Human-Humanoid Dance Demo for OpenDay

Miguel P Xochicale
School of Engineering
University of Birmingham

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Abstract

Document for a brief description of the demonstration of a human-humanoid interaction activity at the Open Day of The University of Birmingham.

For the demo, NAO, a humanoid robot [Gouaillier et al., 2008] has been programmed to move their arms from left to right in a continues way (Fig 1). Additionally, the velocity for NAO's arm movement repetition changed from slow to faster and then slow down as show in Fig 2. In the experiment, participants were asked to wear inertial measurement units and with a webcam, video were recorded to estimate the head pose with Openface framework [Baltruaitis et al., 2016, Baltrusaitis et al., 2018]. Fig 3 show six participants imitating upper arm movements performed by NAO. It can be noticed that detecting the face of participant p08 was fine (E) but when two extra persons were interested in the experiment, and included in the video frame, made OpenFace framework to track the head pose estimation of other person (F).

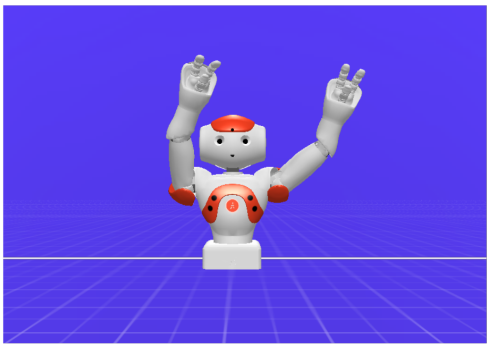

Figure 1: **Nao.** Upper arm movements of NAO.

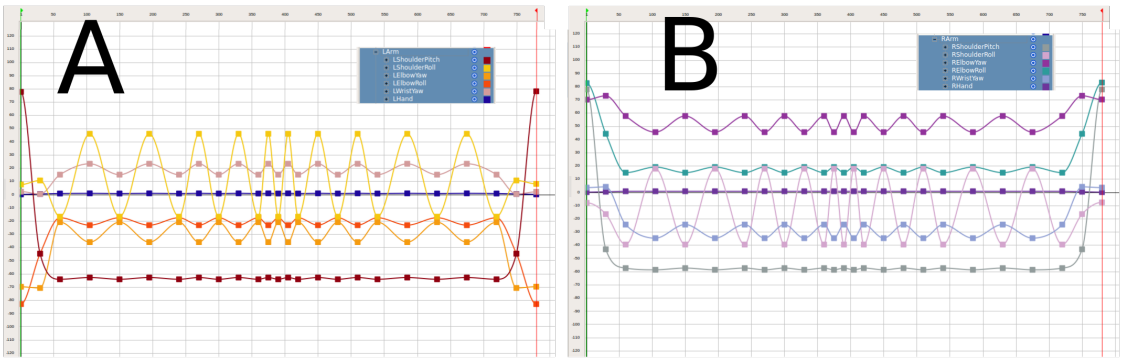

Figure 2: **Joint angles of NAO.** Time series show the increase and decrease of frequency of the join angles for (A) Left arm, and (B) right arm.

References

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[Gouaillier et al., 2008] Gouaillier, D., Hugel, V., Blazevic, P., Kilner, C., Monceaux, J., Lafourcade, P., Marnier, B., Serre, J., and Maisonnier, B. (2008). The NAO humanoid: a combination of performance and affordability. Technical Report arXiv:0807.3223. Comments: 10 pages, 20 figures, paper submitted to IEEE Transactions on Robotics.

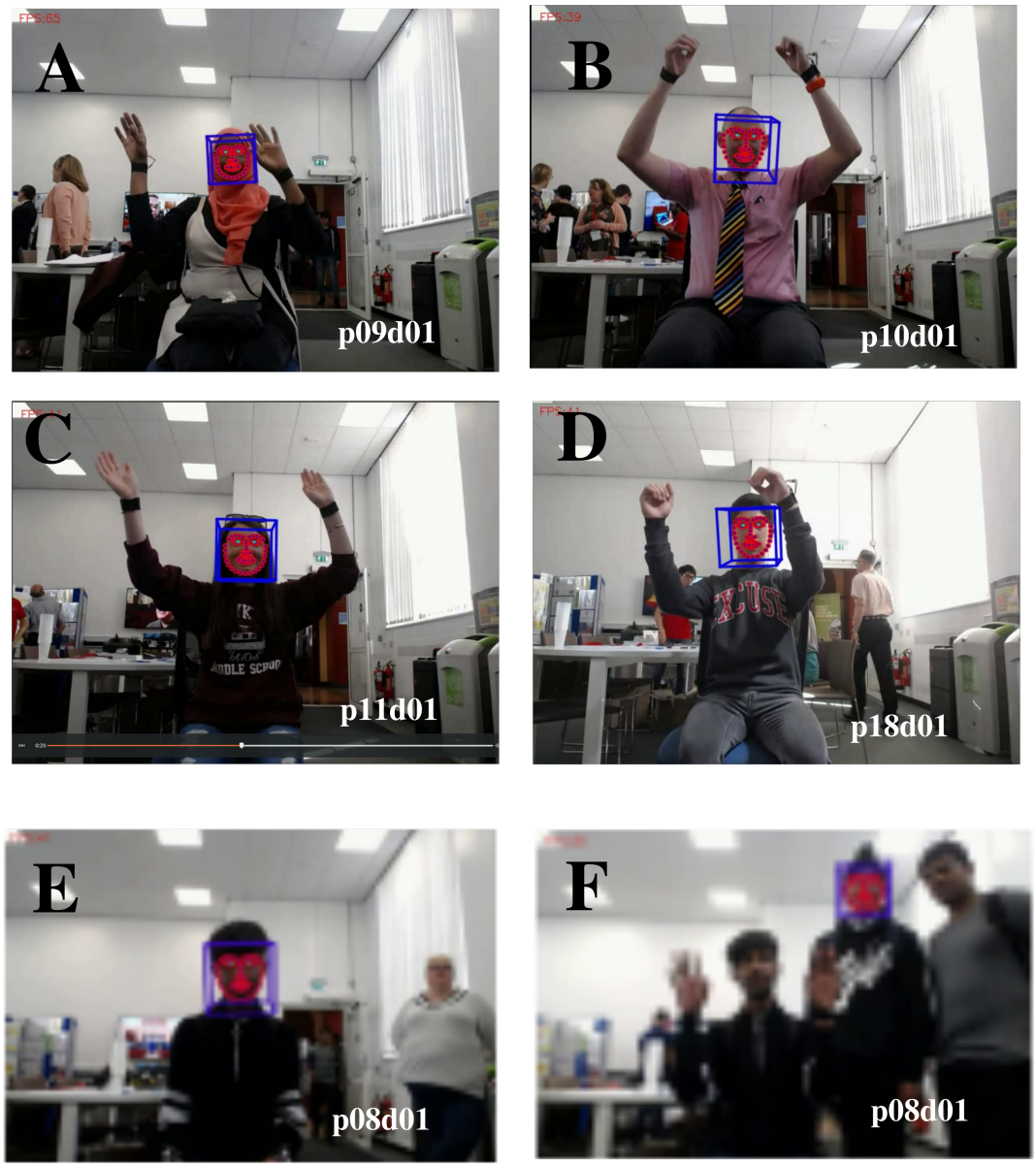

Figure 3: **Six participants performing the Human-Humanoid Imitation Demo.** The head pose estimation is presented for each of the participants (A-F). Detecting the face of participant p08 was fine (E), however, two extra persons were interested in the experiment of (E) which made OpenFace framework to track the head pose estimation of other person (F).