

Helmut Grabner ¹	Jürge

en Gall¹ Luc Van Gool^{1,2}

¹Computer Vision Laboratory ETH-Zurich, Switzerland ²ESAT - PSI / IBBT K.U. Leuven





Abstract. Many object classes are primarily defined by their functions. However, this fact has been left largely unexploited by visual object categorization or detection systems. We propose a method to learn an *affordance detector*. It identifies locations in the 3d space which ``support" the particular function. Our novel approach ``imagines" an actor performing an action typical for the target object class, instead of relying purely on the visual object appearance. So, function is handled as a cuc complementary to appearance, rather than being a consideration after appearance-based detection. Experimental results are given for the functional category ``sitting". Such affordance is tested on a 3d representation of the scene, as can be realistically obtained through SfM or depth cameras. In contrast to appearance-based object detectors, affordance detection requires only very few training examples and generalizes very well to other sittable objects like benches or sofas when trained on a few chairs.





Coogle Chair Dataset
Dept Camera
Structur from Motion

Results
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset

Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset

Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset

Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset

Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset

Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset

Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset

Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset
Image: Coogle Chair Dataset

Image: Coogle Chair Dataset
Im

* This research was supported by the EC Projects SCOVIS (FP7-ICT-216465), IURO (FP7-ICT-248314), and RADHAR (FP7-ICT-248873).



2D Object Detector



de <

Appearance Function vs.





chairs – except for their intended use. There is little we common to all can find in

[Nelson, 1974]

identifies as having important functional An object is first relations.

fact, are the essence of are perceived and, in that we perceive.

Affordance themselves

James Gibson, 1979

Objects like coffee

to fulfill a function.

that were created cups are artifact

Carlson, 1999



Marvin Minsky, 1986