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Cyber security risks in telepresence robotics and their mitigation

Master's Thesis (21 ECTS)

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Abstract:
Telepresence robotics (TRPs) have become increasingly popular, particularly in higher education systems, as they enable users to remotely partake in events. However, this increased usage also presents potential security risks specific to TRPs, such as remote connection, cyber-physical presence, and live video and audio feed. Current risk assessment models do not adequately address these unique concerns, leading to a gap in understanding and mitigating TRPs related risks. This thesis aims to map potential security issues and how to mitigate them by incorporating existing frameworks such as RSF, CIA, OCTAVE A, ISO27005, and NSMROS. By identifying and validating potential risks through case studies and expert interviews, the study seeks to propose mitigation strategies with an emphasis on user data security. This research will provide organizations utilizing TRPs with a better understanding of security risks and effective solutions to protect their systems and users.

Keywords: Cyber security, risk assessment, telepresence robotics

CERCS:

Küberturvalisuse riskid kaugkohalolu robootikas ja nende vähendamine

Lühikokkuvõte:
Kaugkohalolu robotid on muutunud üha populaarsemaks, eriti kõrgemas haridussüsteemis, kuna need võimaldavad kasutajatel osaleda üritustel kaugjuhtimise teel. Siiski kaasnevad selle suurenenud kasutamisega ka kaugkohalolu robotitele omased potentsiaalsed turvariskid, nagu kaugühendus, küber-füüsiline kohalolek ning reaalajas video- ja heliside. Praegused riskihindamise mudelid ei käsitle piisavalt neid ainulaadseid probleeme, ning on olemas lünk seotud riskide mõistmisel ja nende leevendamisel. Käesoleva magistritöö eesmärk on kaardistada kaugkohalolu robotitega seotud turvariskid ning pakkuda ettepanekud seotud riskide leevendamiseks, kasutades olemasolevaid raamistike ning riskihindamise mudeleid RSF, CIA, OCTAVE A, ISO27005 ja NSMROS riskide tuvastamiseks. Täiendavalt toimub potentsiaalsete riskide tuvastamine ning valideerimine juhtumiuuringu (IT Kollež) näitel ja ekspertide intervjuude abil püüab uuring pakkuda leevendusstrateegiaid, keskendudes kasutajate andmete turvalisusele. Lõppkokkuvõttes pakub see teadustöö organisatsioonidele, kes kasutavad TPR-e, paremat arusaamist turvariskidest ja tõhusatest lahendustest oma süsteemide ja kasutajate kaitsmiseks.

List of Abbreviations and Terms

TRPs Telepresence robotics

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References

[1] Ming Lei, Ian Clemente, Haixia Liu, et al. “The Acceptance of Telepresence Robots in Higher Education”. In: *International Journal of Social Robotics* 14 (June 2022), pp. 1–18. DOI: 10.1007/s12369-021-00837-y.

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I. Glossary

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