You-Do, I-Learn: Discovering Task Relevant Objects and their Modes of Interaction from Multi-User Egocentric Video

Dima Damen, Teesid Leelasawassuk, Osian Haines
Andrew Calway and Walterio Mayol-Cuevas

University of Bristol, United Kingdom

University of BRISTOL

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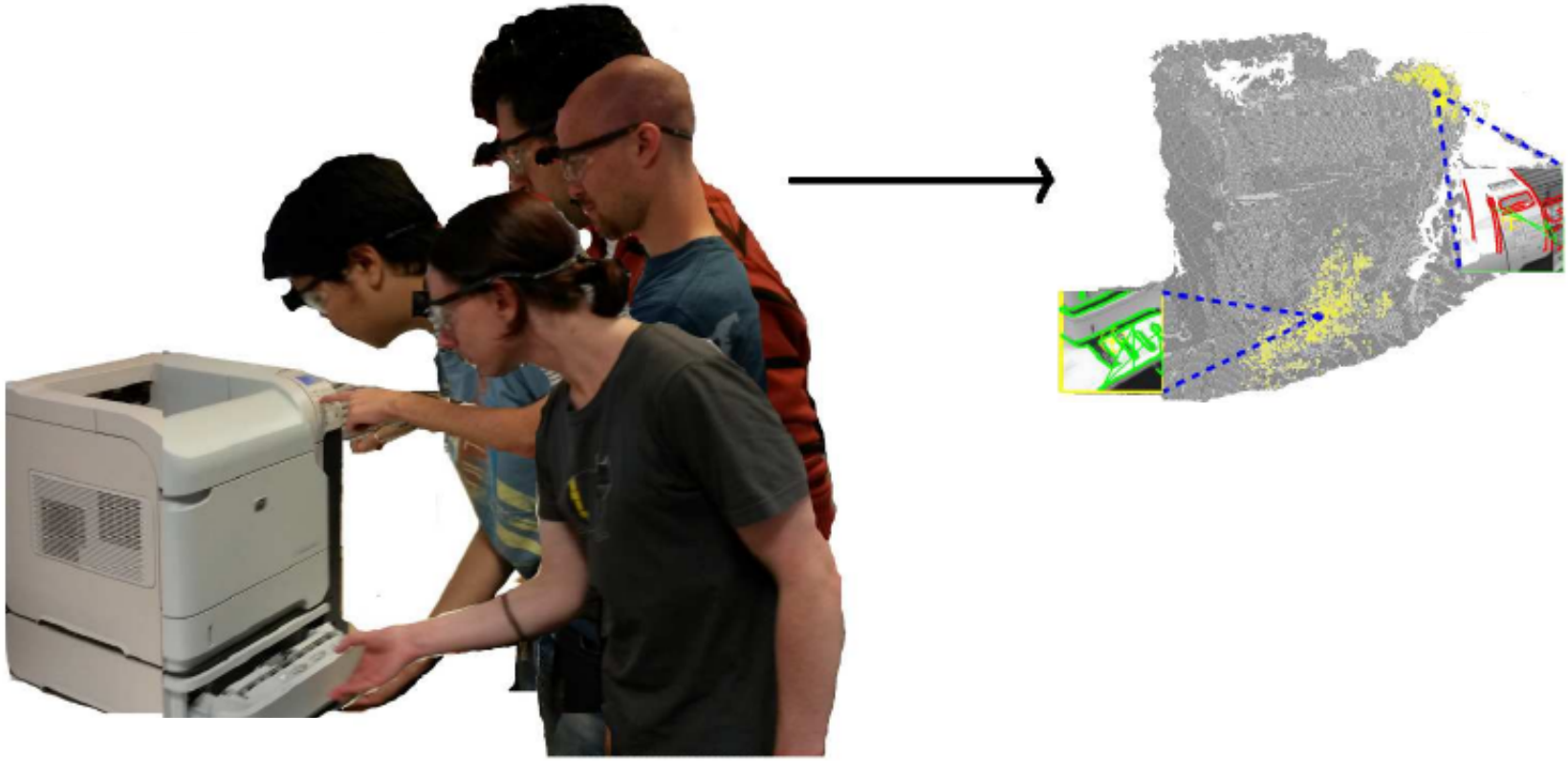
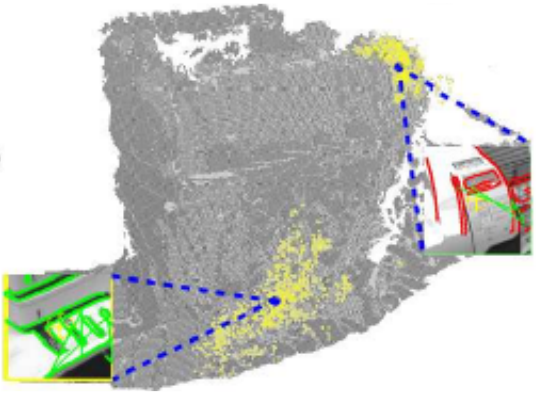
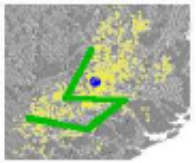
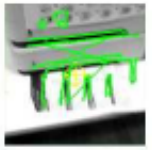




