Building Digital Human based on Inspur MetaEngine

Inspur AI&HPC DevTech：Wang Pengfei

Background of Digital Human

Digital Human Beings

Luo Tianyi

Liu Yexi

AYAYI

Xiao Pu

Dongdong

Virtual Digital Human Technology Modules and Trends

Tech Modules	
character generation	3D character modeling
character expression	Speech and animation generation
composition and display	Terminal Display Technology、AR/VR
*recognition and perception	ASR, FR, Pose Recognition, eye tracking etc
*Analysis and decision	NLU/NLG, Dialogue management,knowledge base

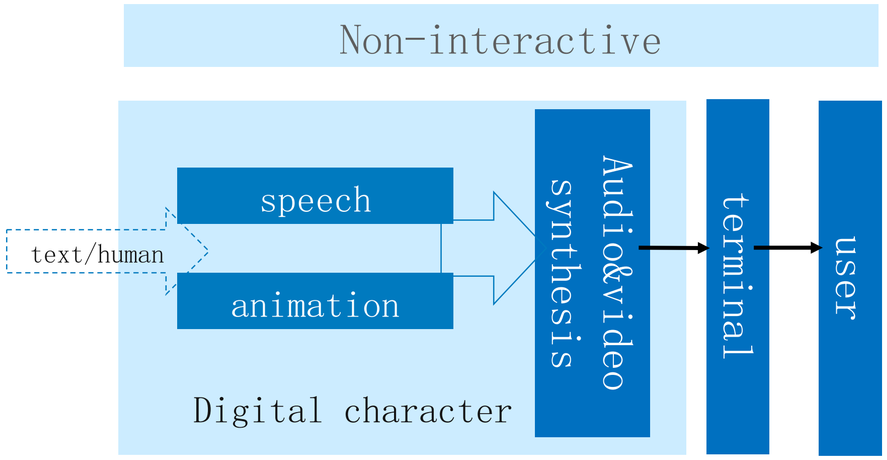
Modeling: Static scanning modeling is still the mainstream, and the dynamic light field 3D reconstruction with high visual fidelity including human behavior and motion is beginning to take shape

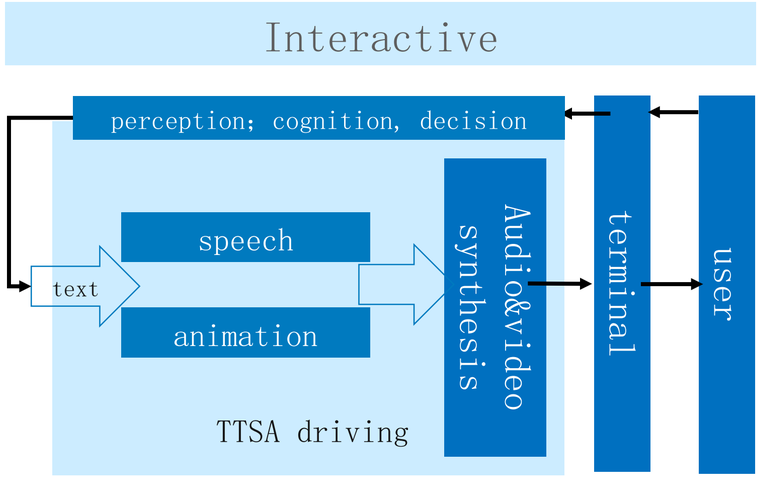
Driving: Facial capture and motion capture are the current mainstream driving methods for digital humans

Rendering: With the improvement of hardware capabilities and breakthroughs in algorithms, the fidelity and real-time performance have been greatly improved

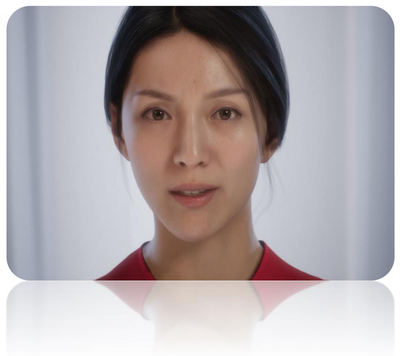
***Technical modules of the interactive digital human**:Fully supported by AI technology,such as CV/ASR/TTS/NLP

