长安汽车 CHANGAN AUTO | 科技长安 智慧伙伴

Principles of Voice Interaction

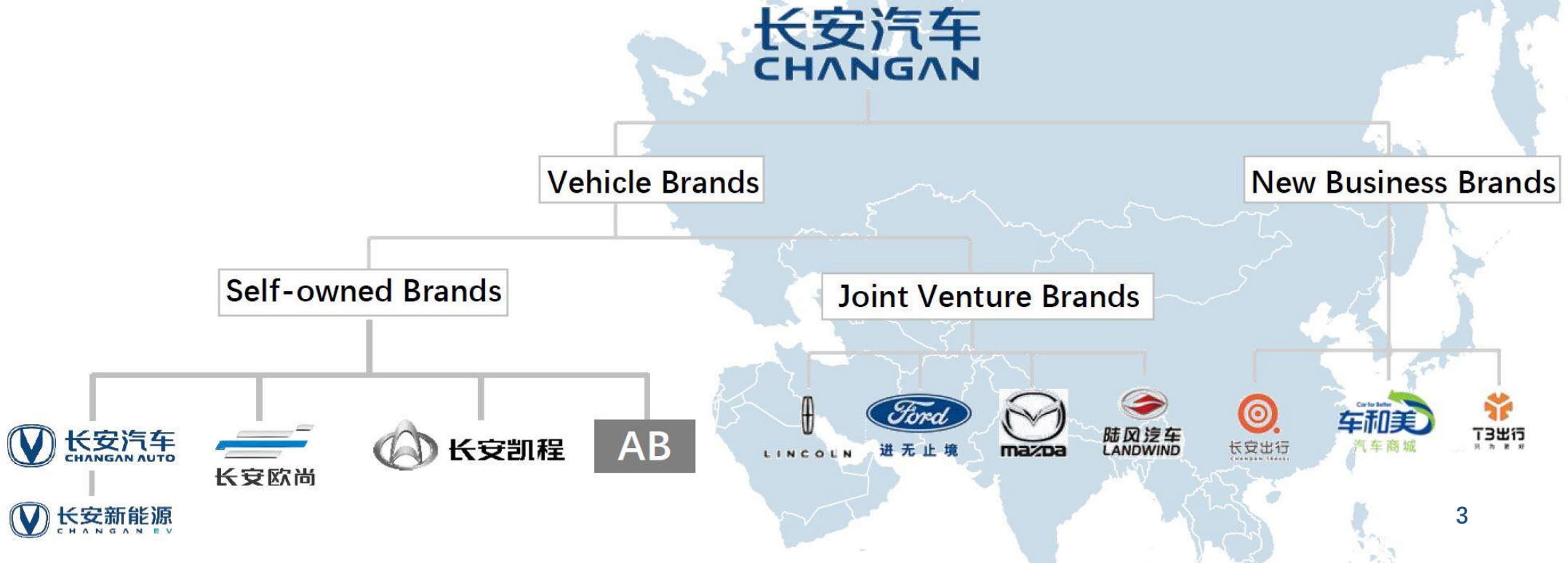
Zehui Cheng

2022.6.30

Contents

Introduction of Changan Automotive Group

Changan Automobile groups is one of the four major automobile groups in China. With 160 years of history and 38 years of car manufacturing experience, we have 14 production sites, and has established the " 6 countries & 9 locations" global R&D layout in Chongqing, Beijing, Hefei, Turin in Italy, Yokohama in Japan, Birmingham in the UK, Detroit in the US and Munich in Germany. We have professional automotive R&D process system and test verification systems to ensure that every vehicle delivered can last more than 10 years or 260,000 kilometers without overhaul.



The milestones of Changan Voice Interaction Development

YIDONG
Smart voice assistant and achieve cloud TTS

2015

2016

RUICHENG CC
Debut vehicular voice character

2017

CS75
One-shot interaction

2018

CS95
Voice+Ecolo-gical

2019

CS75PLUS
Voice+Social media

UNI-K

- Sound localization
- Voice replication
- Part-time wake-up-free
- Contextual interaction
- Customized voice character
- Voice interaction self-learning

