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Robot Proposal: Automated Poker Dealer

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Abstract

This automated poker dealing robot will deal 8 different poker games to up to 8 different players in accordance with the rules of the game selected.

Executive Summary

Introduction

My friends and I play poker all the time but there is this one kid who we do not let deal because he is notorious for dealing from the bottom of the deck. He often comments that it is unfair that everyone else is allowed to deal while only his dealing is held in scrutiny. An automated poker dealer would take the doubt out of human dealing, alleviating this problem once and for all. The rest of this report discusses how such a robot would be constructed.

Integrated System

When turned on the robot would do nothing, waiting for inputs. 8 switches corresponding to 8 player positions would need to be set to determine the number of players and their positions on the table. 8 LED's pointing to the player position will light up when the corresponding switch is asserted. Another set of 3 switches corresponding to 8 different types of poker games like 5 card draw or Omaha would need to be set to specify which game you want to play (I would only implement like 1 or 2 of the games for the project but it still has the expandability if I want to implement the rest later). The name of the game selected would be displayed on the LCD. If the switches are set to invalid inputs (like you can't have 8 players play 5 card draw with 1 deck of cards because there is too much of a chance that the deck will run out) the LCD will say that you have entered invalid inputs. The robot would continue waiting until a deck of cards is placed in the deck loader. A weight sensor will indicate that a deck of cards has been placed in the loader initiating a shuffling sequence. When the shuffling is complete the robot will begin dealing the cards to the positions selected by the 8 input switches in accordance with the game selected (e.g. 2 cards to each player in Texas Hold'em or 4 in Omaha). If a hidden switch is asserted the robot will still deal the cards in accordance with the game selected but will deal from a rigged deck that is hidden inside the robot (if you're going to cheat, do it right). If the game requires the robot to move (a games like Texas Hold'em or Omaha would require the robot to move in order to deal the community cards where as games like 5 card draw would not) IR and bump sensors would detect if obstacles like poker chips or beer bottles are in the way then avoid them. In games that require human action like betting before more cards are dealt (or in the case of games like 5 card draw, specifying how many more cards you want) a special sensor like voice recognition will need to convey to the robot that game play is ready to

continue. When the round is complete and a winner has been determined the robot will eject the rest of the cards and wait for the process to begin again.

The brains of this robot will be an ATmega128 MCU contained in a Mavrik-IB development board from BDMicro. The microcontroller will have to control:

- 2 drive motors
- 1 servo for platform rotation
- 2 motors for shuffling
- 1 motor for dealing to people
- 1 servo for switching play deck with rigged deck
- 2 servos for internal deck manipulation
- 1 LCD screen

When receiving inputs from:

- 12 input switches
- 1 IR detection system
- 4 bump sensors
- 2 weight sensors
- 1 special sensor (probably a voice recognition system)

Mobile Platform

The platform would consist of a two tier cylinder system separated by a lazy susan making it possible for the top cylinder to rotate. The bottom cylinder would house the batteries, two motors for motion, and a mechanism for dealing cards face up or face down in the area underneath the robot. The top cylinder would house the Mavrik board, a mechanism for shuffling cards, and a mechanism for dealing cards to players. The platform will be constructed primarily of a medium grade plywood with a decent looking surface so that it can be stained and then covered with a polyurethane coat.

Actuation

2 drive motors

The base of the platform will have 2 drive wheels and a caster. The 2 drive wheels will be controlled by 2 motors that I have not selected yet.

1 servo for platform rotation

The top cylinder of the platform will need to rotate so that it can deal directly to the different players. A servo connected to the lazy susan base will do this.

2 motors for shuffling

The basic design of a card shuffler is a 3 chamber design with the 2 outside chambers containing a motor in the bottom that propels the cards into the center chamber. These motors only go in one direction at one speed so minimal control is needed.

1 motor for dealing to people

The basic design of my card dealer is an angled chamber with a motor in the base that propels cards out of the robot. This motor only goes in one direction at one speed so minimal control is needed.

1 servo for switching play deck with rigged deck

One section of the internal deck manipulation system will be a section that the deck will fit into that will rotate away bringing a rigged deck into the system.

2 servos for internal deck manipulation

I haven't really finalized this system but I will only have 2 free PWM's left so I will have make it work with 2 more servos.

Sensors

1 IR detection system

For obstacle avoidance

4 bump sensors

For obstacle avoidance

2 weight sensors

To detect that the deck has been placed in the card shuffling mechanism

1 special sensor (probably a voice recognition system)

I don't know about this sensor yet

Behaviors

When the number of players, there position, and the game has been selected the robot will wait till someone places a deck of cards into the deck shuffler. The deck will trigger a wait sensor that will initiate a shuffle. The shuffled cards will be loaded into the dealing mechanism that deals to all the positions that were specified by the players. it does this by rotating to the position then launching a card in the air that should land relatively close to the player. The robot will then go into a wait state that allows the players to place bets. When the players are ready for game play to continue they will communicate this through the special sensor (if it is voice recognition the players will shout a command like "continue" or if it is a game that requires specific inputs from the different players like 5 card draw the commands would be numbers like "one" or "three" corresponding to the amount of cards that the player wants). The robot will continue in this fashion until the game is over at which time the robot will eject the rest of the deck and go into a wait state until the players are ready to begin again.

Experimental Layout and Results

Conclusion

Documentation

Appendices