CSC594 Bibliography\_Topic

The following bibliography is an early attempt to gather background for Artificial Intelligence (AI) content theory related to creative writing.  These articles are not related to creative writing. However, they provide background with regard to how artificial intelligent agents (AIA) evolve, how characteristics are incorporated into an agent and how emotions are biologically manifested.  These papers attempt to provide solutions for a variety of challenges using AIA.  I hope to incorporate some of their aspects into my solution for the creative writing AIA.

I have included a number of references that touch, directly and indirectly, on the biological aspects of emotion.  In fact, it seems that emotional responses have something to do with stress.  In the book, “Why Zebras Don't Get Ulcers,”(Sapolsky) the author argues the unexpected events will trigger a biological hormonal response.  However, in some cases(surprise), we want to experience the unexpected.  In other cases(startled), we may not.  An AIA that distinguishes the difference will have a much more refined interaction with the user.

Making an AIA more realistic might include fitting it with aggression.  Although we may envision an AIA that speaks(communicates) softly and calmly, the believability of it may be lacking when it comes to inspiring creative thought.  In the book, “The Trouble With Testosterone: And Other Essays On The Biology Of The Human Predicament” (Sapolsky) he examines the biological and environmental aspects of aggression.  He finds that aggression does not fully explain hormonal activity.  Other factors such as age and environment have something to do with how aggression is displayed.

An implementer of creative writing AIA can benefit from an understanding of how the brain processes information.  For instance, it is important to understand that our eyes allow humans to sense the light around us, but the brain is what allows us to see.  This, and other facts about the brain and the nervous system, are covered nicely in the lecture series “Understanding the Brain.”(Norden).  The series points out the amazing complexity of the brain which suggests how difficult its processing may be to implement computationally.

The next reference is not specific to AI. However, it does provide context into how real process concerns are translated into ideas that have the potential for AIA solutions.  For example, “Human decision makers typically use heuristics under time-pressured situations. These heuristics can potentially degrade task performance through the impact of their associated biases. (Fendley, M., & Narayanan, S. (2012, 5).”  To help manage this perceived bias the researchers proposed an experiment where the participant was asked to explain his decision-making aloud concerning the characteristic of a target object.  Well, this type of processing is what we are asking the AIA to handle.  Every time the AIA provides a response, it executes a process that is predetermined.  The outcomes the AIA presents may vary based on the implementation; however, the result should be completely explained.

The next reference also speaks to resolving bias in decision-making.  These researchers (Kahneman, D., Rosenfeld, A., Gandhi, L., & Blaser\_, T. (2016, 10)), suggested that there exists bias in the finding of an analyst such that the same analyst faced with virtually the same circumstance would make two different decisions concerning the action to take.  The researcher suggested an organizational approach (gather data, analyze and report).  However, this issue seems to be in whole or in part suitable for an AIA solution.

Staying on the theme of decision-making, the next paper claims to present an approach to the study of emotions and decision-making that relies on the use of a computational framework of "emotional controls"(Velásquez, J. (1998)).  These controls are represented by autonomous agents that rely on emotional processing.  The title sounds interesting; however, I will need to read it more carefully in order to “harvest” it.

The researchers in the next reference are concerned with the AIA conveying effective visual messages to users.  “To achieve this kind of system, we[they] developed an agent that performs some nonverbal communications such as generating facial expression and motions by analyzing the text messages of the users (Alam, L., & Hoque, M. (2017, 12)).  The researcher believes that messages that are presented with familiar gestures are more realistic to the user and, thus, are more effective.  The important point relates to how the process interprets the data that allow the AIA to provide the appropriate gesture.

Another set of researchers published a paper that focused on making the visual AIA more realistic.  It (Bosse, T., & Zwanenburg, E. (2014, 1).) suggests that game characters become more realistic when they sometimes display behavior that concerns their future (prospect-based emotions) rather than their present.

Expressing emotion suggests that the entity has some level of control over the intensity of the expression.  In the book, “On Computational Models of Emotion Regulation and Their Applications Within HCI” (Bosse, T. (2017, 12)), the author provides an overview of computational emotion regulation and summarizes the related psychological literature on emotion generation and regulation.   The author seems to indicate that there is a functional simulation of this work.