Hyper-realistic technical challenges and Multivariate computing power support





Precise Modeling



Multi-tool collaboration

Physics-Based Simulation

Hair/eyes/clothing HPC computing

High-fidelity rendering

Content generation/real-time rendering

Real-time Interaction

Streming data trans and AI

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Multivariate computing power solutions

MetaEngine

AEC

Game Dev

M&E

Digital Twin

Nvidia Omniverse Enterprise

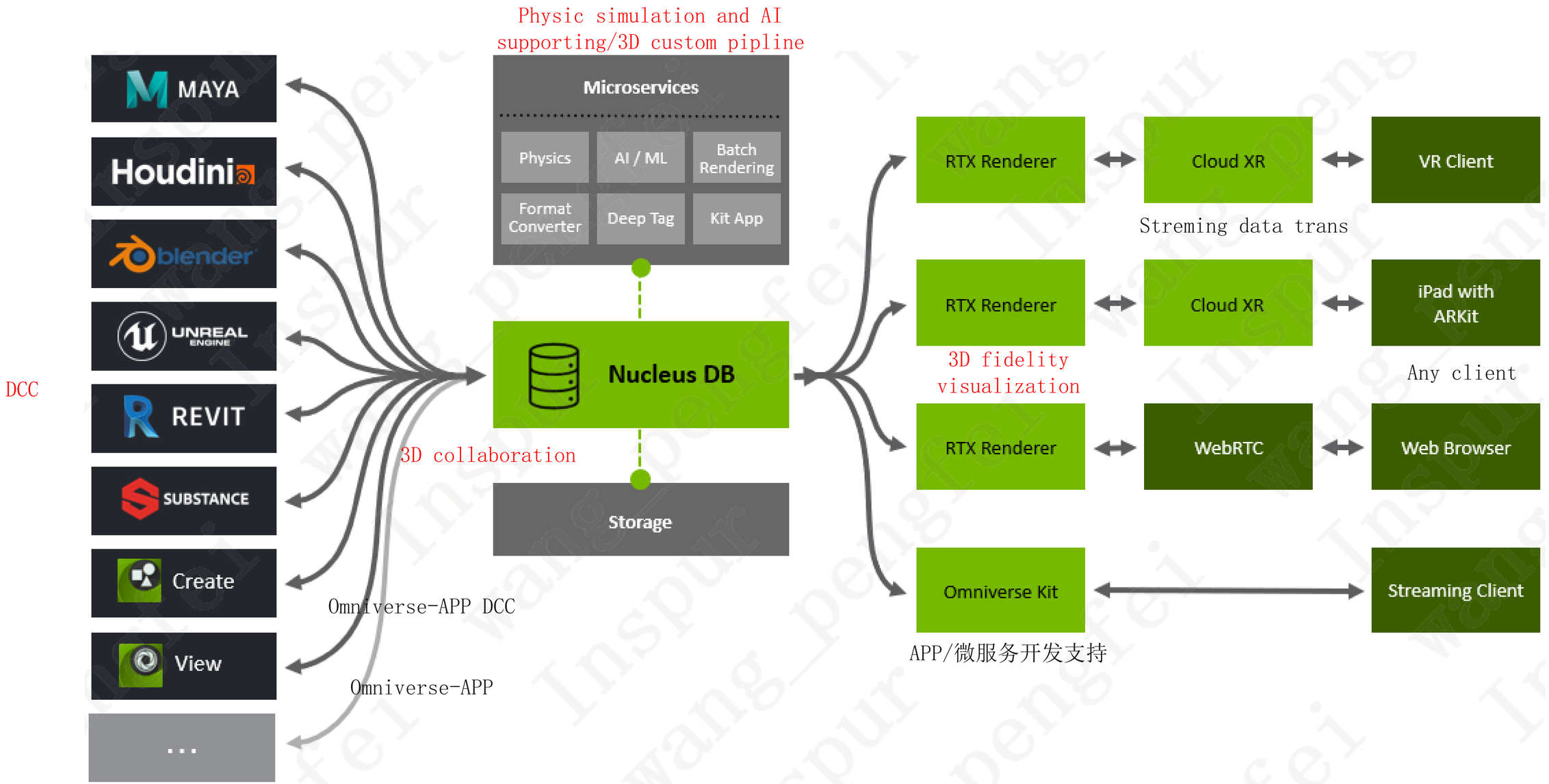
Create	View

Nucleus	Connect	Kit	Simulation	RTX Renderer

CPU|Tensor core|RT core|CUDA core|encoder|decoder|RDMA|

modeling(VDI/collaboration)AI（modeling、driving、interaction、rendering）HPC（simulation） graphic（rendering）

