Accio: A Data Set for Face Track Retrieval in Movies Across Age

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Contributions

- Challenging face track data set: Harry Potter Movies Aging Data set (*Accio*)
- Spans a period of ten years, showing large variations in face images for young actors
- Two tasks for the evaluation: within and across face track retrieval
- Baseline results for the retrieval performance using state of art face track descriptor

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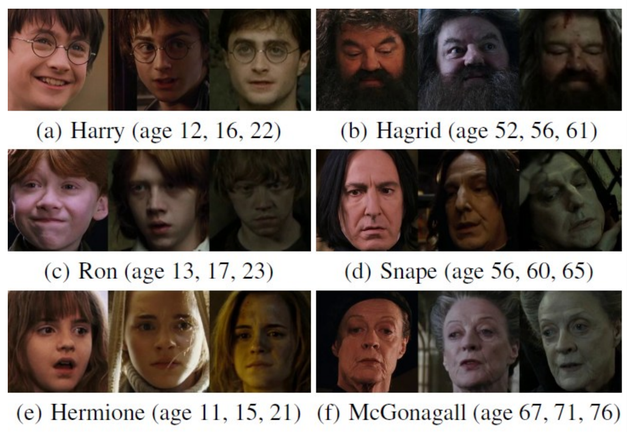
Motivation

Video face recognition challenges such as illumination, resolution and pose are well studied. However there is no data set to study video-based age invariant face recognition.

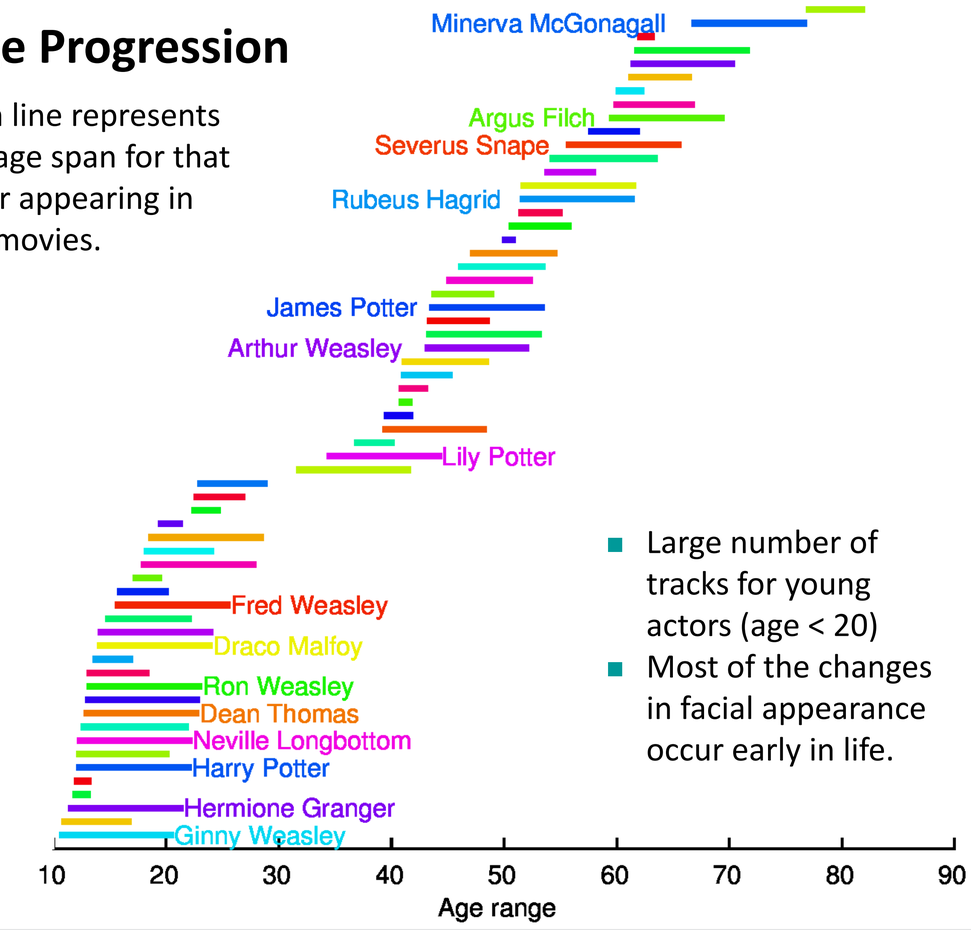
In this work we present a face track data set: Harry Potter Movies Aging Data set (Accio) to study the effects of aging on facial appearance.



