Autonomus Robot for the Detection of Landmines in a Simulated Environment

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I. ABSTRACT

II. INTRODUCTION

En este trabajo, se presenta un agente de aprendizaje por refuerzo profundo (DRL) diseñado para la detección de minas terrestres en un entorno simulado. La detección de minas es un desafío crítico en la ingeniería y la seguridad, ya que estas representan una amenaza significativa para la vida humana y la infraestructura. La combinación de tecnologías avanzadas, como el aprendizaje a utomático y los sensores LiDAR, ofrece una solución prometedora para abordar este problema.

To develop and test our deep reinforcement learning (DRL) agent, we use the Gymnasium library, specifically the CarRacing environment [1]. This library provides a simulated environment that is both flexible and widely used in the research community. The CarRacing environment allows us to create realistic scenarios for training and evaluating our agent. By using this tool, we can focus on improving the agent's performance without the need for a physical setup, saving time and resources.

Recent advancements in reinforcement learning have demonstrated the potential of feedback linearization techniques for controlling autonomous vehicles in complex environments. For instance, [2] explores the use of reinforcement learning to design a linearizing controller for car racing dynamics, enabling efficient path planning and trajectory tracking. Inspired by these methods, our work adapts similar principles to address the unique challenges of landmine detection in simulated environments.

III. RESULTS

IV. METHODS AND MATERIALS

en esta sección se describe la arquitectura del agente, el diseño de la función de recompensa y el protocolo de entrenamiento.

Hola mi gente

V. CONCLUSIONS

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