MetaEngine and omniverse enterprise



MetaEngine Deployment Reference Scheme

workstation - without GPUs for 3D modeling

workstation - with GPUs for 3D modeling connect nucleus

Desktop -without GPUs for create

mobileclient -without GPUs for review

VDI tool: VNC/RDP

VM for AEC(CAD/CAE)

VM for M&E

VM for Gaming

VM for Digital Twins

NVIDIA RTX Virtual Workstations(vWS)

Hypervisor: Vmvare-vsphere esxi/vcenter

CPU|MEMORY|GPU|NIC|STORAGE

OVE nucleus server

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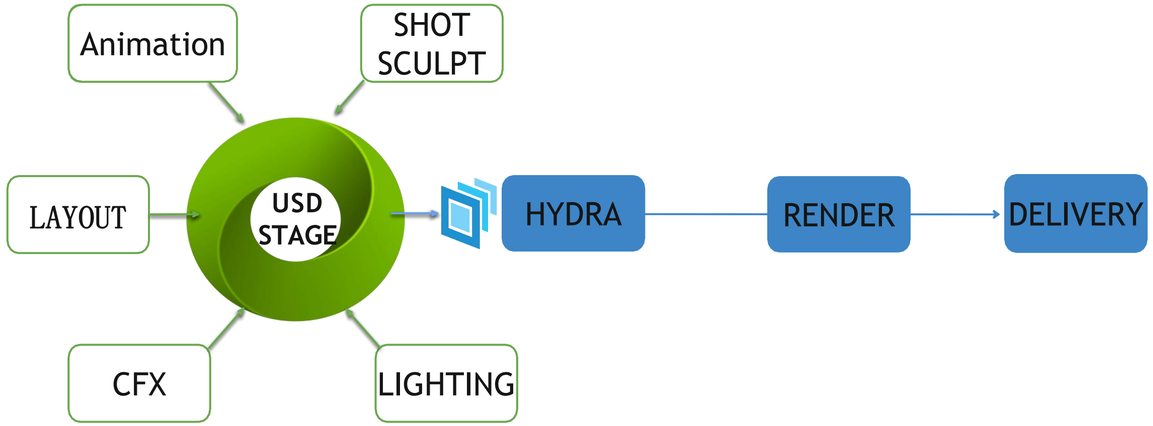
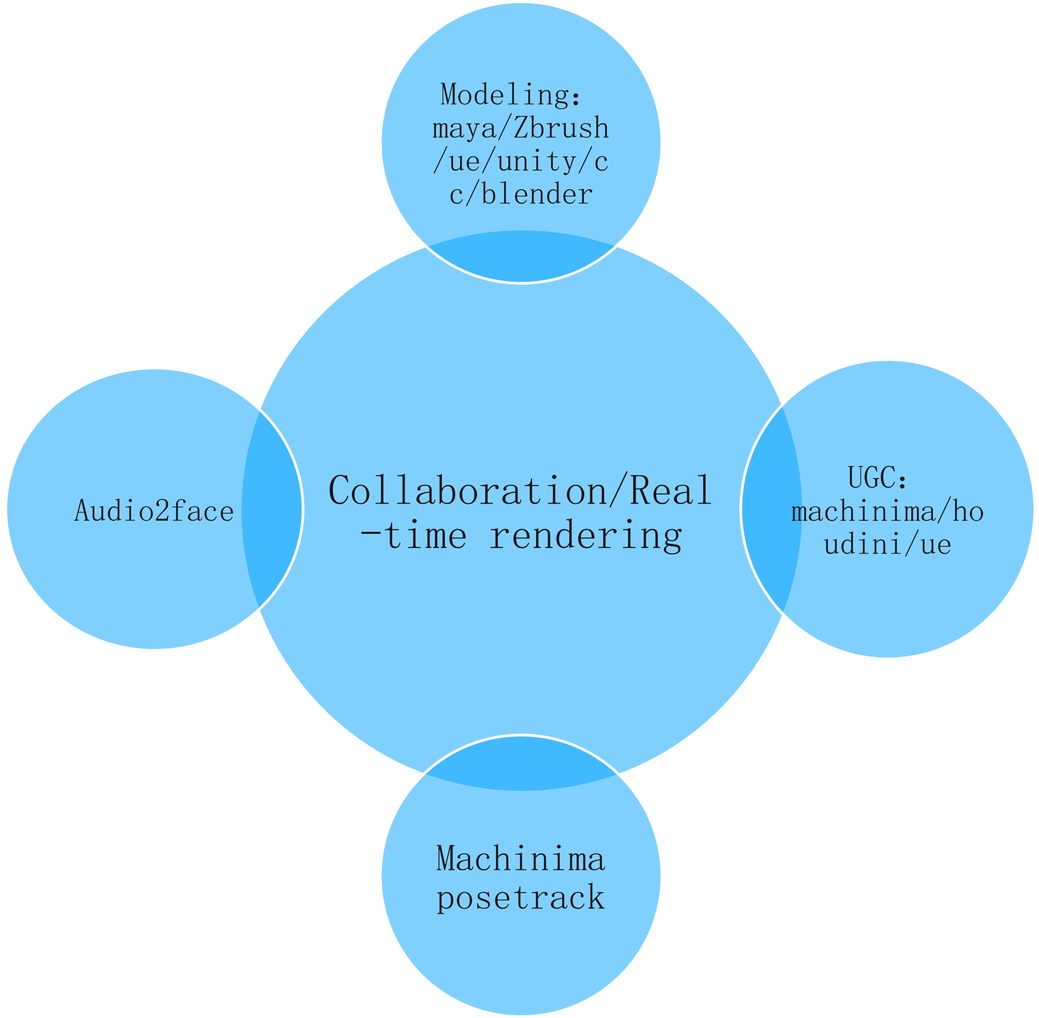
Digital character generation and expression Based On Omniverse Enterprise