(a) Harry (age 12, 16, 22) (b) Hagrid (age 52, 56, 61) (c) Ron (age 13, 17, 23) (d) Snape (age 56, 60, 65) (e) Hermione (age 11, 15, 21) (f) McGonagall (age 67, 71, 76)

Age Progression

Each line represents the age span for that actor appearing in the movies.

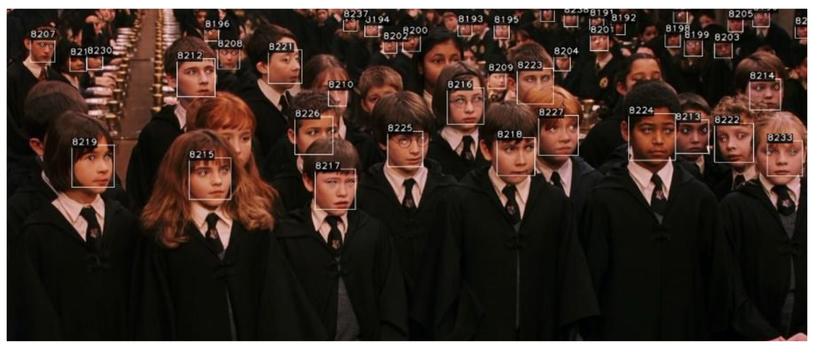


- Large number of tracks for young actors (age < 20)
- Most of the changes in facial appearance occur early in life.

Data Set

- *Data Source*

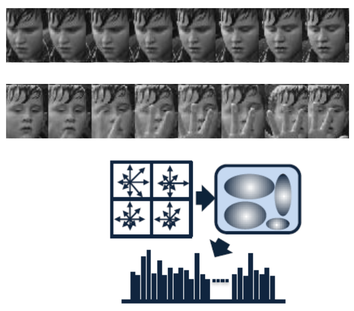
Data is collected and organized using the eight Harry Potter Movies that were released in a period of ten years (2001 – 2011).



- *Face Track Descriptor*

We first detect shot boundaries and within each shot use multi-pose face detectors to find faces. A particle filter tracker is used to form face tracks [2].

The tracks are then encoded using state-of-art Video Fisher Vector Faces [18].



[2] M. Bäuml, M. Tapaswi, and R. Stiefelhagen. Semi-supervised Learning with Constraints for Person Identification in Multimedia Data. In *CVPR*, 2013.

[18] O. M. Parkhi, K. Simonyan, A. Vedaldi, and A. Zisserman. A Compact and Discriminative Face Track Descriptor. In *CVPR*, 2014.

- *Statistics*

The data set contains a total of 38,464 face tracks. 22,830 (59.4%) of these face tracks are labeled with one of 121 character identities as they appear in the film series. The others act as a distractor set for the experiments.

