user

percept

integration

visual mental model

decoding + insight formation

information

percept transformation

visualization system

physical presentation

rendering

visual presentation

presentation mapping

abstract visual form

visual mapping

processed data

data transformation

raw data
one-shot
automatic semi-automatic manual
repeated

+ create new branch
merging

Propagation
branching

automatic
repeated
semi-automatic

Interaction
user action

incompatibility
spatial indirection

Instrumental Manipulation
Concrete Pipeline

Conceptual Pipeline

Faithful Rendering

Instrumental Operation

Interaction

Instrumental Manipulation
stereo display

rotate

3D printed coral

coral model + add. data

i

1

2
rotate & mark

physical 3D chart

sort & filter

i