Omniverse & Digital human modeling

PIPELINE WITH OMNIVERSE ENTERPRISE

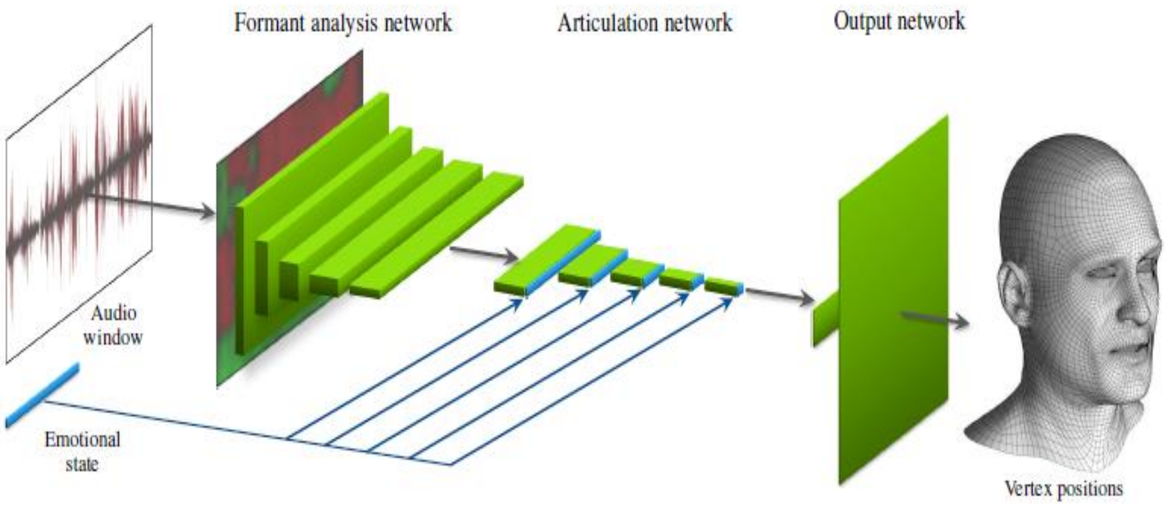


- Collaborative, real time iteration and interactivity from layout to lighting
- Able to test and see high quality renders instantaneously
- New ability to experiment and iterate more, without sacrificing long, overnight render wait times

