HSA Project: Hand-Gesture-Controlled Obstacle Avoiding Robot with Haptic Feedback

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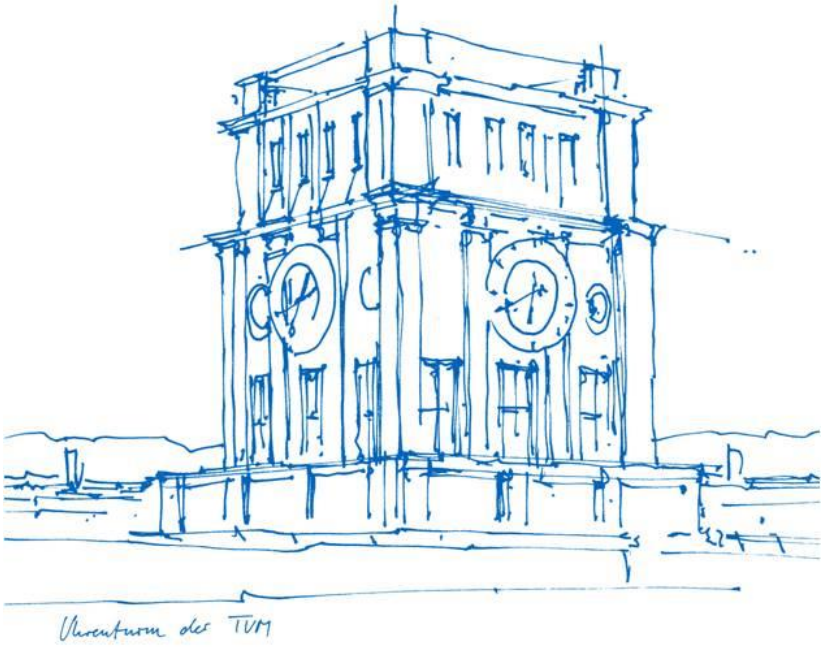
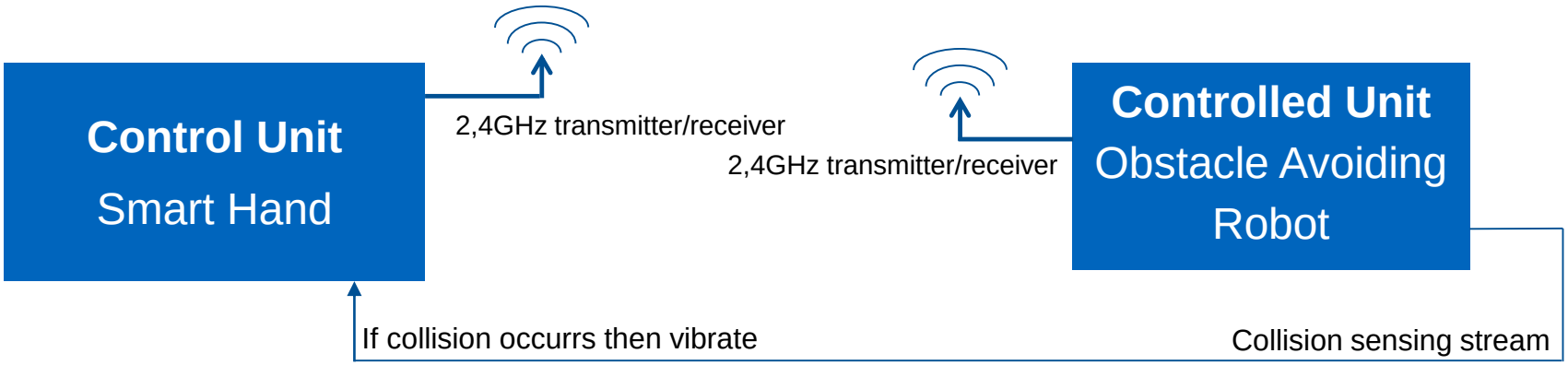


Overview



TX:

- Gesture-based motions are translated into control commands.

Channel:

- Air – Range up to 100m.

RX:

- Collisions feedback commands are translated into haptic vibrations and increases user's sense of presence and agency.

RX:

- Control commands are translated into actions (rotations and translations).

Channel:

- Air - Range up to 100m.

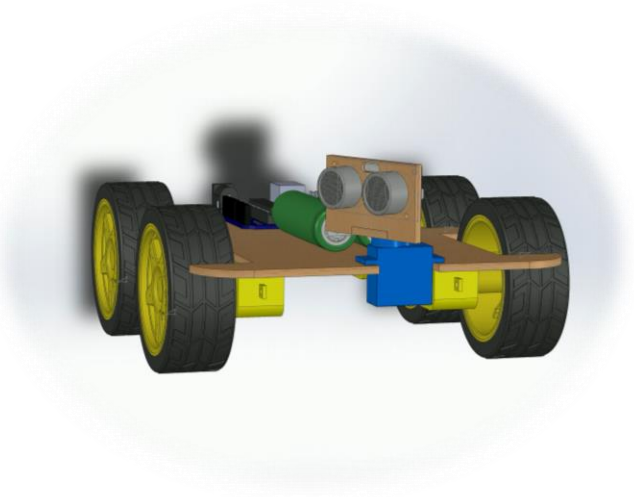
TX:

- Collisions are translated into feedback commands.

Controlled Unit: Obstacle Avoiding Robot

Features

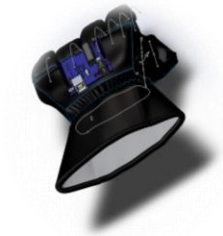
- Body: A Chassis
- Brain: MCU (ATmega328P – Arduino UNO/Nano)
- Transmitter: NRF24L01 2.4GHz - 100m range
- Sensors:
  - Ultrasonic sensor (HC-SR04): distance estimator.
  - 3x Infrared sensors (SN-IRS-01): distance estimators for the right, left and back sides.
- Actuators:
  - Servo (SG90) : Head rotator (180°)
  - 4x Gear Motors with one driver (L298N) (includes H-Bridge, which provides the ability to fully control the left and right-side wheels).



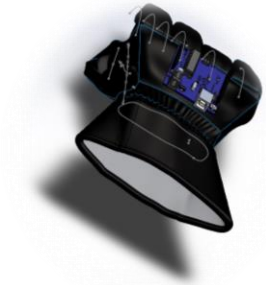
Control Unit: Smart Hand

Features

- Body: Glove
- Brain: MCU (ATmega328P – Arduino UNO/Nano)
- Transmitter: NRF24L01 2.4GHz - 100m range
- Sensors:
  - 6DoF Gyroscope (GY-521 MPU-6050).
- Actuators:
  - Vibration Motor: used to sense collisions as feedback.



move to the left



move to the right

move forwards

move backwards

Thank you for your attention !