Haptics in cars

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Overview

➲ The driving environment can have a lot of distractions for the driver.
➲ The better the driver can focus on driving the safer.
➲ Safety concerns are the most important research area.
Overview

- You can have tactile elements in many parts of the car
- These can be divided into kinds of device
- Devices that the driver has continuous contact with
  - Steering wheel, pedals, the seat
- Other devices
  - Various buttons, levers etc.
Pros & Cons

➲ Pros
- Can attract attention immediately
- Tactile sense commonly not used
- You can several different kinds of stimuli by varying the frequency and place

➲ Cons
- Users can become numb to the haptic signals
- You have to learn what different signals mean
- Can become annoying
Safety

Safety is one of the most critical issues
There are two ways why haptic devices can increase safety
Haptic devices can be used actively
  • By giving warnings to the driver
  • By influencing how driver is driving
The other way is to make the devices the driver uses haptic. This way driver can concentrate on driving and use his sense of touch to operate the devices.
A pneumatic tactile alerting system for the driving environment
The steering wheel has inflatable pads to convey information to the driver.

The main purpose for the project is to alert the driver of possible problems.

They found that tactile feedback from the steering wheel lowered reaction times and also that different frequencies of the vibration can provide extra information to the driver.
Potential problems

- Stimulus can be localized to a specific area on the steering wheel. The driver has to be touching the steering wheel.
- The driver must be aware on what the different haptic messages mean, but this problem can be negated by driver experience.
Haptic gas pedal was researched by Nissan in 2002 to explore the possibilities of developing a support system for drivers for keeping the distance constant to the car ahead.
Pedals

- The gas pedal could push upwards so that the car would lose speed.
- The information gained from prototype tests proved that the drivers did give way to the force from the gas pedal. Also they found that haptic feedback was good enough to replace the visual feedback temporarily.
Pedals

Problems:
- Trust issues
- Taking control from the driver
- Sensor problems
Seat

➲ No examples yet
➲ The seat can be used to
  ● Warn the driver
  ● Give direction signals
  ● Etc.
Universal control

- A single knob can feel like several different knobs
- All the controls can be done with one knob
- Driver doesn't have to see the control when using it
- Usually used with sound / voice or visual feedback
Immersion TouchSense PR-1000

Barrier
Sensation of hitting a hard stop

Detent
Notches associated with selection position

Compound
Two or more effects

Hill
A plateau style of wide detent

Constant Force
Constant force independent of position
BMW iDrive

http://www.bmwblog.com/2008/07/05/video-bmw-7-series-f01-interior-operation-and-idrive/
Questions?