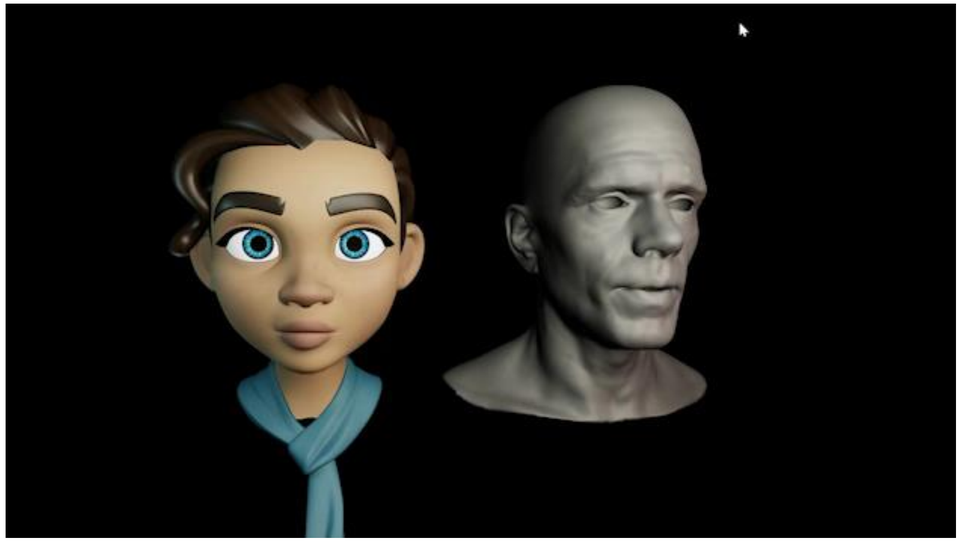


Omniverse audio2face

Audio2face generates facial animation by inputting audio to a pre-trained deep neural network, and the output content will drive the 3D vertices of the animated character



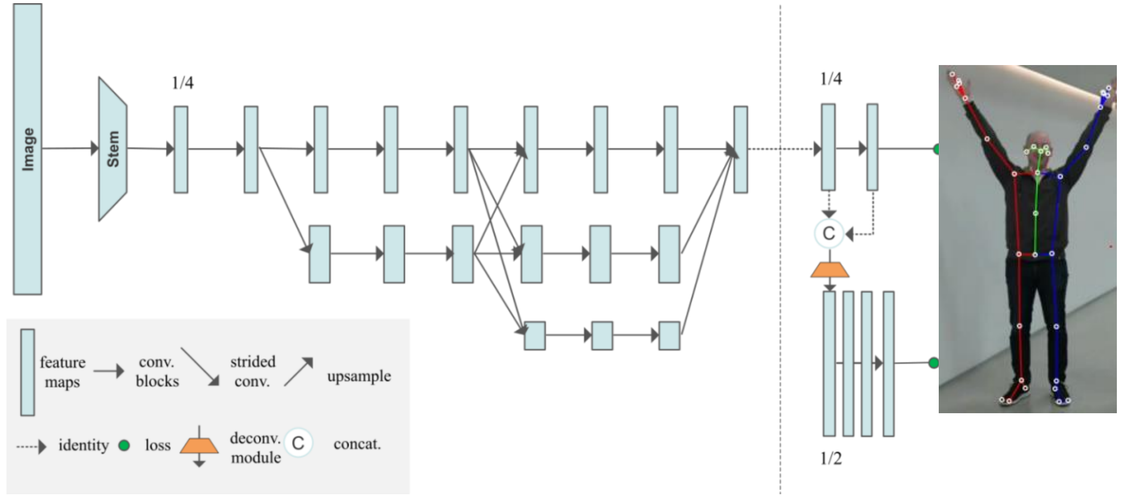
Omniverse audio2face model Arch



Omniverse audio2face sample

omniverse machinima

Machinima makes use of Maxine AR SDK, inputting RGB video stream, detecting 34 joint points of human body (hands 10+ torso 24), driving virtual human movement