2020

UNI-T
Debut voice active service

2021

CS55PLUS/UNI-V
Visible elements voice controllable

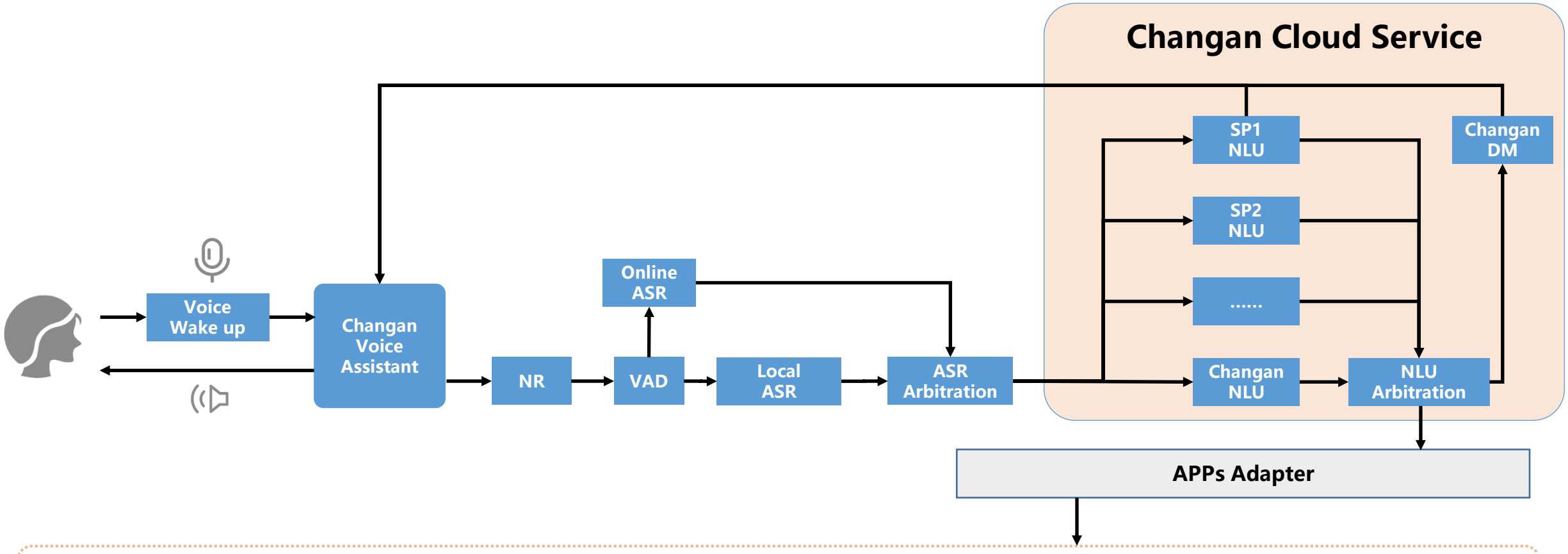
2022.04

Z6
External Vehicle voice interaction

2022.10

Coming soon...

Changan Voice Interaction Framework

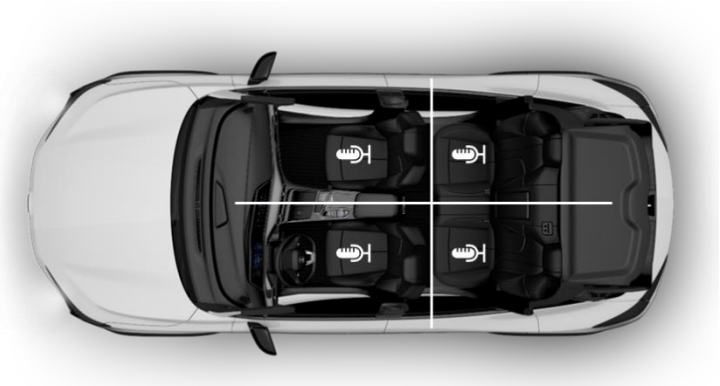


APPS

Media Service		Ecological Service		Navigation Service	AI Recommendation	Others
Social Media	Music	Restaurant Booking	Movie Ticket booking	Voice Navigation	ADAS	Electro-Manual
TV Program	News	Schedule Manage	Petrol Station	Via Points Adding	Vehicle Setting	Chatting
Movie	...	Parking Lot	...	...	...	IoT

Changan Voice Interaction Capability

AFM



- 2 Area/4 Area ECNR
- sound localization

Voice Wakeup

- Multilingual Wakeup
- Chinese Dialect Wakeup
- Multi-Zone Wakeup
- Customized Wakeup Words
- Wakeup Free Using
- Vehicle External Wakeup

