CSC594 Topics in Artificial Intelligence
Emotion and Personality Models for AI Agents

Professor Clark Elliott
DePaul University

Spring 2020-2021

Logistics:

Class meets: Asynchronous, Informal Zoom meetings on Wednesdays at 8:00 PM.
Professor: Dr. Clark Elliott
Class website: http://depaul.edu/~elliott/594
email: elliott AATT depaul edu.
   [Include "594: " prefix in subject line and MEANINGFUL mail header!]
Grader email: elliottgrading2 AATT gmail com. (Administration of submissions only)
Course Management: d2l.depaul.edu

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Textbooks:

None required. We will read from papers and book chapters.

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Grading:

Content theory document and running program   30%
Assignments   50%
Quizzes, exams and exams   20%

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Grading Scale:
            95%            A
            90%            A-
            86,83,80       B+,B,B-
            78,74,70       C+,C,C-
            65,60          D+,D
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I reserve the right to raise the grade of a student that has demonstrated exceptional contributions in some particular portion of the class (forum participation, programming, content theory, ideas file, etc.).

NO LATE ASSIGNMENTS OR EXAMS ACCEPTED FOR CREDIT.

All grades are subject to <u>Academic Integrity Sanctions</u>. See the class website and the student handbook for further discussion.

This is a 500-level seminar class. The general rule is: ***Do Good Work.*** You will know it and I will know it. If you are not clear on the concept, you must ask. Understanding the high standards in a graduate program such as DePaul's is part of your education.

Grading of the content theory website and program code, form postings collection, and ideas files, will be according to rank: best to least. After partial ranking has been determined, working down from the top I will reach the "least-quality full score." All work above this line receives full credit. From that point on I will use a percentage. Half the work of the least quality full score will result in half the points for the assignment, and so on.

"Minor points" notation:

From time to time I use the point box as a communication vehicle in two specific ways, and I reserve the right to add minor points for this purpose:

- One point extra: I am tipping my hat to you for particularly fine work. That is, if you get 101 points on a 100 point programming assignment, I may be saying, "Hey, I noticed the five extra modules your wrote, and that you used SSL instead of sockets! Good job!"
- Two points extra: If you receive two extra points, I am acknowledging an *exceptional* contribution beyond expectations, so 102 points on a 100 point assignment is something to feel really good about, and is a rare compliment.
- Grade of "1": used as a placeholder to let a student know that I have reviewed an assignment, and am waiting for further information or work as per correspondence. A "1" will *always* be resolved to a different grade.
- Grade of "2": a serious warning that you need to communicate with me about possible plagiarism or some other irregularity that is being investigated.

Lecture and reading topics will be drawn from:

- The *Affective Reasoner,* for modeling emotion and personality in emotionally intelligent agents.
- Papers on cognitive appraisal models of emotion
- Papers on neuroscience models of emotion
- Papers on limited artificial neural network models of emotion
- Models of aspects of emotion and personality:
    - Body representations of emotion.
    - Gut-brain interaction relative to emotion, mood and personality.
    - Unusual/Abnormal personalities for gaming.
    - Emotion models of competition.
    - Models of contentment.
    - Models of depression
    - Mind reading: user emotion modeling
    - Models of mood

- o The need for a compassionate computer.
- o Emotion models for human-dog interaction
- o Mobile interfaces for emotion.
- o Models of emotion-to-action
- o Models of emotion decay.
- o Models of story structure based on emotion.
- o Models of the emotion content of humor.
- o Models of business personalities
- o Models of emotion expression
- o Models of music categories for emotion (hard!)
- o Models of emotion as motivation
- o Human-animal emotion models
- o Emotion models for mobile devices
- o Emotion models for Alexa- and Siri-like devices
- o A temporal definition of emotions
- o Metaphor and emotion
- o Models of emotion in groups
- o Emotion models for computer gaming
- o Limited models of emotion for special circumstances: when in battle or war; when in love; when terminally ill; when performing in front of large audiences.
- Symbolic AI structures supporting content theories—high-level overview of:
  - o Spreading activation
  - o Forward chaining
  - o Backward chaining
  - o Heuristic classification
  - o Explanation-based (abductive) reasoning.
  - o Intelligent databases
  - o Case-based reasoning
  - o [Artificial Neural Network *components*]
  - o First order predicate calculus
  - o The "second brain"—how an understanding of gut chemistry and the >15K sets of alien DNA in the microbiome are necessary for any full computational model of the brain.
  - o Production systems
  - o Unification pattern matching
  - o Symbolic programming in LISP—"the language of AI"—within the Java virtual machine.
  - o Heuristic search
  - o Heuristic classification

- Different models: (a) purely creative *alien AI* models intended for practical use, and (b) academic *human AI* models based on psychology and neuroscience for studying the human mind.
- The basics of writing scholarly papers in AI
- Interfaces for communicating with emotionally intelligent agents: language, music, faces, speech recognition.
- Developing "The Hook" for building effective AI programs by identifying useful constraints within the domain.

Class structure:

Office hours for the course are available at campusconnect.depaul.edu

All assignments, the assignment schedule, and the course materials, are available online at either d2l.depaul.edu or the class website. D2L Dropbox is used for all assignments.

Readings will be posted on D2L.

This is primarily a lecture and online discussion class with the goal being that students develop a quarter-long content-theory project in AI.

Discussion forum participation is minimally required and *strongly encouraged,* though students can put more emphasis on their ideas files if they must.

Showing good progress throughout the quarter on the website presenting the student's ongoing content theory is required.

Class will be challenging.

Students will critique one another's work throughout the quarter.

Programming background of some kind is required. However, students may focus more on the written design-specification of their content theory if they wish.