3D pose track

Omniverse machinima sample

4

Digital character interaction and Inspur yuan 1.0

Interactive digital human scenarios and requirements

Liu Yexi

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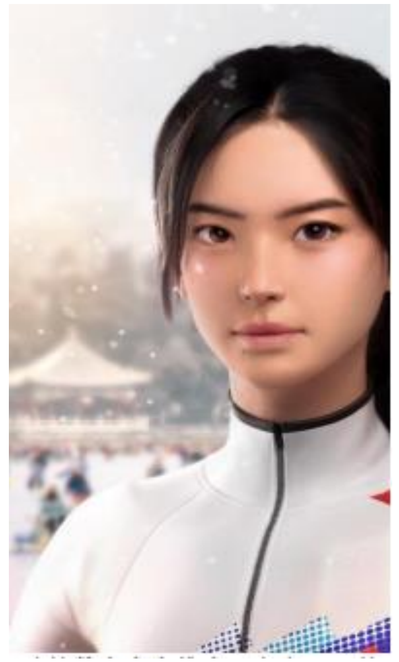
- IP idol, KOL: high-quality video content
- Driven by real human

Xiao Pu



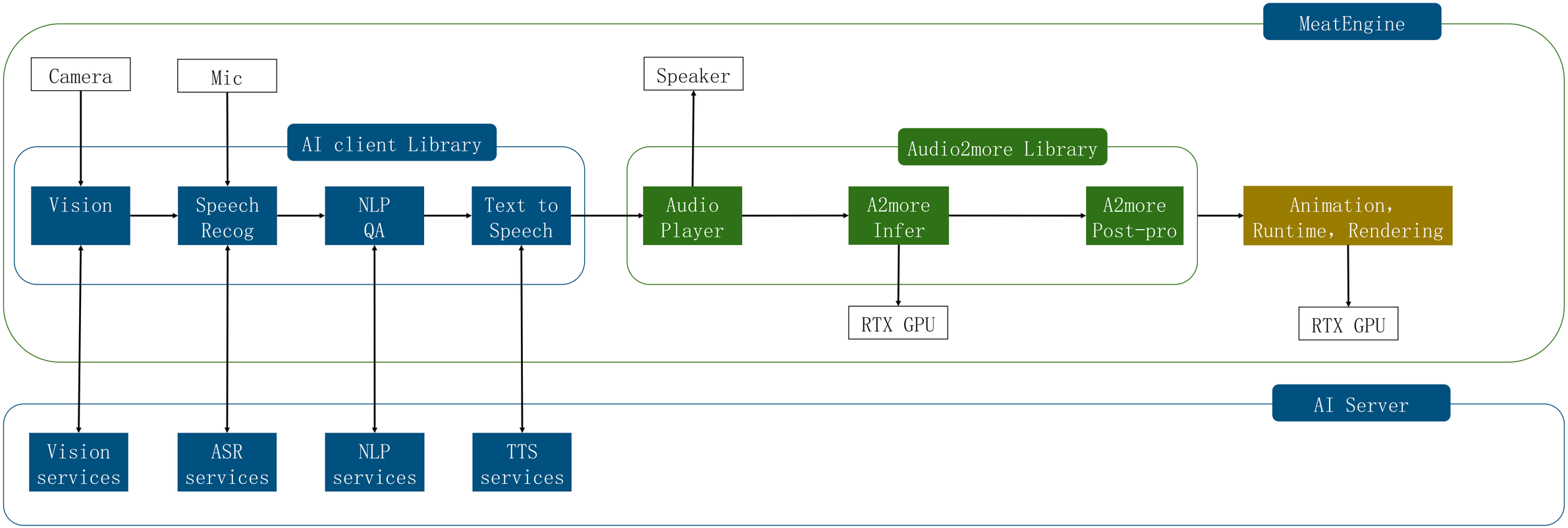
Dongdong

- digital employees, virtual anchors: Real-time, natural and logical interaction
- Driven by AI algorithm

Interactive digital human dialogue flow

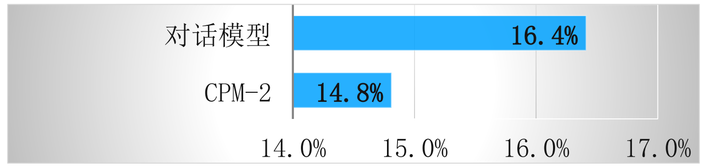
- The interactive digital human system mainly consists of two parts:

1. The AI skill base obtains the signals of Camera and Mic and communicates with the server to obtain the results of visual capture, ASR, NLP/QA and TTS
2. Audio2More Library Obtain speech signals, escape and output facial expressions and actions



Inspur yuan 1.0

对话



kdConv多轮对话精度

用户 情人节女朋友问我重要还是游戏重要，该怎么回答显得情商高?

