Problems I encountered in making the robo-soccer bot:

Tips:

- Communication between the bot and remote must be the first priority
- Stepper motors shouldn’t be used for wheels (atleast for such heavyduty projects).

Communication issues:

- Bluetooth (using HC05 module):

Can't be used for live communication. Also, significant lag between consecutive signals and also skipping them.

- Wifi (using esp8266 microcontroller):

Better option, but the available esp had only 1 analog pin.

- Radio(using nrf24L01 module/ HC12 module):

Best option as data transfer is instantaneous and also easy to code so more flexibility in movement.

nrf module just won't connect due to unknown reasons

We used hc12 finally but its range became negligible because of the metal chassis; covering a part of it and lifting the module helped a little but a more powerful module with proper antenna instead of the spring one might have worked.

Movement issues:

Power requirement of the high torque geared dc motors we ordered was way too high due to which we had to use stepper motors available, which led to many problems:

- The nema17 stepper motors were very heavy and increased the weight of the car significantly and also have very high power consumption.
- Using stepper motor for wheels caused many issues as they only spin at the set speed and if an external torque any higher than the motor could provide is applied, the motor will straightaway stop and vibrate instead of just slowing down like dc motors.
- Also, controlling multiple steppers simultaneously is very difficult, you have to alternate between 2 stepping each only a few steps because Arduino can only operate one stepper motor at a time and will not execute another command when it is being used.(while dc motors easily keep on running until next command)

So, if you do use stepper motors for such purpose; the value of speed and steps must be chosen carefully while alternating between the motors else they will just vibrate and heat up.