CS886 - Affective Computing

Jesse Hoey
School of Computer Science
University of Waterloo
DC3613
jhoey@cs.uwaterloo.ca

September 5, 2024

Emotions and Intelligent Computers

1997: Rosalind Picard in *Affective Computing*

"This book proposes that we give computers the ability to recognize, express and in some case 'have' emotions. Is this not absurd?"

Now:

- IEEE Transactions on Affective Computing
- International Conference on Affective Computing and Intelligent Interaction (ACII)
  - → `https://www.acii-conf.net/2024/`
- Increasing awareness that emotions play a significant role in human intelligence
- but, still don't have "emotional machines" - why not?

Objectives of the Course

- Study basic theories of emotion: socio-cultural and psychological
- Study existing computational models of emotion, both socio-cultural and psychological
- Learn how emotions are fundamental to human interaction and intelligence
- Investigate how AI systems can make use of emotions to provide better interactions with humans

Key Messages:

1. Emotion motivates humans.
2. Emotion is cultural and social (group oriented)
3. AI for human interactive systems needs emotion
4. Emotions are strongly connected to ethics and morality
5. For emotionally aware AI, make sure you get it right for your target users.

Course Outline

- Week 1: Introduction - what is emotion?
- Weeks 2-3: Cultural/Social theories of Emotion/Culture
  - Henrich
  - Douglas
  - Lakoff
  - Lawler
- Week 4: Psychological Theories of Emotion
  - Universal/Categorical
  - Dimensional
  - Rational and Cultural
- Weeks 5-9: Computational Modeling
  - Signals and Affective Computing
  - Socio-Cultural Models
    - Vaisey-Valentino, Bales
    - Ridgeway
    - Affect Control Theory
    - BayesACT
- Weeks 10-12: Student presentations

Invited Lectures

- Seth Winward (Psychology) - psychological study of emotions
- Matthew Silk (Philosophy) - ethics
- Sam Johnson (Philosophy) - decision making
- Annika Hillebrandt (Psychology) - ethics in the workplace
- Roxanne Itier (Psychology) - neuroscience of emotion
- Clara Colombetto (Psychology) - LLMs

Course Structure

- 3 hours/week
- Weeks 1-9 (approx): 8-9 lectures on major topics by instructor
- Invited Lectures (6)
- Weeks 10-12: student presentations (10-15 minutes each)
- Independent study (no class) Sept 17th and Sept 26th
- Reading summaries
  (100-200 words 1x per lecture for 6 lectures of your choice)
- Project
- Student presentations + summaries 2x
- Assessment:
  - Project (35%: 5% proposal, 30% project)
  - Presentation (1 talk 15% + 2 summaries 10% = 25%)
  - Summaries (6x5%=30%)
  - Participation (10%)
- No prerequisites - all welcome!

Project Details

- Individual project
- Small groups (2-3 people) OK, but must have a clear delineation of roles in the proposal and approval by the instructor.
- Project ideas:
  - Implementated systems, user studies, conceptual frameworks, theoretical development,
  - Pick a paper and re-implement it and see if you can improve it
  - Write an app that uses emotions (e.g. a chatbot!)
  - Literature reviews may be acceptable (talk to instructor)
- Proposal: 1 page, 5-10 references
- Final Report: 8 pages, correctly formatted 15-20 references

Evaluation

The project reports will be evaluated on three main criteria, with weights as shown. These are used as guidelines for the instructor when evaluating the work.

- Completeness (50%): does the report state contributions, claims, assumptions, strengths and weaknesses?
- Clarity (30%): is the report clear, readable, and free of spelling and grammar errors, and presented using the required format? If Generative AI is used, it is properly declared?
- References (10%): are the references correctly formatted, complete (e.g. including page numbers, book titles, years, etc), and are the guidelines for citing wikipedia and other online content respected?
- Originality (10%): does the report uncover something novel?

Academic Integrity

When writing, follow these simple rules:

1. ALWAYS write your own submitted work.
2. CLEARLY indicate contributions from anyone else
   - "The sun was shining on the sea..." (Carroll, 1871)
3. Apply Rule 2 IMMEDIATELY when writing
4. DON'T cut and paste.
5. NEVER NEVER NEVER NEVER cite Wikipedia.

Note:

- Failing to follow Rules 3-4 is undetectable but you are strongly advised to do this.
- Failing to follow Rules 1-2 will result in heavy mark deductions.
- Failing to follow Rule 5 will result in immediate failure.

Generative AI

- All usage of Generative AI (e.g. ChatGPT, etc) is permitted, but must be declared on all submitted work.
- Any work using GPT-like tools without declaring will be given zero marks.
- note that GPT-like tools will generate the uniform content across users. Submitted work will be graded in part on originality, so any work using GPT-like tools may not obtain these marks.