Smart Net

-An IoT-based Smart System to Address Rule Violations.

Meet our team

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Introduction

Volleyball is a fast-paced and exciting sport having 12 players, 6 players for each. The major issues that the game faces are inaccuracies in line detection and net touches. These issues can affect the outcome of games and undermine the fairness of the sport. Through the use of IoT technologies, we hope to address these issues and contribute to the continued growth and development of volleyball.

Problem Statement

Volleyball is a highly dynamic sport that relies on accurate line detection and fair play. However, there are two significant issues that affect the game:

- line detection.
- net touches.

History and Rules

History :

- Volleyball is a fast-paced and exciting sport was invented in 1895.
- volleyball is one of the most popular sports in the world, with over 220 national federations and millions of players at all levels.

Rules :

- Each team has six players on the court at a time, with three in the front row and three in the back row.
- The game begins with a serve, in which a player hits the ball over the net to the other team.
- Players are not allowed to touch the net, and the ball must be hit over the net in three touches or fewer.
- A point is awarded when the ball lands on the opposing team's court, or if the opposing team commits a fault (e.g. touching the net or hitting the ball out of bounds).
- The game is played in sets, with each set consisting of 25 points (or 21 points for beach volleyball). The first team to win three sets wins the match.

Existing Solution

In and Out Line Monitoring System for Volleyball

Proposed Solution :

- This proposed system provided solution for line umpires by using “Line Monitoring System”.
- They used Capacitive Tactile Sensors, Force Sensitive Resistors, Micro Controllers and LED indicators.
- Whenever the player place their foot on the outline while serving, the IoT sensor senses the line detection and gives indication through the LED attached to the Microcontroller.

Problems

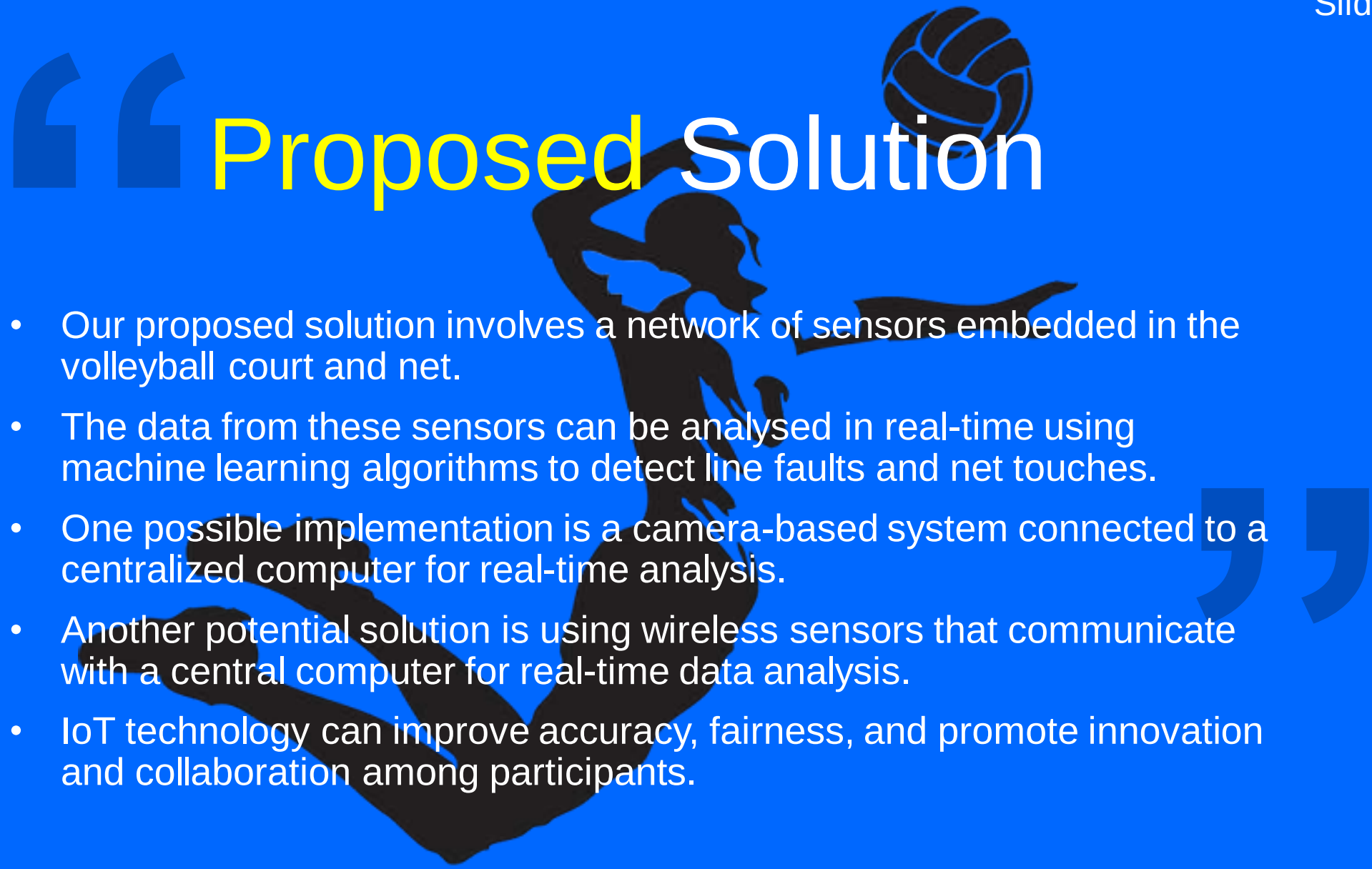
Line Detection :