Three sources of information harvested

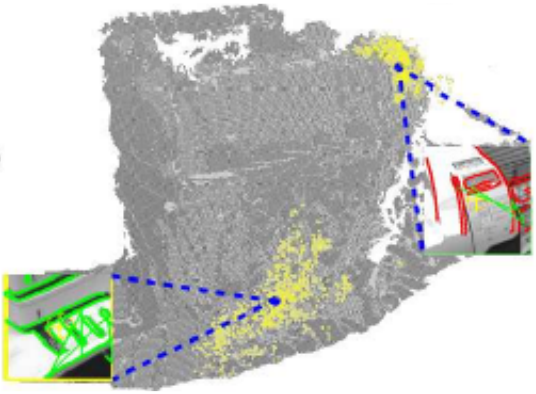


3D Gaze paths



Appearance

Action



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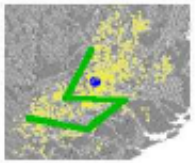

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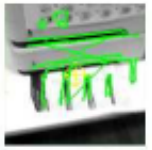


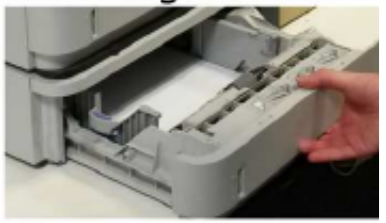
Appearance

Action

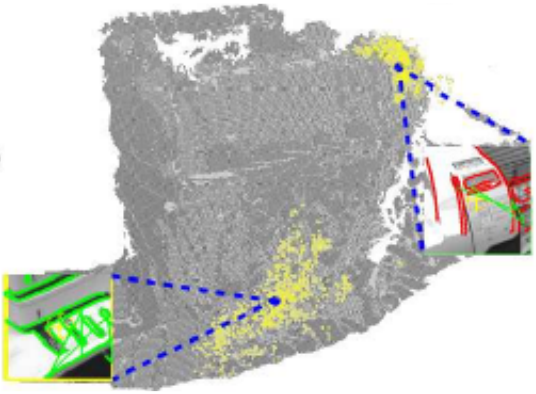
Automatically extracted object Usage Modes

"Mode 1"

"Mode 2"



"Mode 3"



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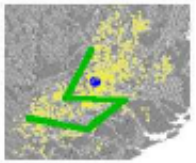
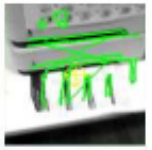


3D Gaze paths



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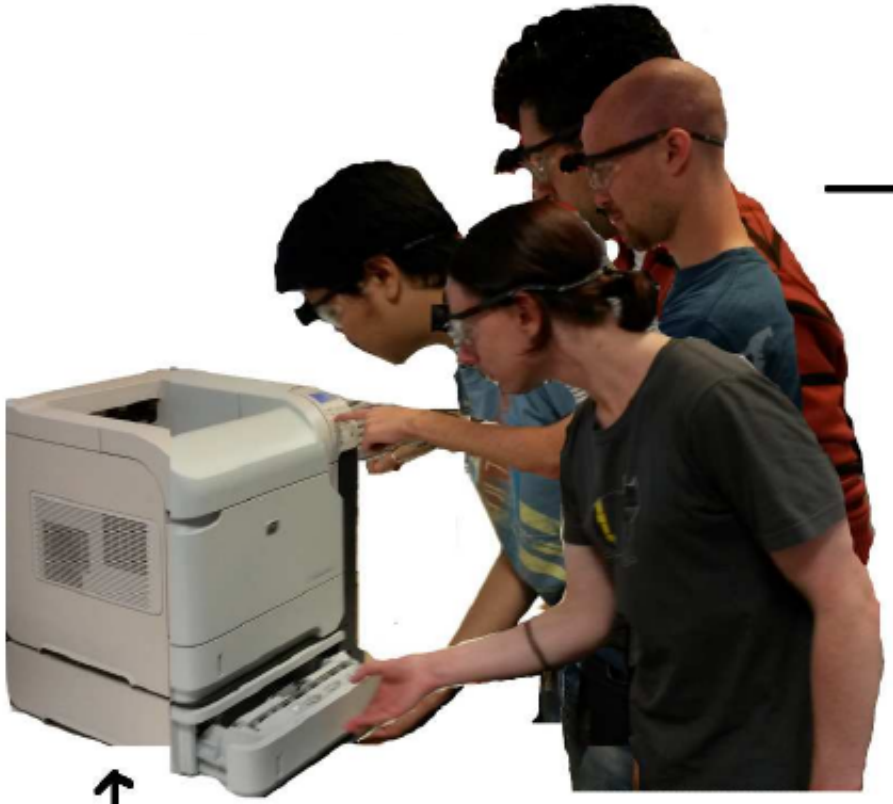
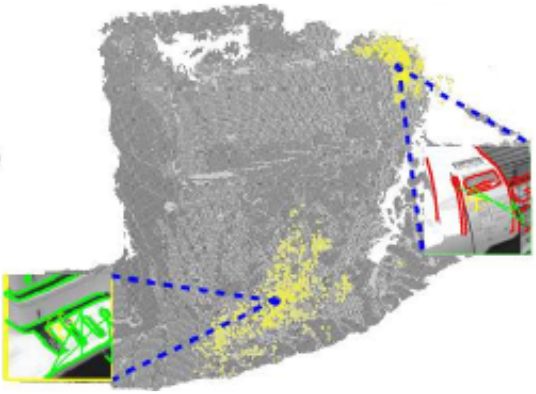
"Mode 1"

