Human-Following Car

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Our project is the development of a low-cost human-following car, as we are interested in drones. We decided not to use GPS, as it is already implemented as ‘following technique’ in many commercialized drones. We took a RC car to serve as a basis for our system. After doing some research on sensors and concepts of tracking an object, we opted for Raspberry Pis (MiniPC) as pivotal part of the car. Its GPIO (General Purpose Input/Output) pins (digital) are able to generate, using the accurate program, PWM (Pulse-width modulation) signals to control the car. Moreover, we use these pins to interact with the ultrasonic and IR distance-measuring sensors, to implement switches and to communicate between the two Raspberries. An infrared camera takes pictures of the person, which wears an infrared LED on its back. These pictures are analyzed by an image analysis library. We wrote our programs in python and used some open source libraries. The program running on the first Raspberry reads out the camera’s video stream, determines the position of the IR LED and gives out a signal controlling the direction the car is driving to. The second Raspberry handles the ultrasonic distance-measuring sensor. Its program processes the latter’s data and gives the car a corresponding signal to control its speed. There is a connection between the two computers, which allows to cut the throttle, when there is no person in front of the car. This technique can be used in multiple domains: at the airport to carry the baggage or to supply a person going for a run. Moreover, it can be mounted on golf cars, on supermarket caddies or on wheelchairs. The latter would drive next to you, instead of needing you to push it from behind.

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