
Vision-Based Localization for Autonomous Basketball Robots

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Abstract— Localization is a fundamental capability for autonomous robots, enabling them to operate effectively in dynamic environments. In Robocon 2025, accurate and reliable localization is crucial for improving shooting precision, avoiding collisions with other robots, and navigating the competition field efficiently. In this paper, we propose a hybrid localization algorithm that integrates classical techniques with learning-based methods, relying solely on visual data from the court's floor to achieve self-localization on the basketball field.

Keywords—*Robot Localization, Autonomous Navigation, Neural Networks, Robocon*

I. INTRODUCTION

Section II reviews existing methods and prior research related to this work. **Section III** provides a detailed description of our proposed algorithm, approach, and model architecture. **Section IV** provides the results obtained from our experiments. **Section V** evaluates the accuracy of our approach and discusses potential directions for future work.

II. RELATED WORK

III. METHODOLOGY

IV. RESULTS AND ANALYSIS

V. CONCLUSION AND FUTURE WORK

VI. REFERENCES