Emotion through Intel RealSense

CS2951K Final Project Proposal

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1 Research question

Affect display is the combination of facial, gestural and vocal cues by which persons consciously or unconsciously communicate emotion. In their recommendations on affective multimodal HCI, Pantic et al [1, p. 3] suggest that

2 Significance

Reliably determining user affect is an open problem in HCI and part of a field called affective computing. The development of affect sensitive intelligent agents would computers to interact more effectively with humans in tasks where emotion has an impact, learning or driving for example. Part of the problem with infering affect is based in technological limitations which we hope to address using Intel's RealSense technology. Another part of the problem is that individual users introduce noise into their affective display in the form of nervous tics, cultural differences and other pecularities. An example of this can be seen with autism which changes the affective display of the individual away from expected norms. Finding a method to calibrate affect detection for individuals would allow intelligence agents to tune themselves better to the needs of individual users.

3 Methodology

We plan to formulate the problem at the highest level as a multimodal bayes filter where the objects being filtered on are affective states treated as points in a multi-dimensional space where the dimensions are factors of affect (e.g. anxiety-confidence, boredom-facination). Each of the modes of input will have its own algorithm with trainable parameters

3.1 How to know if we have solved the problem?

Milestone 1. Successful detection of user facial expression using Intel RealSense camera and based on that, inference of emotion.

Milestone 2. Formalized POMDP model that outputs decision from input user expression and inferred emotion.

Milestone 3. Extensive testing (hoping) to justify the performance of Intel RealSense emtion inference, our POMDP model and the output decision.

Final results. We have solved the problem if testing indicates that we can make satisfiable decision given user input facial expression and commands.

4 Related Work

5 Schedule

Date	TODO
2/26 - 3/5	
3/6 - 3/12	Milestone 1
3/13 - 3/19	
3/20 - 3/26	Milestone 2
3/27 - 4/2	
4/2 - 4/7	Checkpoint presentation
4/8 - 4/14	Milestone 3
4/15 - 4/21	Prepare results
4/23 - 4/28	Final presentation

6 Bibliography

References

[1] Maja Pantic, Nicu Sebe, Jeffery F Cohn, and Thomas Huang. Affective multimodal human-computer interaction. In *Proceedings of the 13th annual ACM international conference on Multimedia*, pages 669–676. ACM, 2005.