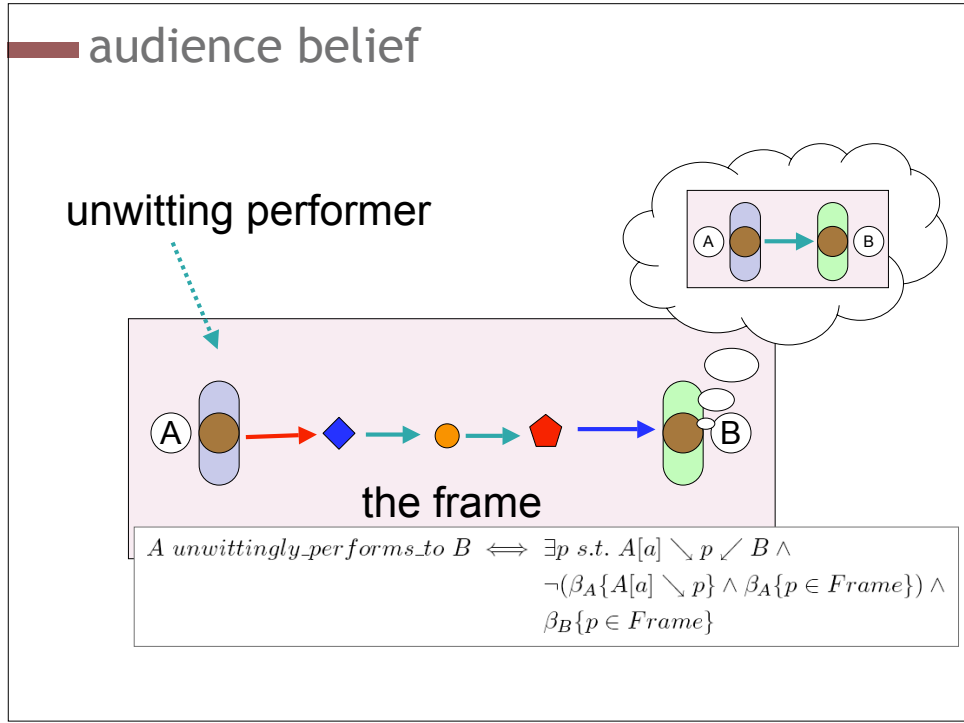


unwitting observer

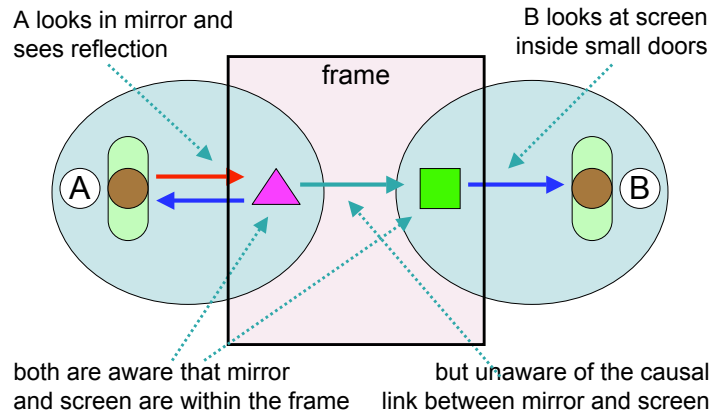


$$A \text{ performs_to } B \Rightarrow A[a] \wedge \beta_A \{A[a] \setminus B\}$$

... still not quite there



Deus Oculi



Deus Oculi - tableaux of beliefs

	actual situation	B_A (A's beliefs)	B_B (B's beliefs)
1. A and B come to the exhibit	mirror $\in$ Frame screen $\in$ Frame mirror $\rightarrow$ screen	mirror $\in$ Frame screen $\in$ Frame + knows B's beliefs	mirror $\in$ Frame screen $\in$ Frame + knows A's beliefs
2. A looks at mirror, B looks at screen	mirror $\hookrightarrow$ A screen $\hookrightarrow$ B A $\rightarrow$ mirror	mirror $\hookrightarrow$ A screen $\hookrightarrow$ B A $\rightarrow$ mirror	mirror $\hookrightarrow$ A screen $\hookrightarrow$ B A $\rightarrow$ mirror
3. B sees A in screen	A $\rightarrow$ mirror $\rightarrow$ screen screen $\hookrightarrow$ B		
4. B infers relationships			mirror $\rightarrow$ screen
5. A looks at mirror, B looks at screen	mirror $\hookrightarrow$ B B $\rightarrow$ mirror mirror $\rightarrow$ screen screen $\hookrightarrow$ B	screen $\in$ Frame	B $\rightarrow$ mirror $\rightarrow$ screen screen $\hookrightarrow$ A + knows A's beliefs