Regulating the expression of emotion has a close relationship to this next reference.  For this article, (Bruijnes, M. (2016, 10 7)), the researcher attempts to develop an AI framework where an AIA acts the role of crime “suspect” for a police training interrogation simulation.  The author indicates that the simulator is sensitive in that interrogation scenarios are tuned based on the user's personality.

This next article presents a game of “treasure hunt” that involves 12-13-year-old children interacting with an “embodied agent”.  The agent was used to feedback information(instruct) to the students during the hunt.  These interactions were sometimes none existent, neutral or affective(Foster, M. E., Deshmukh, A., Janarthanam, S., Lim, M. Y., Hastie, H., & Aylett, R. (2015, 1)).   The children's impressions of the agent were taken by survey at the end of the experiment.  I wonder if the researcher used some method to normalize the responses of the target group.  I understand that children sometimes offer recollections of events that are very different from what the adult may perceived.

In some cases, otherwise healthy and intelligent adults, seem to lose their minds when put in conditions they did not anticipate.  This next paper presents a stranded passenger model based on an airline departure area. Agent simulations show how environment and human characteristics such as age, gender and emotional contagion influence frustration, dynamics and frequency of maladaptive behavior(Medeiros, L., & van der Wal, N. (2017, 8)).  The simulation integrates two AIA support models that are aimed at reducing the overall frustration of passengers faced with this scenario.

In a similar paper, an evacuation model that incorporates the emotional behavior of an AIA is discussed.  The researchers contend that current models do not account for psychological, social and group decision making factors (van der Wal, N., Formolo, D., & Bosse, T. (2017, 6)).   This work presents and confirms the outcomes of an evacuation simulation that integrate emotional factors.  The importance of this work, in my view, is its focus on group behavior.

I have included several articles in this bibliography that speak to the state-of-the-art in Artificial intelligence.  This next paper is concerned with presenting the development status of emotion and intelligent software agents (Ivanovic, M., Budimac, Z., Radovanovic, M., Kurbalija, V., Dai, W., Badica, C., . . . Mitrovic, D. (2015, 11).) as of 2015.  The researchers address topic areas such as modeling agents, learning in emotional environments and interactive emotional systems.  They suggest research steps for forming a framework for the development applications of emotional agents.  Finally, they discuss research for designing agents capable of recognizing, reasoning and displaying emotion.

This next article seems to be an overview of spoken dialogue systems (SDS).  The researcher (Sun, K., Xie, Q., & Yu, K. (2015, 7)) present the key concepts and difficulties associated with SDS; however, they do not make any suggestions as to what they hope to accomplish.  Of course, we assume that they are concerned with promoting the science of AI.

I have included an additional article concerning SDS because the researchers (Wang, Z., & Lemon, O. (2013, 8)) provide information concerning the operation of the match algorithm.  This article is researching a method that would reduce the errors associated with tracking dialogue states that are related to automatic speech recognition and spoken language understanding.

Advancements with regard to spoken dialogue systems have shown that maintaining a probability distribution of possible dialogue states (referred to as “belief”) and managing tuning can significantly improve performance in the long-term.  These systems use the highest probability score along with a list of best guesses with normalized confidence scores.

Researchers in this article want to consider the effectiveness of the spoken language use (SLU)- best-guess-list without any additional external data.  The project design reasons that because the common strategy is to use confidence scores from the best guess list as “immediate information” for the belief computation suggests that the system is largely dependent on that one parameter.  Therefore, performance of a spoken dialogue system (SDS) might improve if it employed only the best guess list--as opposed to the dialogue state distribution.

This next paper concerned the modes that researchers use to gather emotional physiological data.  The electroencephalogram (EEG) is their primary means of gathering data.  They discuss how data from these devices is enhanced by algorithms such as machine learning (ML), nearest neighbor (KNN), naive Bayesian (NB) and support vector machines (SVM)(Zhang, J., Yin, Z., Chen, P., & Nichele, S. (2020)).

This final paper is focused on explaining the basic concept of emotional intelligence in affective computing.  It proposes a research topic with regard to ethical issues related to affective computing. Finally, the article presents an interactive learning emotional system that employs agents for human computer interactions (Zohora, S., Khan, A., Srivastava, A., Nhu, N., & Dey, N. (2016, 11)).

