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Author: Mr. Ali Baghchehsara
TU Clausthal, Germany

Prof. Dietmar Moeller
TU Clausthal, Germany
Mr. Barret Schlegelmilch
Massachusetts Institute of Technology (MIT), United States

AUTONOMOUS SECURITY BOT FOR SPACE OPERATIONS: CHALLENGES AND BENEFITS

Abstract

Presence of on-board assistants like CIMON demonstrates an increasing interest in autonomous crew support systems for spaceflight operations. One of the biggest challenges identified in the for autonomous operation of space flights. On-board Assistants with self-preservation built in can help us to make remarkable scientific discoveries for space operations. However, we need to ensure a secure design in order to safely and securely apply AI for performing critical tasks.

Use of IoT and AI based applications, require rigid safety and security measures to ensure mission accomplishment. In this case, Space Communications Protocol Specifications standard (SCPS) may be outdated for such activities as it is done by humans. In this case, there is the desire for an autonomous system to ensure end to end (E2E) overall mission operations, a so called Autonomous Security Bot (ASB) - USPTO Patent 62,770,758 - is introduced to address and take care of these challenges related to space communication applications for Space Flight operations. Future missions even to the Moon or Mars will require autonomous operations and control.

The concept of the bot requires applying advanced analytics and evaluate them based on relevant evidences. Such bottlenecks are obviously analogous to a single human being charged with control of a mission. ASB will be collecting data inputs to train the system, we have to develop a model for one task and re-apply it to different, but similar, task. With the help of many of these frameworks, it will be easy to modify existing base models. Once our model is ready, it will be easy to to implement machine vision technology.

Thus, we have made some use cases with the help of cognitive computation such as IBM Watson. One of the use case is an analog mission architecture with cognitive system for a verified performance. Our autonomous security protection is based on threat identification model will be helping to create AI-based system architecture for specific use in flight operations. In addition to the ASB cognitive vision, Natural Language Processing (NLP) within Intel Framework Optimization (TM) and Natural Language Understanding (NLU) is important subset for ASB. Both Intel and IBM Watson is offering great NLP and NLU services for various industries.

The ASB front end and verification of the autonomous modeling technologies for space application has its own limits and advantages that we would like to study in this paper.