"Mode 2"

"Mode 3"

Automatically generated
How-To video guides





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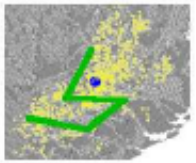
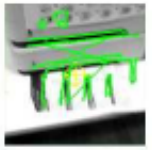


3D Gaze paths



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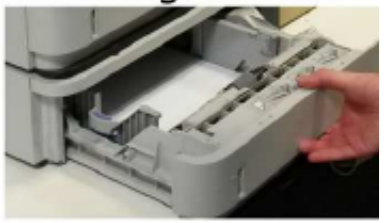
"Mode 2"



"Mode 3"

Triggered by looking

Automatically generated
How-To video guides

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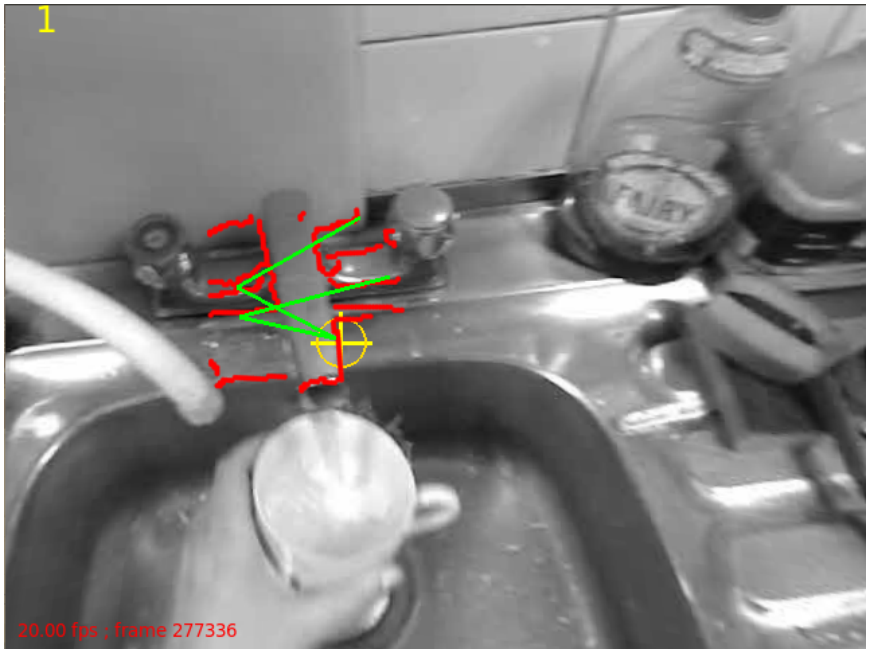
The Proposed Method

- ***fully unsupervised***
- 3D Gaze Fixations
- Online clustering to discover objects
- Fixed objects like a coffee machine
- Moveable objects like a cup
- For each object, from multiple operators, video snippets are extracted.
- Used as help guides – triggered by gaze

Real-time Learning and Detection

- Multiple Texture-minimal Objects [1]



[1] Damen, Dima and Bunnun, Pished and Calway, Andrew and Mayol-Cuevas, Walterio (2012). Real-time Learning and Detection of 3D Texture-less Objects: A Scalable Approach. British Machine Vision Conference (BMVC) [Best Poster Paper]

Results