Alam, L. & Hoque, M., 2017. A Text-Based Chat System Embodied with an Expressive Agent. *Advances in Human-Computer Interaction,* 12, Volume 2017, pp. 1-14.

Alvarado, N., Adams, S. S. & Burbeck, S., 2002. The role of emotion in an architecture of mind. *IBM Research.*

Bosse, T., 2017. On Computational Models of Emotion Regulation and Their Applications Within HCI. In: s.l.:s.n., pp. 311-337.

Bosse, T. & Zwanenburg, E., 2014. Do Prospect-Based Emotions EnhanceBelievability of Game Characters? A CaseStudy in the Context of a Dice Game. *Affective Computing, IEEE Transactions on,* 1, Volume 5, pp. 17-31.

Bruijnes, M., 2016. *Believable Suspect Agents: Response and Interpersonal Style Selection for an Artificial Suspect,* Netherlands: University of Twente.

Cañamero, L., 2005. Emotion understanding from the perspective of autonomous robots research. *Neural networks,* Volume 18, p. 445–455.

Cernea, D., Weber, C., Kerren, A. & Ebert, A., 2014. *Group Affective Tone Awareness and Regulation through Virtual Agents.* s.l., s.n.

Fendley, M. & Narayanan, S., 2012. Decision Aiding to Overcome Biases in Object Identification. *Advances in Human-Computer Interaction,* 5.Volume 2012.

Foster, M. E. et al., 2015. *Influencing the Learning Experience Through Affective Agent Feedback in a Real-World Treasure Hunt.* s.l., s.n., pp. 1711-1712.

Ivanovic, M. et al., 2015. Emotional Agents - State of the Art and Applications. *Computer Science and Information Systems,* 11, Volume 12, pp. 47-47.

Kahneman, D., 2011. *Thinking, Fast and Slow.* s.l.:Farrar, Straus and Giroux.

Kahneman, D., Roseneld, A., Gandhi, L. & Blaser\_, T., 2016. Noise: How to Overcome the High, Hidden Cost ofInconsistent Decision Making\_. *Harvard Business Review\_,* 10.

Medeiros, L. & van der Wal, N., 2017. *An Agent-Based Model Predicting Group Emotion and Misbehaviours in Stranded Passengers.* s.l., s.n., pp. 28-40.

Norden, J. J., 2007. *Understanding the Brain.* s.l., s.n.

Sapolsky, R. M., 1998. *The Trouble With Testosterone: And Other Essays On The Biology Of The Human Predicament.* s.l.:Scribner.

Sapolsky, R. M., 1998. *Why Zebras Don't Get Ulcers, 2nd Edition: An Updated Guide To Stress, Stress Related Diseases, and Coping.* s.l.:Henry Holt and Company.

Sapolsky, R. M., 2007. *A Primate's Memoir: A Neuroscientist's Unconventional Life Among the Baboons.* s.l.:Scribner.

Sapolsky, R. M., 2017. *Behave: The Biology of Humans at Our Best and Worst.* s.l.:Penguin Publishing Group.

Sun, K., Xie, Q. & Yu, K., 2015. Recurrent Polynomial Network for Dialogue State Tracking. 7.

van der Wal, N. a. F. D. a. B. T., 2017. An Agent-Based Evacuation Model with Social Contagion Mechanisms and Cultural Factors. pp. {620-627.

van der Wal, N., Formolo, D. & Bosse, T., 2017. *An Agent-Based Evacuation Model with Social Contagion Mechanisms and Cultural Factors.* s.l., s.n., pp. 620-627.

Velásquez, J., 1998. Modeling emotion-based decision-making. *Emotional and intelligent: The tangled knot of cognition,* p. 164–169.

Wang, Z. & Lemon, O., 2013. *A Simple and Generic Belief Tracking Mechanism for the Dialog State Tracking Challenge: On the believability of observed information.* s.l., s.n.

Zhang, J., Yin, Z., Chen, P. & Nichele, S., 2020. Emotion recognition using multi-modal data and machine learning techniques: A tutorial and review. *Information Fusion,* Volume 59, pp. 103-126.

Zohora, S. et al., 2016. A Study of the State of the Art in Synthetic Emotional Intelligence in Affective Computing. *International Journal of Synthetic Emotions,* 11.Volume 7.