ASR

- Chinese/English ASR
- Chinese&English mixed ASR
- Chinese Dialect ASR
  (Cantonese...)
- Vehicle External ASR

Changan Voice Interaction Capability

长安汽车 CHANGAN AUTO 科技长安 智慧伙伴

NLU

- Mandarin/Dialects NLU
- Chinese & English mixed NLU
- External NLU
- VAD（based on NLU）

Interaction

- Multi-Rounds Dialog Management
- Contextual Dialog Management
- Barge-in Voice Interruption
- One-shot

Changan Voice Interaction Development Planning

长安汽车 CHANGAN AUTO | 科技长安 智慧伙伴

Changan Automobile future voice interaction planning and development direction:

1. **Private cloud for Voice recognition**

   ASR、NLU and dialog management on Changan cloud server;

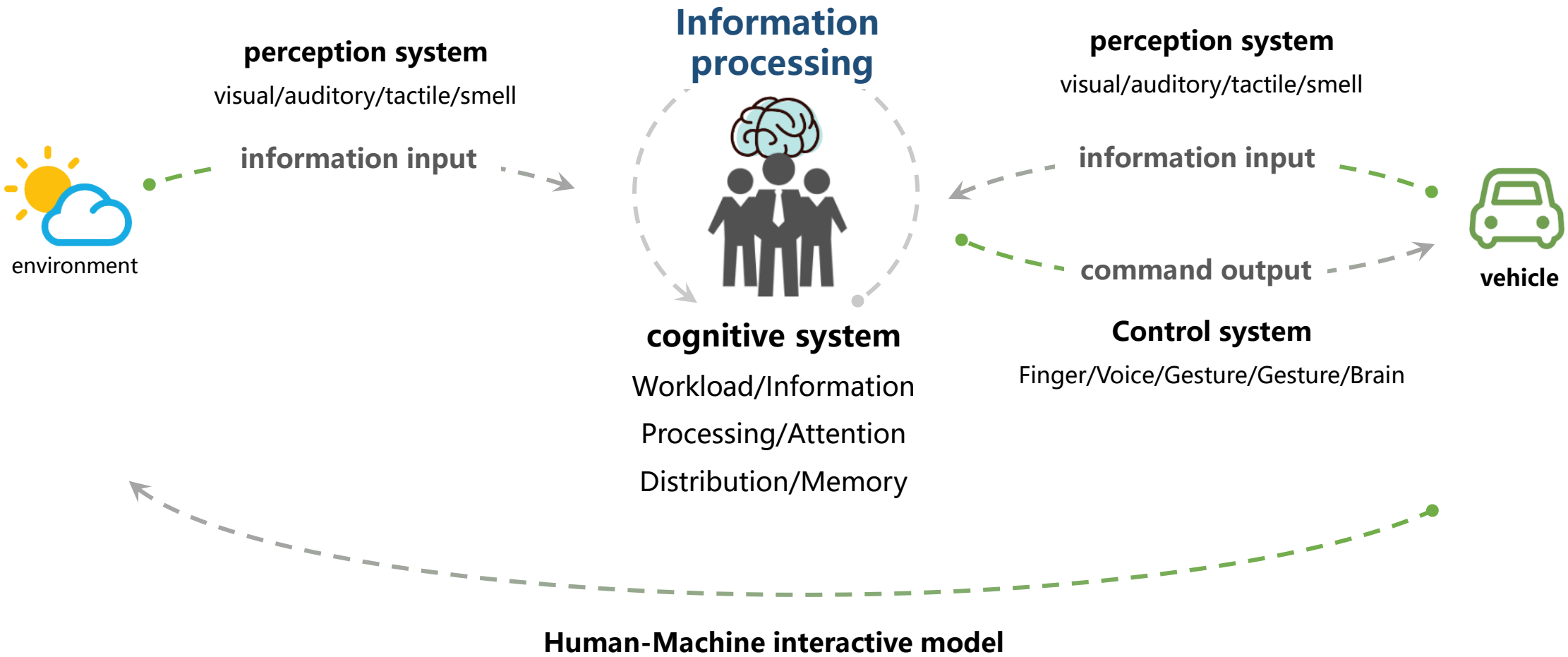
2. **Multimodal natural language interaction**

   Combine with visional modal to build more efficient interaction;

3. **Natural language processer**

   Abstract user portraits and generate natural language semantics according to users specific habits, to make dialog more intelligent and anthropomorphic.

