Questions for Tech United

Which rules are hard to implement in the robot and are there chances of breaking the rules?

- Collisions – soft okay, deciding in which one at fault when the situation is vague (two robots clash to get the ball)

What annoys you about the referee during the match?

- Matches tide
- When biased decisions are made
- The ball is not seen clearly during the match, so it may raise doubt when the referee makes decisions
- Ball in and Ball out decision, also Goal or No Goal

What do you minimally expect from an autonomous referee?

- *Ball in or out*
- Who can take corner / Which team has touched the ball last time
- When it's goal or not
- Collisions (not minimum expectation, would be nice to have)
- Penalty area rules

Give the list of needs and order them accordingly.

- Integration with Ref Box
- Free kick
- Throw in
- Corner
- Goal
- Giving a Pass before a goal
- Visualization (Why this decision was made) **optional**

1. **Capable to show proof**
   - In what ways do you envision receiving proof or documentation of the decisions made by the autonomous referee during a match?
     - Goal-line technology
     - A slow replay with labels would be nice

2. **Objectivity (Fairness related, the system is impartial):**

- What specific measures or features would you consider indicative of a fair decision-making process?
    - Videos/visualization to show
    - Replay
- How would you define and prioritize the level of objectivity you expect from the autonomous referee in comparison to a human referee?
- Are there specific scenarios where you see potential challenges in maintaining objectivity?
    - Soft collisions (he said it already)

3. **Accuracy**
    - What level of accuracy do you expect from the autonomous referee in interpreting and enforcing the soccer robot rules?
    - Are there specific rules or situations where correctness and precision are especially crucial for your team?

4. **Continuity**
5. **Progress**
6. **Robustness:**
    - What factors do you consider essential for the reliable operation of the autonomous referee in a dynamic and unpredictable environment like a robot soccer match?
        - Electricity power
        - Internet connection

7. **Real-time (decision taken now of the actual incident with minimal delay)**
    - To what extent is real-time decision-making capability crucial for the success of the autonomous referee in robot soccer matches?

8. **Adaptability**
    - How often do the rules of the MSL change?
        - Every year it changes a bit

9. **Need to follow RoboCup MSL Rules**
10. **Consistent decisions**
    - How important is the ability of the autonomous referee to consistently make similar decisions in similar situations?
    - Are there particular aspects of consistency that you see as more critical for the referee's effectiveness?

11. **Safety**

Notes:

How long can you wait for a decision to be made when a fault occurs? E.g. 2 sec
- 1 sec at maximum

Which one is more important, the system that communicates with the RefBox directly or the module/function that the system use to make decisions (e.g. the class or the method)?
- Functions

Have Tech United made some kind of autonomous referee for the soccer robot? If yes, what systems and/or functions you may have developed?
- The one that senior of last year has made.
-

If needed, can we use 2 service robots for ball tracking on sidelines?

If a team falsify the goalkeeper extending mechanism and passes through the precheck, and when the referee found it out during the play, will it be considered as a goal or not, or will the cheating team be disqualified?
- (NOT TOTALLY SURE) it's considered as a goal, and the goalkeeper needs to be replaced.

Other NOTES:

- Feature to detect ball spinning is not mandatory in the first phase, but it'll be necessary if no more human referee
- Check if only one defending robot in penalty area (feature) for 10 seconds
- Check the dribbling distance travelled by the robot, 3 meters. The backward dribbling distance is 1m
- There is no rule for max speed of ball
- The Auto Ref system would be best for Competitions but can be for Tech United
- What annoys you about Auto Ref?   (Ball in/out) (Goal or No Goal) (Collisions of players)
- Stadium Cameras are only for Tech United and not for other fields
- Robots can't score from their own half.
- Players are identified by colour filtering, player numbers, Labels and unique IDs
- There is no such rule of velocity of Robots.
- Penalty Area Rule: Only one Robot per team should be in penalty area apart from goal keeper and time is 10 seconds. (No two robots of the same team can be in penalty area at same time)
- Goal keeper can extend up to 10cm at one side for 1 sec after every 5 sec
- **User Needs :**
    - Integration with RefBox
    - Free kick / Throw / Corner / Goal
    - Visualization
    - Giving a Pass before a goal
    - Which team player has last touched the ball