KNOWLEDGE WORKER PRODUCTIVITY

Automatically Detected Nonverbal Behavior Predicts Creativity in Collaborating Dyads

FALL 2013

UPDATE

mediaX
STANFORD UNIVERSITY

mediaX connects businesses with Stanford University's world-renowned faculty to study new ways for people and technology to intersect.

We are the industry-affiliate program to Stanford's H-STAR Institute. We help our members explore how the thoughtful use of technology can impact a range of fields, from entertainment to learning to commerce. Together, we're researching innovative ways for people to collaborate, communicate and interact with the information, products, and industries of tomorrow.

media at Stanford University

Automatically Detected Nonverbal Behavior Predicts Creativity in Collaborating Dyads

Knowledge Worker Productivity Project Update October 2013

Research Team: Jeremy Bailenson, Associate Professor, Communication; Andrea Stevenson Won, PhD Candidate, Communication; Wenqing Dai, Graduate Student, Computer Science; Le Yu, Graduate Student, Computer Science

Summary

What if we could automatically detect how well members of a group are "synching" on a collaborative project?

Nonverbal behavior can provide information about the outcomes of joint interactions. The concept of rapport, "a state of mutual positivity and interest that arises through the convergence of nonverbal expressive behavior in an interaction," has been linked to success in a number of interpersonal interactions, including physician/patient interactions.

In the current study we designed a creative task in which two people collaborated to suggest novel strategies to conserve resources. During this task, nonverbal behaviors of 110 participants were tracked and recorded using the Kinect computer vision algorithm. Machine learning algorithms were trained to form "bottom up" patterns in the nonverbal behavior. When presented with dyads that were not used during training, the models predicted whether each dyad performed high or low in creativity with over accuracy well above chance.

We also demonstrated preliminary evidence for the link between nonverbal synchrony and creativity, in that models which combined nonverbal behavior from both participants outperformed models looking at only single participants from the dyad.

Consequently we created a coarse "top down" measure of interactional synchrony by correlating the summed movements of the two participants with various time delays. While synchrony occurred—the amount of movement of the two participants correlated

when looking at short time lags—there was only minor predictive relationship between the preliminary top-down synchrony measure and creativity.

The results from the current study reinforce previous research indicating that automatically detecting nonverbal behavior may allow the prediction of outcomes in dyadic interactions. In addition, it points the way to more precise definition and measurement of concepts such as synchrony in interpersonal interaction. Given that the production and perception of nonverbal behavior may have cross-cultural elements, finding ways to automatically detect and measure nonverbal behaviors based on body movements will continue to be an important area of future work.

Additional Reading:

Statement of the Knowledge Worker Productivity Research Theme
http://mediax.stanford.edu/KWP/concept

For more information:

- membership
- research themes
- events (conferences, seminars, workshops etc.)

Please visit our website - *http://mediax.stanford.edu*

Like us on Facebook -
https://www.facebook.com/MediaXatStanford
Follow us on Twitter -
https://twitter.com/mediaXStanford
Join us on LinkedIn -
http://www.linkedin.com (search for MediaX at Stanford)
Watch us on YouTube -
http://www.youtube.com/user/mediaxstanford

or contact:

Martha Russell, Executive Director - marthar@stanford.edu

Jason Wilmot, Communications Manager - jwilmot@stanford.edu

Adelaide Dawes, Program Manager - adelaide@stanford.edu

Acknowledgements

Many thanks to mediaX Members and Partners, whose contributions have supported this Research.

Special thanks to the professors and researchers who provided these research updates. Thanks also to Addy Dawes, Program Manager, and Jason Wilmot, mediaX Communications, for editing and putting this report into the format you are reading.