Line detection is critical in volleyball as it determines whether a ball has landed in or out of bounds. However, the current technologies used for line detection, such as cameras and sensors, are not always accurate, especially in fast-paced and dynamic games. This can lead to incorrect calls, affecting the outcome of a game, and undermining the fairness of the sport.

Net Touch :

Net touches occur when a player comes into contact with the net while playing the game. These touches can be accidental, but they can also be used as a tactic to gain an advantage over the opposing team. However, the current technologies used for net touch detection are not always reliable, leading to incorrect calls, affecting the outcome of a game, and undermining the fairness of the sport.

Proposed Solution



- Our proposed solution involves a network of sensors embedded in the volleyball court and net.
- The data from these sensors can be analysed in real-time using machine learning algorithms to detect line faults and net touches.
- One possible implementation is a camera-based system connected to a centralized computer for real-time analysis.
- Another potential solution is using wireless sensors that communicate with a central computer for real-time data analysis.
- IoT technology can improve accuracy, fairness, and promote innovation and collaboration among participants.

Technology and sensors.

1

Pressure Sensors

It detects the amount of pressure kept on area of ground and net & reads the data.

2

Force Sensors

It detects the force applied by the object on the sensor and reads the data.

3

Proximity Sensors

It is a device that can detect or sense the approach or presence of nearby objects.

4

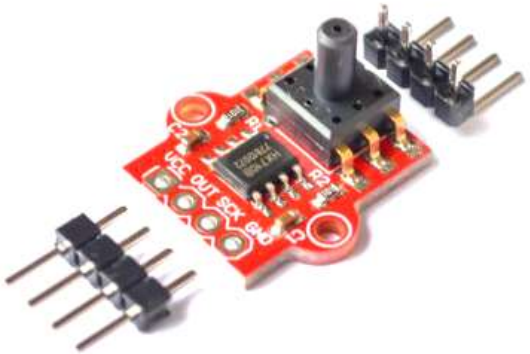
Photoelectric Sensors

It is used to detect the object by emitting and receiving the light rays when obstacle come.

