

# Recognizing Activities of Daily Living with a Wrist-mounted Camera

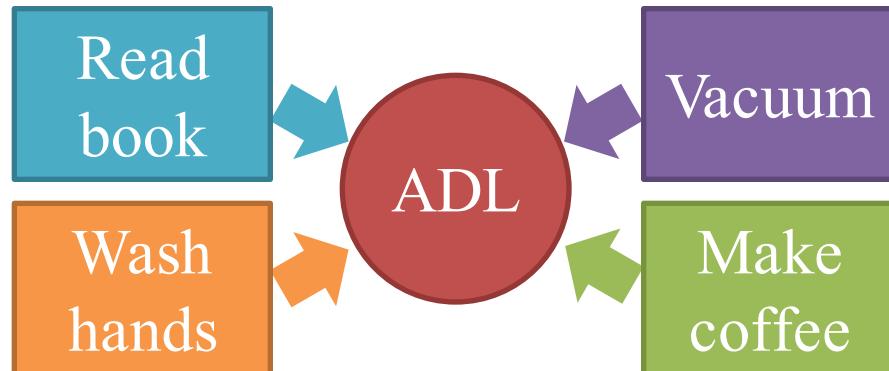
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# Introduction

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- Activities of Daily Living (ADL)
  - Applications: tele-rehabilitation, life-logging



- The key point of ADL recognition is handled object

ADL  
recognition = Handled object  
recognition

Wash  
dishes



Make  
tea

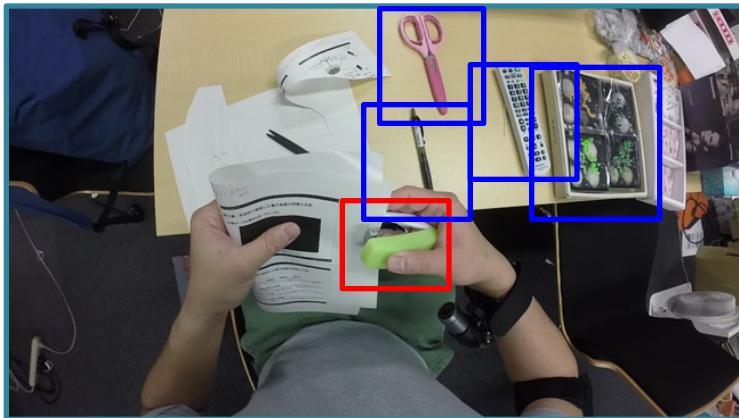


# Wrist-mounted camera

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Head-mounted camera



Wrist-mounted camera



We have to...

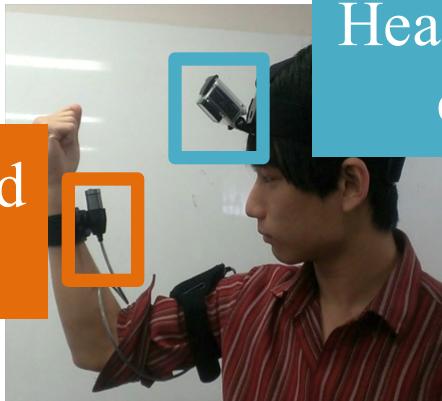
- detect objects
- choose handled object

We can skip detection ☺

# Dataset

Download: <http://www.mi.t.u-tokyo.ac.jp/static/projects/milad1>

Wrist-mounted camera

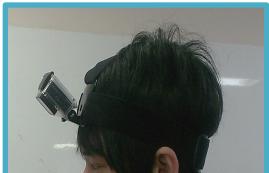


Head-mounted camera

- ✓ 20 subjects
- ✓ 20 different houses
- ✓ 23 daily activities
- ✓ 6.5 hours
- ✓ Publicly available!



Wrist



Head



Mean image

# Dataset

Download: <http://www.mi.t.u-tokyo.ac.jp/static/projects/milad1>

Wrist-mounted  
camera



Head-mounted  
camera

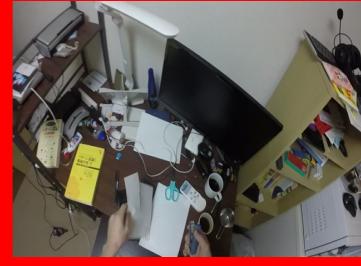
- ✓ 20 subjects
- ✓ 20 different houses
- ✓ 23 daily activities
- ✓ 6.5 hours
- ✓ Publicly available!



