NATURAL USER INTERACTIONS IN CARS

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What is NUI

- The Natural User Interaction is "The way of interacting with any user module using natural communication methods of our daily life"
- The Interaction can be of any natural methods like

Speech and voice control

Gestures

Eye movements and facial expressions

Combination of any of them

- There are some pros and cons in this method like others

Pros and cons

PROS

- Easy involvement of the user into the interaction module
- Makes life easier (at least interacting with a car)
- Reduces wear and tear of the components
- Freedom of movement

FACIAL EXPRESSION TRACKING

- Safety applications & entertainment

  e.g During sleep – warning, auto-parking

  Avoid accidents – Facial fears – auto brakes, loud warning

  Entertainment – Songs change

http://www.youtube.com/watch?v=1r6Vwts3f24 - 3D Facial imaging

INTERACTION USING VOICE AND SOUNDS

- Various voice recognition systems already available

  e.g SIRI, Audi MMI etc

http://www.youtube.com/watch?v=gSPcoH4wx-U - Audi voice control system

Some illustrations

RETINA TRACKING:

- Safety & Entertainment
- http://www.youtube.com/watch?v=uOIN-lhWpHM&feature=player_embedded -Driver assistance
- http://www.youtube.com/watch?v=gvN1elQ8NLY-Driver drowsiness & distractions
- Automatic auto drive mode activation
- Auto break (already implemented in some cars)

VOICE COMMANDS:

- Further improvements possible
- Song selection from playlist
- Applications initialization:

  e.g Wiper on/off, Headlight on/off, Navigation system, door lock/open, open Dashboard... what not !

- Improving efficiency of many languages and slangs recognition
- Applications manipulations using various sounds

  e.g clap to change the song (not for driver), any other innovative sounds to map with applications

GESTURE CONTROL

- Gesture plays very important role in NUI
- Types of gestures

Deictic gestures – For pointing an object

Manipulative – Controlling an object

Semaphoric – Symbolizes an object

Language – Sign language

Gesticulated – Speech and action

http://www.youtube.com/watch?v=oWu9TFJjHaM - Wearable gestures

The gesture control can be design by manipulating one or more gesture types

e.g : Deictic + Manipulative :

- Controlling mirrors (side and front)
- Auto drive activation – Drinking coffee, seeing a text
- Manipulating music or video systems

Deictic + Semaphoric :

- Opening and closing of doors
- Wiper on
- Opening/closing the dash board
- Seat adjustment

Deictic + Language :

- Setting temperatures
- Muting/increasing the volume in music system
- Moving/selecting options in an augmented reality displays for web browsing, navigation, video calling etc..

  http://www.youtube.com/watch?v=hcqsHAoWW9Y - AUDI augmented reality

  http://www.youtube.com/watch?v=nCqu4nju0ow - Eye control Hyundai
- The options can also be gesticulated (with voice and gesture) for more accuracy

CONS

- The cultural differences in method of interaction

e.g : The head movement for saying “Yes” in west is different from east

- The irregularities in tone, and slangs depending on culture
- Possibility of user forgetting his gesture in adverse situations or emergencies
- The problem of false positives
- Many gesture control softwares can accommodate only up to 30 gestures
- No gesture should be distractive to the driver

Measures to overcome cons

- Universal framework for gestures in automobiles needed
- Large variable sets of tones, and slags should be implemented
- Planning and deep analysis required for mapping gestures with applications
- Survey of automobile users can be taken
- More degrees of freedom
- Perfect gesture segmentation

Discussions and clarification

Thank you for your kind co-operation