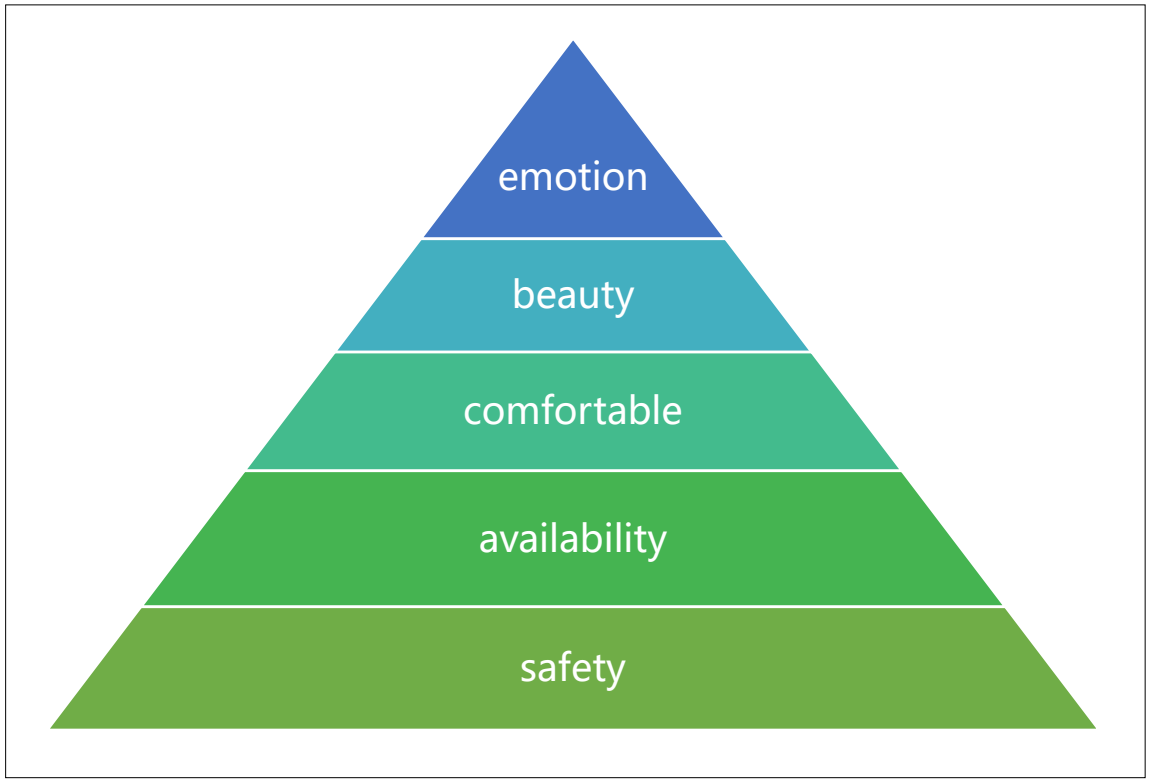
Human – Machine interactive model



Vehicle Human-Machine interaction experience faces new challenges

- The user's demand for intelligent connected vehicle and in line with Maslow's hierarchy of needs, from basic to personalized: safety, availability, efficiency, comfort, emotion
- With the rapid development of intelligent technology, the diversification of user groups and the complex driving environment, the intelligent connected vehicle are facing huge challenges in meeting the diverse needs of users

Vehicle Experience



effect

Human-Machine-Environment Variation

Basic Design Principles of Voice User Interface (VUI)

- Mobile device and IVR system design
- Conversational Design
- Set User Expectations
- Design Tools
- Confirmation Strategy
- Command-Control Mode and Conversation Mode
- Conversational Signs
- Exception Handling
- Don’t blame the User
- Novice and Expert Users
- Keep Track of Context
- Help and other Generic Parts
- Latency
- Disambiguation
- Barrier-free Design

Advanced Design Principles of Voice User Interface (VUI)

Today, with the accuracy of speech recognition available, the challenge of designing a good VUI comes more from NLP — the way it processes the input information, than the technology itself.

- Different types of voice input
- Capture intents and objects
- Dialogue management
- Don’t leave users alone
- Sentiment Analysis and Emotion Detection
- "Wake up" words
- Context
- Self-Service Datasets

Thank You !

长安汽车
CHANGAN AUTO