Automatic annotation of head velocity and acceleration in Anvil

Jongejan, Bart

Published in:
Proceedings of the Eighth International Conference on Language Resources and Evaluation (LREC'12)

Publication date:
2012

Document Version
Author final version (often known as postprint)

Citation for published version (APA):
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Bart Jongejan

We describe an automatic face tracker plugin for the ANVIL annotation tool. The face tracker produces data for velocity and for acceleration in two dimensions. We compare the annotations generated by the face tracking algorithm with independently made manual annotations for head movements. The annotations are a useful supplement to manual annotations and may help human annotators to quickly and reliably determine onset of head movements and to suggest which kind of head movement is taking place.

Velocity:

\[ v_x = \frac{x(t + \Delta t) - x(t)}{\Delta t} \]

\[ a_x = \frac{v_x(t + \Delta t) - v_x(t)}{\Delta t} \]

Nod:

- up
- down

HeadForward:

- up
- down

Shake:

- left
- right

SideTurn:

- left/right

Tilt:

- up/down

Waggle:

- up/down

HeadOther:

Some types of head movements can be categorized automatically, but with low reliability.

The statistical analysis of a single 5-minute video of a conversation between two people has taught us that there are no threshold values that are optimal for detecting all kinds of head movements.

Future

Combine sequences of automatically detected head movement phases into phrases, aiming at 1:1 correspondence with manual annotations.

Combine velocity and acceleration to detect movements along curved paths.