Wrist



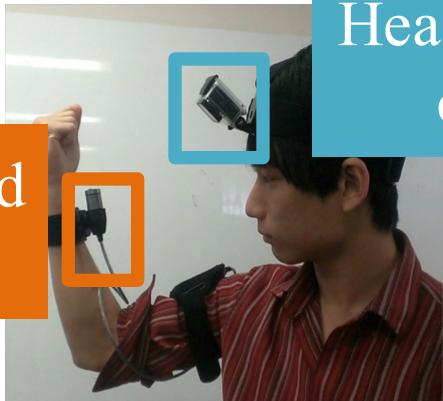
Head  
Mean image



# Dataset

Download: <http://www.mi.t.u-tokyo.ac.jp/static/projects/milad1>

Wrist-mounted camera



Head-mounted camera

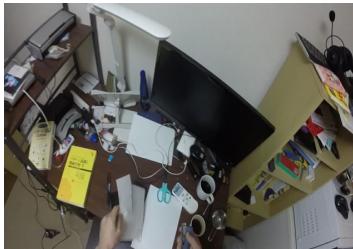
- ✓ 20 subjects
- ✓ 20 different houses
- ✓ 23 daily activities
- ✓ 6.5 hours
- ✓ Publicly available!



Wrist



Head



Mean image

# Dataset Videos

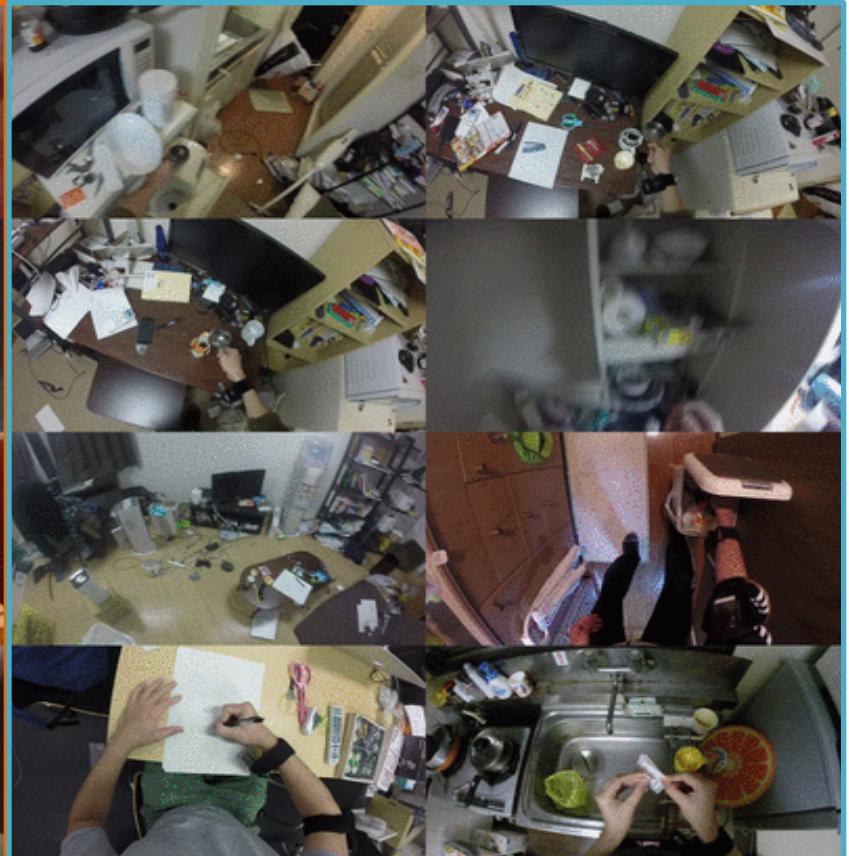
- Handled objects:  
large, always centered

