

Behavior-Based Approaches to Visual Perception

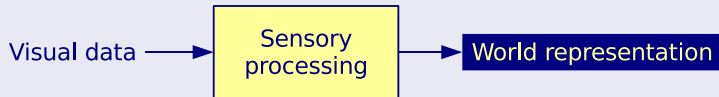
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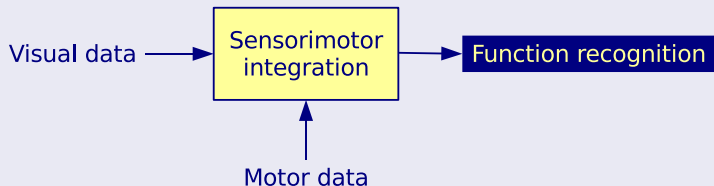
Hamburg, Oct. 10, 2009

Behavior-Based Visual Perception

Classical approach:



Behavior-based approach:



Chairs ...

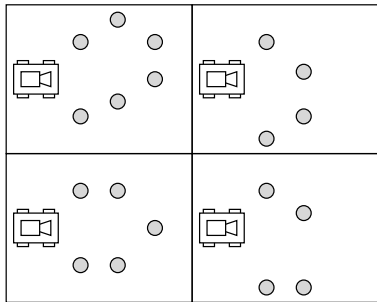
Image with various chairs in varying illumination removed for copyright reasons...

Question: Is it possible to determine the behavioral meaning (the “affordance”; Gibson, 1979) independently from classical object recognition?

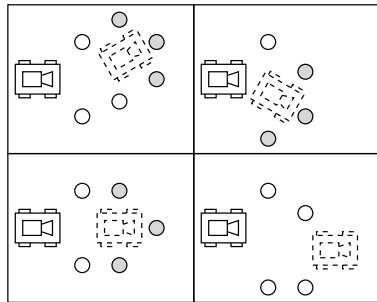
Study 1: Bootstrapping Cognition from Behavior

Möller, R. and Schenck, W. (2008). Bootstrapping cognition from behavior — a computerized thought experiment. *Cognitive Science*, 32(3):504–542

Deadend or corridor?



Simulated movement:



Study 1: Bootstrapping Cognition from Behavior

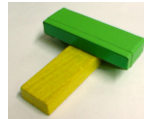
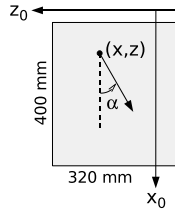
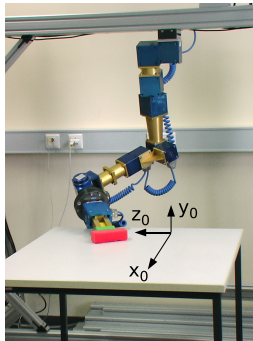
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Basic steps:

- Learning of a visuo-tactile forward model for sensory prediction
- Learning of an inverse model for foresighted obstacle avoidance behavior
- Action simulation with these internal models
- Classification deadend/corridor by a pure motor criterion

Study 2: Space Perception

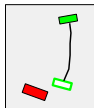
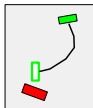
Schenck, W. (2009). Space Perception through Visuokinesthetic Prediction. In: *ABIALS 2008 Postproceedings* (G. Pezzulo, M. Butz, O. Sigaud, & G. Baldassarre, eds.), LNAI 5499, Springer, pp. 247–266



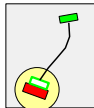
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Initial situation:



Successful simulation:



→ Movement parameters as indicators for perceived distance

Thank you!

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