

# Emotion through Intel RealSense

CS2951K Final Project Proposal

Ning Hou (nhou), Lee Painton, Eric Rosen

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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. Some cues are objective (e.g. smiling indicating happiness) while others may be more subjective (e.g. rubbing hands together when anxious). We are interested if a multimodal framework may be used to first learn parameters representing an individual's peculiarities of affect and then estimate that person's affect.

## 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 inferring 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 peculiarities. 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

### 3.1 How to solve the problem?

1. Obtain facial expression data from Intel RealSense.
2. Construct POMDP model for emotion, action and transition.
3. Solve the decision problem using Bayes filter.
4. Test the model by user input from class and friends.
5. Adjust and formalize the model.

### 3.2 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 emotion 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