Populating Conversational VH Data Bases: Optimizing Implementation and Ameliorating Challenges

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ABSTRACT

Virtual Humans require data bases of responses in order to support conversational exchanges with users. This paper focuses on methodologies employed and results observed in the process of creating and optimizing such data bases. The authors are participants in a program charged with mentoring young adults considering active-duty or civilian technical careers in the Department of the Navy. This work evolves from a decade of research at the Institute for Creative Technologies which has produced several systems enabling users to engage in conversation-like exchanges with digital virtual humans, relying on natural language processing. Building on this previous work, the authors report on the design considerations, the process of establishing relevant responses based on live interactions, and the generation of potential responses. They describe the procedure for selecting engaging mentors, the process of recording the responses, and the editing of the responses. They review the testing with live subjects, assessing the initial results, and modifying the data base to better serve the users. A major thread of this paper is the project's reaction to the revelatory observation that young mentees are not inclined to ask germane questions, but instead pose non-sequiturial social queries. Meeting this challenge was central to fulfilling project goals. These steps will be reported with accompanying examples and data, all directed toward providing the readers with a better understanding of how to create their own data bases, in order to utilize conversational Virtual Humans. The authors assert this is more engaging than an FAQ list, as it emulates live mentors guiding the users to questions, answers, and insights that the team feels are crucial for the mentees' growth and understanding. The paper closes with a section on the extensibility of this approach to other areas of concern where computers could augment humans in providing needed guidance and counseling.

ABOUT THE AUTHORS

Dan M. Davis is a consultant for the University of Southern California, focusing on large-scale distributed DoD simulations. Prior to his retirement, for a decade he was the Director of USC's JESPP Project for JFCOM. In the '90's, as the Assistant Director of Caltech's Center for Advanced Computing Research, 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 as a Commander, Cryptologic Specialty, U.S.N.R. He received B.A. and J.D. degrees from the University of Colorado in Boulder.

Daphne Kapolka, PhD, is a Senior Lecturer in the Physics Department at the U.S. Naval Postgraduate School, where her specialty is acoustics. Her research has focused on ranging and detection physics in both the acoustic and the electromagnetic spectra. She also has been involved in investigating subsurface communications using acoustic devices. In addition to teaching at NPS, she did a tour teaching chemistry and physics at the Naval Academy Preparatory School. Dr. Kapolka served as an Engineering Duty Officer in the U.S. Navy before retiring as a Lieutenant Commander after a twenty-year career during which she served in capacities as an Anti-Submarine Officer and as an OIC of a recruiting unit in Detroit Michigan. Dr. Kapolka is a member of the Acoustical Society of America and the American Institute of Physics. She earned an MA degree in from the University of Chicago and both an MS and a PhD from the Naval Postgraduate School.

Nicholas Kaimakis is active in research at the Institute for Creative Technologies of the University of Southern California. His current research thrusts are in the use of computer generated avatars or video clips, animated and directed by natural language optimized Artificial Intelligence (A/I) programs that present a life-like dialogue capability to interact with remote users via the internet. He has demonstrable success designing efficient project struc-

tures, teaching programming, and managing multi-faceted teams. His current project is funded by the Navy and is designed to help improve knowledge of STEM fields across varied demographics with the development of an interactive interface that makes STEM information more accessible on-line. He is an undergraduate student studying Computer Science (CS) within the Viterbi School of Engineering at the University of Southern California.

Samuel Breck is a Research Assistant at the Institute for Creative Technologies at the University of Southern California, where he focuses on chat-bots. His research interests are: TommyBot - Information hub messenger chatbot for USC (building location/hours, menus, events, etc.), SCal.tech - The web application contains many of the same features as Google calendar including creating events and sharing them with others. It has increased functionality allowing a user to import their classes, receive real-time study notifications, import events, and receive study recommendations, and Transit Priority - A vehicle interface through an android application to demonstrate the possible applications of DSRC technology with Transit Vehicles. Application gives priority to a Transit Vehicle at an intersection via V2R communication through BSM broadcasted by the DSRC OBU and modification of traffic control logic to optimize traffic flow. Sam expects to receive a BS in Computer Science from USC in 2019.