	HP-1	HP-2	HP-3	HP-4	HP-5	HP-6	HP-7	HP-8
# characters	36	42	34	44	47	41	56	54
# face tracks	5249	5335	3919	7616	5850	3354	2910	4231
# unknown tracks	2006	1874	1437	4237	2316	1116	623	2025
# named tracks	3243	3461	2482	3379	3534	2238	2287	2206

- *Comparison of age-invariant face recognition data sets*

Unlike other data sets, ours consists of face tracks, which on average are 50 frames (2 seconds) long thus yielding over 1.9 million face images

Data set	video?	# images	# people	age span
FGNET	No	1,002	82	0-45
MORPH	No	55,134	13,618	0-5
CACD	No	163,446	2,000	0-10
ACCIO [Ours]	Yes	38,464 tracks	121	0-10

Experiments

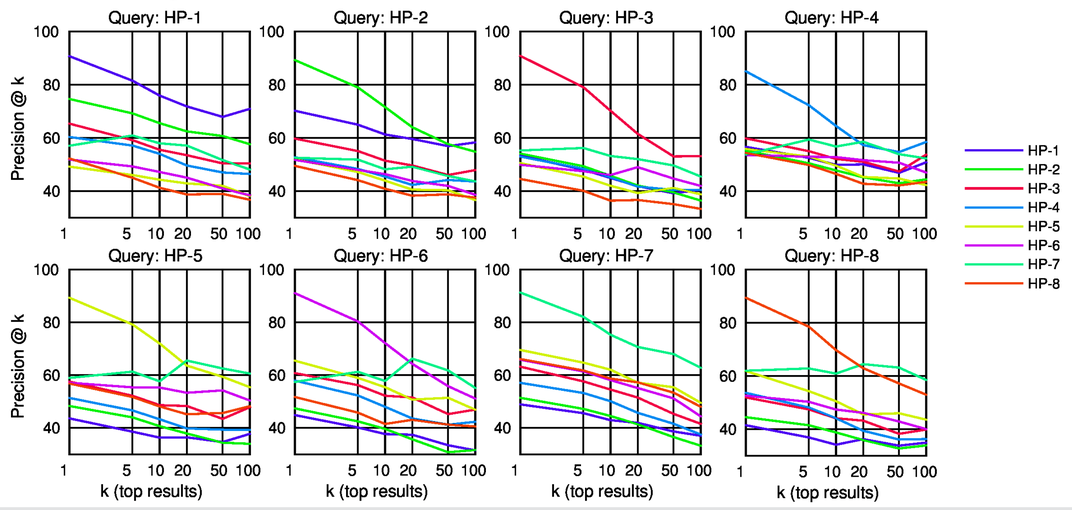
- *Within* movie face track retrieval

	HP-1	HP-2	HP-3	HP-4	HP-5	HP-6	HP-7	HP-8
P @ 1	90.8	89.3	90.9	85.1	89.4	91.1	91.3	89.4
P @ 5	81.5	79.0	79.1	72.3	79.3	80.4	82.1	78.6
P @ 20	71.9	64.0	61.5	57.3	63.7	64.3	70.7	63.0
P @ 50	67.9	57.6	53.0	54.7	59.4	55.8	68.0	57.2
P @ 100	70.9	54.8	53.1	58.5	55.5	51.1	62.8	53.0
MAP	42.4	31.7	31.2	28.4	32.1	30.4	38.6	33.2

- *Across m*ovies face track retrieval

	HP-1	HP-2	HP-3	HP-4	HP-5	HP-6	HP-7	HP-8
HP-1	42.4	31.1	26.8	24.5	21.5	22.2	27.7	20.0
HP-2	32.1	31.7	22.9	20.1	18.6	19.8	23.2	17.9
HP-3	23.0	20.8	31.2	19.9	18.1	21.0	23.4	16.2
HP-4	27.2	23.3	27.1	28.4	20.9	23.0	24.4	20.5
HP-5	20.3	18.5	22.0	17.4	32.1	22.5	25.7	20.8
HP-6	21.4	18.3	24.3	19.8	23.7	30.4	24.5	17.9
HP-7	24.3	20.8	24.7	19.6	26.4	24.8	38.5	25.5
HP-8	19.9	18.8	20.2	18.1	21.7	20.8	28.4	33.2

- Precision @ k results



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