EPIC Kitchens Dataset

EPIC-Kitchens is the largest dataset in first-person (egocentric) vision; multi-faceted non-scripted recordings in native environments - i.e. the wearers' homes, capturing all daily activities in the kitchen over multiple days. Annotations are collected using a novel 'live' audio commentary approach.

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Citing

When using the dataset, kindly reference:

```
@article{Damen2018EPICKITCHENS,
   title={Scaling Egocentric Vision: The EPIC-KITCHENS Dataset},
   author={Damen, Dima and Doughty, Hazel and Farinella, Giovanni Maria  and Fidler, Sanja and
           Furnari, Antonino and Kazakos, Evangelos and Moltisanti, Davide and Munro, Jonathan
           and Perrett, Toby and Price, Will and Wray, Michael},
   journal={arXiv preprint arXiv:1804.02748},
   year={2018}
}
```

(Check publication here)

Dataset Details

Ground Truth

We provide ground truth for action segments and object bounding boxes.

- **Objects:** Full bounding boxes of narrated objects for every annotated frame.
- **Actions:** Split into narrations and action labels:
  - Narrations containing the narrated sentence with the timestamp.
  - Action labels containing the verb and noun labels along with the start and end times of the segment.

Dataset Splits

The dataset is comprised of three splits with the corresponding ground truth:

- Training set - Full ground truth.
- Seen Kitchens (S1) Test set - Start/end times only.
- Unseen Kitchens (S2) Test set - Start/end times only.

Initially we are only releasing the full ground truth for the training set in order to run action and object challenges.

Important Files

- `README.md (this file)`
- `README.html`
- `README.pdf`
- `license.txt`
- `EPIC_train_action_labels.csv` (Info).
- `EPIC_train_action_labels.pkl` (Info).
- `EPIC_train_action_narrations.csv` (Info).
- `EPIC_train_object_labels.csv` (Info).
- `EPIC_test_s1_timestamps.csv` (Info).
- `EPIC_test_s1_timestamps.pkl` (Info).
- `EPIC_test_s2_timestamps.csv` (Info).
- `EPIC_test_s2_timestamps.pkl` (Info).
- `EPIC_noun_classes.csv` (Info).
- `EPIC_verb_classes.csv` (Info).

We direct the reader to RDSF for the videos and rgb/flow frames.

We provide html and pdf alternatives to this README which are auto-generated.

Files Structure

EPIC_train_action_labels.csv

CSV file containing 14 columns:

Column Name	Type	Example	Description
`uid`	int	`6374`	Unique ID of the segment.
`video_id`	string	`P03_01`	Video the segment is in.

Column Name	Type	Example	Description
narration	string	close fridge	English description of the action provided by the participant.
start_timestamp	string	00:23:43.847	Start time in HH:mm:ss.SSS of the action.
stop_timestamp	string	00:23:47.212	End time in HH:mm:ss.SSS of the action.
start_frame	int	85430	Start frame of the action (WARNING only for frames extracted as detailed in Video Information).
stop_frame	int	85643	End frame of the action (WARNING only for frames extracted as detailed in Video Information).
participant_id	string	P03	ID of the participant.
verb	string	close	Parsed verb from the narration.
noun	string	fridge	First parsed noun from the narration.
verb_class	int	3	Numeric ID of the parsed verb's class.
noun_class	int	10	Numeric ID of the parsed noun's class.
all_nouns	list of string (1 or more)	['fridge']	List of all parsed nouns from the narration.
all_nouns_class	list of int (1 or more)	[10]	List of numeric IDs corresponding to all of the parsed nouns' classes from the narration.

Please note we have included a python pickle file for ease of use. This includes a pandas dataframe with the same layout as above.

EPIC_train_action_narrations.csv

CSV file containing 5 columns:

Note: The start/end timestamp refers to the start/end time of the narration, not the action itself.

Column Name	Type	Example	Description
participant_id	string	P03	ID of the participant.
video_id	string	P03_01	Video the segment is in.
start_timestamp	string	00:23:43.847	Start time in HH:mm:ss.SSS of the narration.
stop_timestamp	string	00:23:47.212	End time in HH:mm:ss.SSS of the narration.
narration	string	close fridge	English description of the action provided by the participant.