Wrist-mounted camera



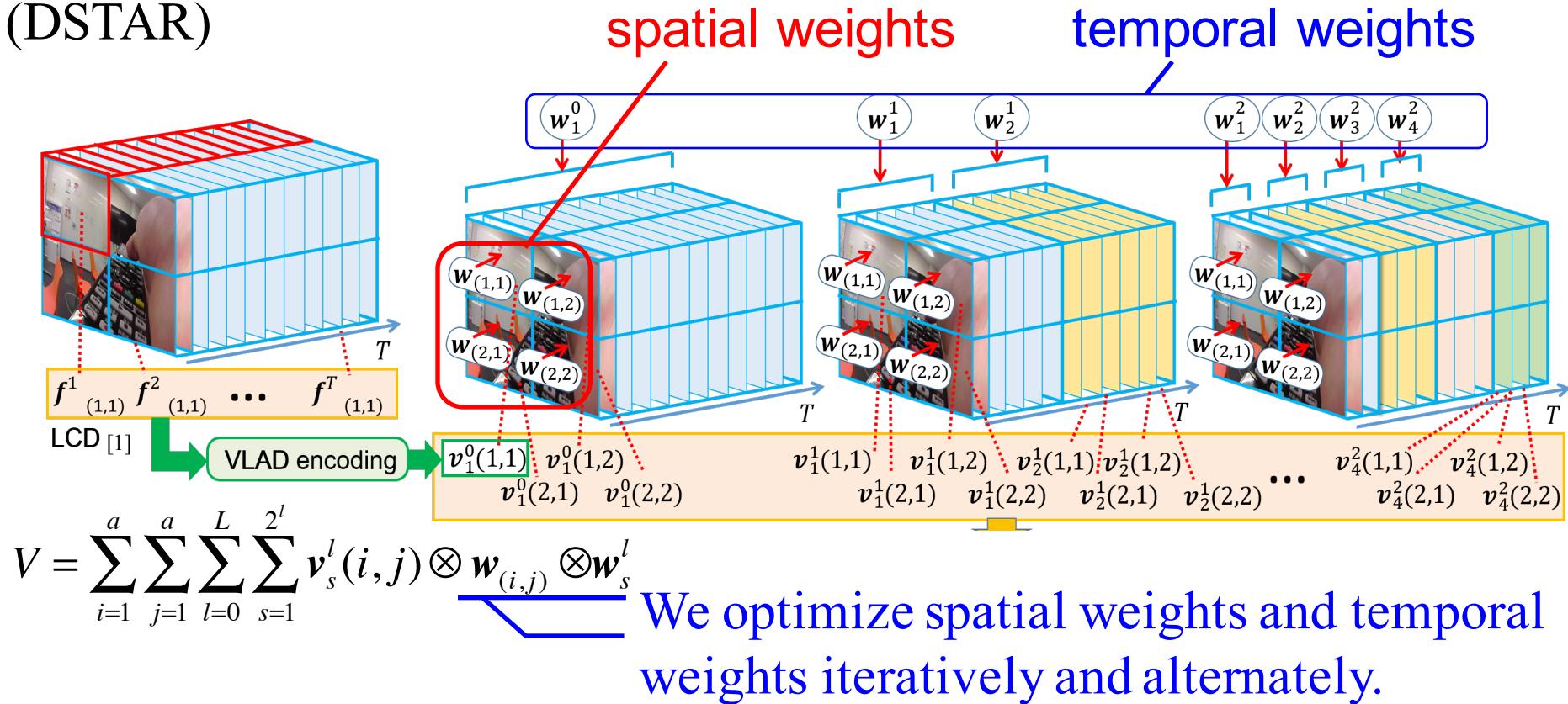
- Handled objects:  
small, different position

Head-mounted camera



# Algorithm

Discriminative Spatio-Temporal Aggregated latent concept descriptors (DSTAR)



DSTAR can take advantage of *spatial bias* and *temporal bias* of the video captured by a wrist-mounted camera

# Results

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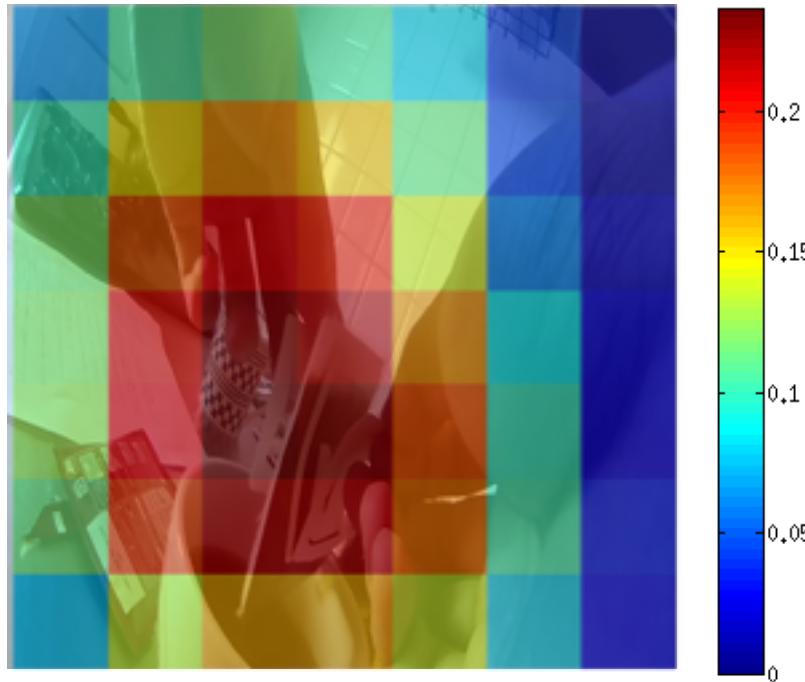


Video Features	WMC	HMC
LCD+VLAD [1]	78.6%	62.4%
DSAR (ours)	<b>82.0%</b>	61.6%
DSTAR (ours)	<b>83.7%</b>	62.0%

Video Features	WMC	HMC
iDT+FV [34]	73.6	78.1
LCD & iDT+FV	84.1	80.5
DSTAR & iDT+FV	<b>85.5</b>	80.2
DSTAR (WCD) & iDT+FV (HCD)		<b>89.7</b>

# Results

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# Summary

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## □ Contribution

- Wrist-mounted camera for ADL recognition, instead of head or chest
- Novel video representation
- Publicly available dataset

## □ Dataset: <http://www.mi.t.u-tokyo.ac.jp/static/projects/miladl>

Thank you

