



RECENT ADVANCES IN AI FOR NATIONAL SECURITY

Context-observant
LLM-Enabled Autonomous
Robots (CLEAR) – **Jake Macdonald**

Poster Abstract

The Context-observant LLM-Enabled Autonomous Robots (CLEAR) platform offers a general solution for large language model (LLM)-enabled robot autonomy. CLEAR-controlled robots use natural language to perceive and interact with their environment. Contextual descriptions deriving from computer vision and optional human commands prompt intelligent LLM responses that map to robotic actions. By emphasizing prompting, system behavior is programmed without manipulating code or fine tuning an LLM. CLEAR employs off-the-shelf pre-trained machine-learning models for controlling robots ranging from simulated quadcopters to terrestrial quadrupeds. Each LLM exhibits behavioral differences when embodied by CLEAR, contrasting in actuation preference, ability to apply new knowledge, and receptivity to human instruction, with GPT-4 demonstrating the best performance. The CLEAR platform contributes to HRI by increasing the usability of robotics for natural human interaction.

About the Author(s)

Jake Macdonald is an undergraduate studying computer science at Clemson University and a student technical assistant staff member of MIT Lincoln Laboratory's Artificial Intelligence Technology Group. He has research experience in LLM-enabled robotics, human-centered computing, and quantum systems. He is especially interested in continuing research in applied robotics.

For more information, please contact raains@ll.mit.edu

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.

This material is based upon work supported by the Under Secretary of Defense for Research and Engineering under Air Force Contract No. FA8702-15-D-0001. Any opinions, findings, conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Under Secretary of Defense for Research and Engineering.

© 2023 Massachusetts Institute of Technology.

Subject to FAR52.227-11 Patent Rights - Ownership by the contractor (May 2014) Delivered to the U.S. Government with Unlimited Rights, as defined in DFARS Part 252.227-7013 or 7014 (Feb 2014). Notwithstanding any copyright notice, U.S. Government rights in this work are defined by DFARS 252.227-7013 or DFARS 252.227-7014 as detailed above. Use of this work other than as specifically authorized by the U.S. Government may violate any copyrights that exist in this work.