EPIC_train_object_labels.csv

CSV file containing 6 columns:

Column Name	Type	Example	Description
noun_class	int	20	Integer value representing the class in noun-classes.csv.
noun	string	bag	Original string name for the object.
participant_id	string	P01	ID of participant.
video_id	string	P01_01	Video the object was annotated in.
frame	int	056581	Frame number of the annotated object.
bounding_boxes	list of 4-tuple (0 or more)	"[(76, 1260, 462, 186)]"	Annotated boxes with format (<top:int>,<left:int>,<width:int>,<height:int>).

EPIC_test_s1_timestamps.csv

CSV file containing 7 columns:

Column Name	Type	Example	Description
uid	int	1924	Unique ID of the segment.
participant_id	string	P01	ID of the participant.
video_id	string	P01_11	Video the segment is in.
start_timestamp	string	00:00:00.000	Start time in HH:mm:ss.SSS of the action.
stop_timestamp	string	00:00:01.890	End time in HH:mm:ss.SSS of the action.
start_frame	int	1	Start frame of the action (WARNING only for frames extracted as detailed in Video Information).
stop_frame	int	93	End frame of the action (WARNING only for frames extracted as detailed in Video Information).

Please note we have included a python pickle file for ease of use. This includes a pandas dataframe with the same layout as above.

EPIC_test_s2_timestamps.csv

CSV file containing 7 columns:

Column Name	Type	Example	Description
uid	int	15582	Unique ID of the segment.
participant_id	string	P09	ID of the participant.
video_id	string	P09_01	Video the segment is in.
start_timestamp	string	00:00:01.970	Start time in HH:mm:ss.SSS of the action.

Column Name	Type	Example	Description
`stop_timestamp`	string	`00:00:03.090`	End time in `HH:mm:ss.SSS` of the action.
`start_frame`	int	`118`	Start frame of the action (WARNING only for frames extracted as detailed in Video Information).
`stop_frame`	int	`185`	End frame of the action (WARNING only for frames extracted as detailed in Video Information).

Please note we have included a python pickle file for ease of use. This includes a pandas dataframe with the same layout as above.

EPIC_noun_classes.csv

CSV file containing 3 columns:

Note: a colon represents a compound noun with the more generic noun first. So pan:dust should be read as dust pan.

Column Name	Type	Example	Description
`noun_id`	int	`2`	ID of the noun class.
`class_key`	string	`pan:dust`	Key of the noun class.
`nouns`	list of string (1 or more)	`"['pan:dust', 'dustpan']"`	All nouns within the class (includes the key).

EPIC_verb_classes.csv

CSV file containing 3 columns:

Column Name	Type	Example	Description
`verb_id`	int	`3`	ID of the verb class.
`class_key`	string	`close`	Key of the verb class.
`verbs`	list of string (1 or more)	`"['close', 'close-off', 'shut']"`	All verbs within the class (includes the key).

File Downloads

Due to the size of the dataset we provide three scripts for downloading the videos, frames or object annotation images separately.

Note: These scripts will work for Linux and Mac. For Windows users a bash installation should work.

These scripts replicate the folder structure of the dataset release, found here.

If you wish to download part of the dataset instructions can be found here.

Video Information

Videos are recorded in 1080p at 59.94 FPS on a GoPro Hero 5 with linear field of view. There are a minority of videos which were shot at different resolutions, field of views, or FPS due to participant error or camera. These videos identified using `ffprobe` are:

- 1280x720: `P12_01`, `P12_02`, `P12_03`, `P12_04`.
- 2560x1440: `P12_05`, `P12_06`
- 29.97 FPS: `P09_07`, `P09_08`, `P10_01`, `P10_04`, `P11_01`, `P18_02`, `P18_03`
- 48 FPS: `P17_01`, `P17_02`, `P17_03`, `P17_04`
- 90 FPS: `P18_09`

The GoPro Hero 5 was also set to drop the framerate in low light conditions to preserve exposure leading to variable FPS in some videos. If you wish to extract frames we suggest you resample at 60 FPS to mitigate issues with variable FPS, this can be achieved in a single step with FFmpeg:

```
ffmpeg -i "P##_**.MP4" -vf "scale=-2:256" -q:v 4 -r 60 "P##_**/frame_%010d.jpg"
```

where `##` is the Participant ID and `**` is the video ID.

Optical flow was extracted using a fork of `gpu_flow` made available on github. We set the parameters: stride = 2, dilation = 3, bound = 25 and size = 256.

License

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Changelog

- 09/04/18: Initial Release