# Warthog Robotics HSL Team Description Paper for RoboCup 2026

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**Abstract.** This paper presents the Warthog Robotics Centaurus project and the key improvements made to this RoboCup Humanoid Soccer League initiative over the past year. The research and development cycle included various software improvements, focused on player behavior during the match.

**Keywords:** Humanoid Robots · Behavior Tree · Role Assignment

## 1 Introduction

Warthog Robotics is a research and development Robotics group from the University of São Paulo at São Carlos. The group consists of over 100 members, including bachelor and master students from several knowledge areas, such as Computer Science and Electrical, Mechatronics, and Computer Engineering, and develops Robotics technologies in various areas, applying most of them at Robotics competitions. Since 2011, the group reach expressive results at RoboCup Small Size League (SSL), including a third place at RoboCup 2025 Salvador and second place at 2025 *Competição Brasileira de Robótica (CBR)*, the biggest Latin America robotic competition. Furthermore, the team also participate from RoboCup @Home, securing the first place at 2020 *CBR*.

In 2025, following the new road map from RoboCup, the team started the development of their humanoid soccer team, exposing the improvements at demonstration matches at *AI Brasil Experience*, the largest Artificial Intelligence (AI) event of Brazil. Warthog Robotics' latest software improvements are detailed in Section 2, with an approach focused on the modification attacker's behaviors.

## 2 Software Improvements

Warthog Robotics new humanoid soccer team consists of the Booster Robotics T1 platform. Since the acquisition of the robots, initial efforts have focused on

acquitance and understanding of this new platform and Boosters software framework developed for it [1]. Concurrently, the default robot behaviors implemented in the original software were improved to enhance the robots offensive capabilities in a real humanoid soccer RoboCup match.

The improvements developed consisted on the modification of the default behaviors found in the booster robotics code. Originally, the conditions for the kicking motion for a shot on goal was very restricted, frequently preventing it from happening in a real game situation. Therefore, by loosening these conditions, the team's offensive capabilities were increased. This change was validated during the AI Experience competition, were it resulted in a goal scored by a kicking action in one the games played.

## 3    Future Work

Warthog Robotics has an extensive history in robotics competitions and research, and has achieved high quality projects in different RoboCup categories since 2012, mainly in the SSL [2]. With the interruption of the SSL in RoboCup in 2028 and the acquiring of the Booster platforms, Warthog Robotics development team is shifting its primary focus towards the humanoid league.

One of the first steps towards achieving a high level of soccer competitiveness will be the implementation of passing plays, specifically in kick-offs and free-kicks. These type of game events are recurrent in a soccer game and even more in a robot soccer game, therefore maximizing the offensive capabilities of the team in these situations is crucial. Moreover, a better control of the T1 robot is a challenging task, and will be addressed in future development cycles. Currently, the walking and kicking motions are inadequate for a competitive soccer game, therefore improving them will be one of the teams priorities.

## 4    Conclusions

Warthog Robotics' new HSL project has shown sufficient competency for participating in a soccer match in compliance with the current RoboCup rules. The latest improvements consisted on improving the team's offense through increasing the kick on goal attempts. For the RoboCup 2026, other skills will be improved in order to improve the team's competitiveness.

## References

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