Areas of focus

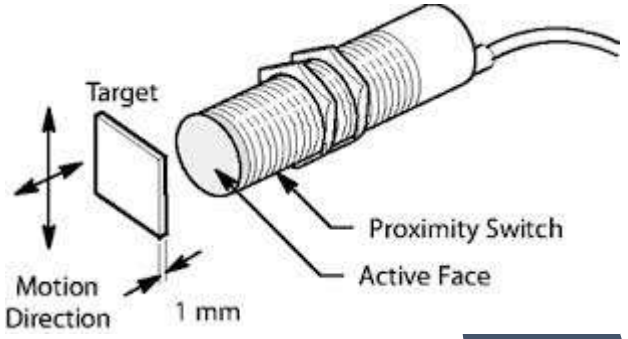
Pressure Sensors

These are used in this project to detect the pressure applied on the area of border line and also net and sense that line touch happened.
And also net touch of object.



Proximity Sensors

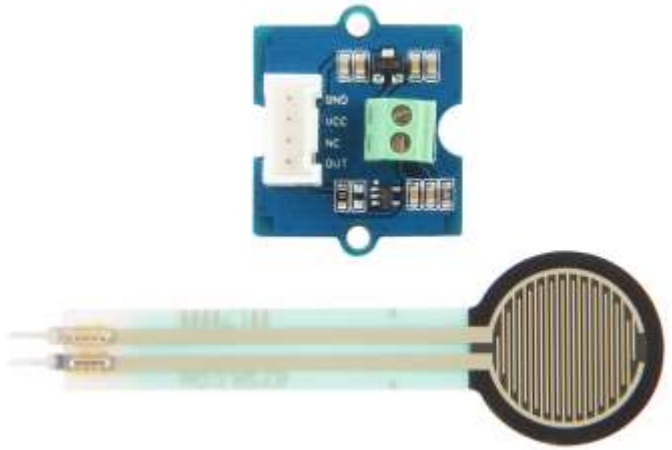
These are used in this project to detect the Object.
It is a device that can detect or sense the approach or presence of nearby objects with respect to the volleyball Net.



Areas of focus

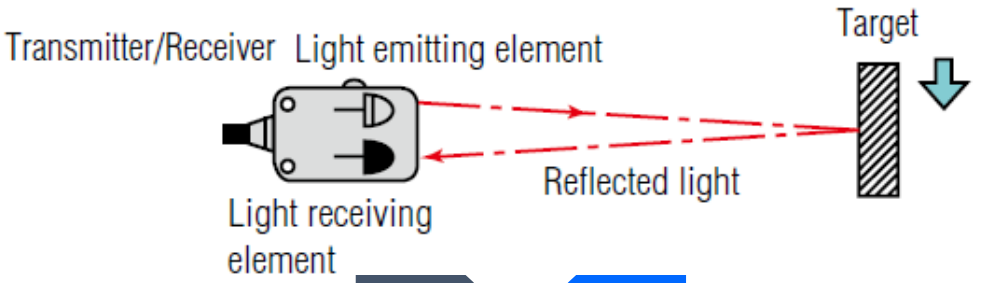
Force Sensors

These are used in this project to detect the motion of the volleyball net when an object hits the net.



Photoelectric Sensors

It is used to detect the object by emitting the light rays and sensing the reflected light rays when object gets abstacled, emitted by the sensor itself.



Summary

In conclusion, the IoT hackathon on volleyball line detection and net touch issues presents a unique opportunity to develop innovative solutions to address these specific problems. Through the use of sensors, machine learning algorithms, and computer vision techniques, participants can develop real-time systems that accurately detect line faults and net touches in volleyball matches. The benefits of participating in this hackathon include promoting collaboration, innovation, and problem-solving skills, as well as the potential to have a positive impact on the sport of volleyball. With the continued advancement of technology and the increasing demand for accurate and fair sports play, this hackathon is an important step towards enhancing the integrity and fairness of volleyball games.

Thank you

- Team Tech Cruisers ☺