

Soggetto: proposta di tirocinio

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|-------------|---|
| <i>ID</i>   | PTI_Distefano Salvatore_22/11/2024 11.46.43 |
| <i>Data</i> | 22/11/2024 11.46.43                         |

**Supervisore del progetto**

|                           |                     |
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**Co-Supervisore del progetto**

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| <i>Posizione</i>    |  |
| <i>Dipartimento</i> |  |



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### Dettagli del progetto

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| <i>Titolo</i>  | Intelligent Operating Systems / AI-Operated System |
| <p><i>Descrizione dettagliata:</i> Intelligent operating systems (OS) are a new frontier in computing, integrating artificial intelligence (AI) technologies to enhance user experience, system performance, and security. These systems aim to move beyond traditional OS functions by learning from user behavior, adapting to changing environments, and automating tasks.</p> <p><b>Key Features and Benefits:</b></p> <p><b>Personalization:</b> Intelligent OS can adapt to individual user preferences, tailoring the interface, recommendations, and system behavior to specific needs.</p> <p><b>Predictive Capabilities:</b> By analyzing user patterns and historical data, these systems can anticipate user needs, proactively suggesting actions or information.</p> <p><b>Automated Tasks:</b> Intelligent OS can automate routine tasks, such as software updates, file management, and system optimization, saving users time and effort.</p> <p><b>Enhanced Security:</b> AI-powered security features can detect and respond to threats in real-time, protecting systems from cyberattacks.</p> <p><b>Contextual Awareness:</b> Intelligent OS can understand the context of user interactions, enabling more intuitive and efficient operation.</p> <p><b>Challenges and Considerations:</b></p> <p><b>Privacy Concerns:</b> The collection and analysis of user data raise privacy concerns, requiring robust data protection measures.</p> <p><b>Complexity:</b> Developing and maintaining intelligent OS is complex, requiring significant expertise in AI and OS technologies.</p> <p><b>Dependency on Data:</b> The effectiveness of these systems relies on the availability and quality of data, which may not always be sufficient or reliable.</p> |  |

#### Current State and Future Directions:

While intelligent OS are still in their early stages of development, several promising examples exist:

Microsoft Windows 11: Incorporates AI-powered features like Focus Assist and Smart App Control.

Apple iOS and macOS: Utilize AI for tasks like Siri voice assistant, intelligent suggestions, and on-device learning.

Google Android: Employs AI for features like Google Assistant, adaptive battery management, and predictive text.

AIOS: AIOS (LLM-based AI Agent Operating System) introduces a novel architecture for serving LLM-based agents by isolating resources and LLM-specific services from agent applications into an AIOS kernel. This AIOS kernel provides fundamental services (e.g., scheduling, context management, memory management, storage management, access control) and efficient management of resources (e.g., LLM and external tools) for runtime agents. To enhance usability, AIOS also includes an AIOS-Agent SDK, a comprehensive suite of APIs designed for utilizing functionalities provided by the AIOS kernel.

<https://arxiv.org/abs/2403.16971>

Some other relevant references on such topics are:

Operating System And Artificial Intelligence: A Systematic Review: This paper provides a comprehensive overview of the integration of AI and OS, covering techniques like memory management, process scheduling, and intrusion detection.

<https://arxiv.org/abs/2407.14567>

Intelligent Management for the Operating System Services: This research discusses the development of an intelligent operating system feature that supports smart predictions and recommendations using AI capabilities within the Linux operating system.

[https://www.researchgate.net/publication/267298089\\_Intelligent\\_Manage\\_for\\_the\\_Operating\\_System\\_Services](https://www.researchgate.net/publication/267298089_Intelligent_Manage_for_the_Operating_System_Services)

An Intelligent Approach to Automated Operating Systems Log Analysis for Enhanced Security: This paper presents a multiclass text classification approach for self-healing systems using MNB and CountVectorizer on OS logs.

<https://www.mdpi.com/2078-2489/15/10/657>



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|-----------------------------------|--------------------|
| <i>Durata (mesi – max 12)</i>     | <<Durata in mesi>> |
| <i>Durata (ore)</i>               | <<Durata in ore>>  |
| <i>Numero di posizioni aperte</i> | 5                  |

### **Competenze richieste dal tirocinio**

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|---|--|
| <i>Requisiti tecnici:</i> programming, basics of AI and Operating systems |  |
| <i>Altri requisiti</i>  |  |