Learning Goals:

By the end of class students will:

...write a structured *content theory* of one area of human endeavor, likely—but not necessarily—focusing on models of emotion and personality. In an analysis suitable for input to a symbolic AI program design answer the question: What are the *objects, categories, procedures* and *relationships* that we manipulate in symbolic ways within the chosen domain?

...make updates to a website throughout the quarter that lists progress on the developing content theory, essential arguments motivating the work, (indexed) blue-sky ideas relative to the development of content theories, implementation notes, suggested readings with annotations, structured outlines for papers generated from the work, scholarly critiques of other work.

...write an AI implementation of a portion of their content theory.

... demonstrate their running code in a short video presentation, along with accompanying PowerPoint slides.

...produce a small scholarly bibliographic search in computable models of emotion and personality and a corresponding Word-compatible XML bibliography file.

...write an indexed collection of interesting, creative blue-sky ideas suitable for graduate-level exploration in AI.

...produce a corpus of online scholarly discussion postings relative to the topics covered.

...have a broad survey understanding of AI systems and techniques used in symbolic AI.

...Demonstrate master's-level knowledge of the course materials in artificial intelligence on quizzes and exams.

Submission File Formats:

All submissions to D2L MUST BE IN THE SPECIFIED FORMAT or they will not be accepted for credit. No other formats will be graded. Often this means in STANDARD ZIP FORMAT, including submissions of a single file for programming assignments. No 7zip files, no rar files. No exceptions. Contained within the ZIP archive, all text submissions must be made in Microsoft Word format, or in plain HTML, or plain text. NO PDF FILES. (Free programs are available to produce each of these formats.) Java files should be submitted in plain text form, within a ZIP file, suitable for command-line compile.

In some cases zip files are prohibited. Follow the instructions for each assignment.

Students are responsible for downloading their assignments after uploading, to make sure that files have not been corrupted. Corrupted files will not be graded.

NO LATE ASSIGNMENTS will be accepted for credit, unless otherwise noted. No exceptions.

Academic Integrity:

Cheating, plagiarism, and unethical conduct are not allowed, and will be sanctioned, including referral to the dean's office, and failure in the class. Please refer to the academic handbook by which rules you are expected to abide.

Violations include, but are not limited to: making claims on any checklist for work that has not been done; including ANY un-cited work of others in any documents you turn in; turning in work, including any program, that has been authored by someone other than yourself; and in some cases including *any* work of others, whether cited or not–see the rules for each assignment.

More Policies

Changes to Syllabus

This syllabus is subject to change as necessary during the quarter. If a change occurs, it will be addressed during class, posted in D2L, and sent via email.

Online Course Evaluations

Evaluations are a way for students to provide valuable feedback regarding their instructor and the course. Detailed feedback will enable the instructor to continuously tailor teaching methods and course content to meet the learning goals of the course and the academic needs of the students. They are a requirement of the course and are key to continue to provide you with the highest quality of teaching. The evaluations are anonymous; the instructor and administration do not track who entered what responses. A program is used to check if the student completed the evaluations, but the evaluation is completely separate from the student's identity. Since 100% participation is our goal, students are sent periodic reminders over three weeks. Students do not receive reminders once they complete the evaluation. Students complete the evaluation online in CampusConnect.

Academic Integrity and Plagiarism

This course will be subject to the university's academic integrity policy. More information can be found at http://academicintegrity.depaul.edu/. If you have any questions be sure to consult with your professor. There is NO CHEATING OF ANY KIND in this class!

Academic Policies

All students are required to manage their class schedules each term in accordance with the deadlines for enrolling and withdrawing as indicated in the University Academic Calendar. Information on enrollment, withdrawal, grading and incompletes can be found at: cdm.depaul.edu/enrollment.

Students with Disabilities

Students who feel they may need an accommodation based on the impact of a disability should contact the instructor privately to discuss their specific needs. All discussions will remain confidential.
To ensure that you receive the most appropriate accommodation based on your needs, contact the instructor as early as possible in the quarter (preferably within the first week of class), and make sure that you have contacted the Center for Students with Disabilities (CSD) at: csd@depaul.edu.

Lewis Center 1420, 25 East Jackson Blvd.
Phone number: (312)362-8002
Fax: (312)362-6544
TTY: (773)325.7296

Other Course Policies

Attendance: Students are expected to attend each class, or view the class online, typically during the week the lecture is presented. Attendance will not be formally taken beyond the start of the quarter, but unless otherwise noted ALL the course material presented in the lectures is suitable for exams. I will sometimes ask questions of named students not present in the classroom, to be viewed online, and answered at the forums. All students matter to me.

Class Discussion: Student participation in class discussions is expected, and this will take place in class for local students, and online for all students.

Attitude: A professional and academic attitude is expected throughout this course. Measurable examples of non-academic or unprofessional attitude include but are not limited to: talking to others when the instructor is speaking, mocking another's opinion, cell phones ringing, emailing, texting or using the internet whether on a phone or computer. If any issues arise a student may be asked to leave the classroom.

Cell phones / laptops in class: If you need to use your cell phone for any reason, or your laptop for any reason other than following the class slides, and taking notes, *leave the room.* You may quietly leave and re-enter as often as necessary unless I note otherwise. Your peers devote many hours out of their busy lives, and thousands of dollars, to come to class. They deserve a vibrant, focused, environment. If you have a special case, discuss it with the instructor ahead of time. NO TEXTING, EMAIL, FACEBOOK, etc. in the classroom.

Civil Discourse: DePaul University is a community that thrives on open discourse that challenges students, both intellectually and personally, to be Socially Responsible Leaders. It is the expectation that all dialogue in this course is civil and respectful of the dignity of each student. Any instances of disrespect or hostility can jeopardize a student's ability to be successful in the course.