

Proactive Natural Language Processing: Addressing Terminology Disparity and Team Coalescence

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Abstract: *There is a continuing need for battlefield simulations and virtual humans. Most recently, the authors have been focused on the creation of virtual conversation environments to leverage the mentoring skills of selected individuals by creating large libraries of short video clips of advice which are then presented to the user in response to their questions. In these endeavors two issues have arisen; the inconsistency of the definitions used and the need to ameliorate the impacts of short-tour intervals on team formation. This paper will address both of these issues, review existing research, document some early research into these impediments, and discuss the similarities of these issues to those faced by the standards community writ large. They will cite and review the work of Professor Bruce Tuckman: Forming, Storming, Norming, and Performing. The benefits of using virtual humans to enhance these processes are outlined. The need for and design of proactive Natural Language Processing-enabled virtual humans and computer agents is set forth and analyzed. The paper will lay out the research goals, identify the semantic differences, and report on the potential impacts of those differences. In its totality, this paper intends to demonstrate that, in addition to the need to evangelize about the necessity of standards, this community has a lot to contribute to researchers, developers, and implementers faced with destructive differences in terminology, understanding and practice. All of this data and analysis will be presented in a way that should make sure that the insights garnered therefrom are accessible by members of this and other communities and they can be implemented and modified, as is most effective. Future advances now in development are discussed, along with the utility of these new capabilities and approaches.*

Authors' Biographies

DAN M. DAVIS is now a consultant for the University of Southern California, focusing on large-scale distributed DoD training, education and avatar mentors. Pre-retirement, he was the Director of USC's JESPP project for JFCOM for a decade. As the Assistant Director of the Center for Advanced Computing Research at Caltech, he managed Synthetic Forces Express, bringing HPC to DoD simulations. Prior experience includes serving as a Director at the Maui High Performance Computing Center and as a Software Engineer at the Jet Propulsion Laboratory and Martin Marietta. He has served as the Chairman of the Coalition of Academic Supercomputing Centers and has taught at the undergraduate and graduate levels. As early as 1971, Dan was writing programs in FORTRAN on one of Seymour Cray's CDC 6500's. He saw duty in Vietnam as a USMC Cryptologist and retired from the reserves as a Commander, Cryptologic Specialty, U.S.N. He received B.A. and J.D. Degrees from the University of Colorado in Boulder.

MILTON ROSENBERG is a Special Project Manager at the Institute for Creative Technologies, University of Southern California. He has managed several large research and development projects there for the Army Research Laboratory and for the Office of Naval Research. These projects were designed to engage service personnel via computer generated virtual environments and personnel. He has over 20 years of experience managing multiple projects. Milton supervised the construction and global rollout of the Whirlpool manufacturing system and holds a patent in methods for maintaining computer software. He holds a BS in Business Administration.

MARK C. DAVIS, PH.D. is currently retired after careers in the US Navy and as a computer design engineer for both IBM and Lenovo. Rising to the level of Distinguished Engineer at Lenovo, he was responsible for the design of laptop computer cross-disciplinary technology, including PC architecture, embedded systems, open source and virtualization. Previous work was with IBM in the areas of software development and architecture involving security, storage and virtualization. Dr. Davis has been granted well over fifty patents that were filed during his service at both companies. He is a graduate of the Duke University NROTC program and was commissioned as an Ensign, attended nuclear power school, and served as a Submarine Officer for twelve years, including one duty tour as a classroom instructor. He left the service as a Lieutenant Commander to pursue a PhD. Mark holds a BSEE degree from Duke University and a PhD in Computer Science from the University of North Carolina, where his advisor was Professor Fredrick P. Books.

DANIEL P. BURNS is a lifelong Systems Engineer, first with the Active Duty Navy, then SAIC, and small business. He served as Naval Chair and Professor of Practice in Systems Engineering at the Naval Postgraduate School (NPS). Captain Burns served as the as the Military Associate Dean and as acting Dean of the Graduate School of Engineering and Applied Sciences at NPS. His research interests center on analyses of both human and resource utilization in defense efforts. He also served as the USAF Air Education Training Command Dean of Students for 180 plus graduate student's certificate, Masters and PhD education and research program within the Strategic Nuclear Enterprises (SNE) ten thousand officers, enlisted and civilian student population. Captain Burns received a BS degree from the U.S. Naval Academy, an MS from the Naval Postgraduate School and an MS from Southern Methodist University. He is currently working with Portland State University on a Ph.D.

EVAN JAKSHA is studying Computer Science and currently focusing in the use of virtual humans as an effective interface to address a range of critical issues in the military. He comes from a military family with both his father and two siblings currently serving in the US Armed forces. His research interests include cyber warfare and national security. Growing up in San Diego, he is a long-time resident in Southern California. He is scheduled to graduate in 2022 with a degree in Computer Science, with a Minor in Cyber Security from the United States Military Academy in West Point, New York.

SKANDER GUIZANI is studying Electrical Engineering and currently focuses his research efforts on hardware, infrastructure, and operations of long-range secure communications systems. Skander is from Tunisia and is a foreign exchange student at the United States Military Academy at West Point, New York. Back in Tunisia, his father is a Colonel and commands a unit in that country. While at the Institute for Creative Technologies, Skander will be working with the MentorPal team to enhance the virtual human conversations for advising high school seniors. He intends to pursue a doctoral degree and is focusing his research on that goal. He anticipates receiving a degree in Electrical Engineering in the spring of 2022 from the United States Military Academy, West Point.