源1.0 情人节重要，游戏不重要，因为游戏只是消遣，而你是我的全部。

用户 我前两天买一匹大白马，不小心掉茶碗里淹死了，你知道吗?

源1.0 你的茶碗是不是叫“茶海”？

用户 女朋友问我刚刚把粉底液打翻弄脏你的键盘了，怎么办？我该怎么回答?

源1.0 我不介意，我只是担心你弄脏了你的衣服。

问答

WebQA精度

问题 世界上第一艘完全去除风帆、采用蒸汽动力的铁壳装甲舰是哪个国家制造的?

答案 英国

问题 围棋棋盘有多少个交叉点?

答案 361

问题 太阳大气的最外层是?

答案 日冕

翻译

哲学

自然派的哲学家也被称为“苏格拉底之前的哲学家”。德谟克里特斯虽然死于苏格拉底数年之后，但他所有的想法都属于苏格拉底之前的自然派哲学。

Naturalist philosophers are also known as the philosophers before Socrates. Democritus, who died several years after Socrates, had all of his ideas of the natural philosophy of the formers.

对话

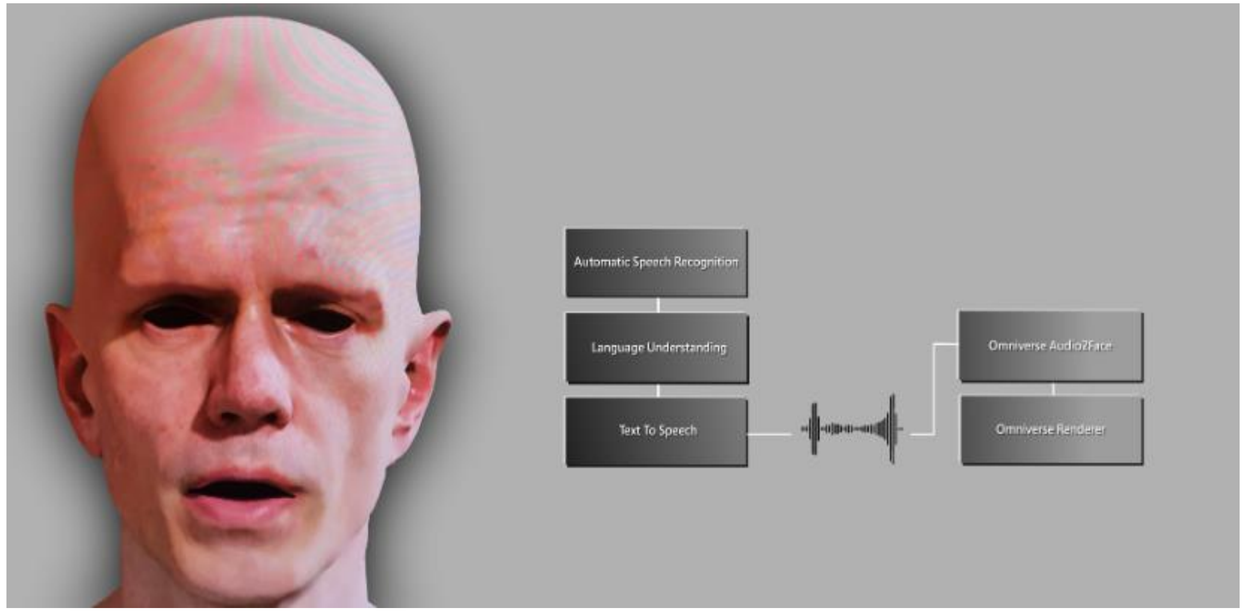
嗨,我是乔治,今晚我将为您服务。您现在准备点菜还是稍待一会呢?

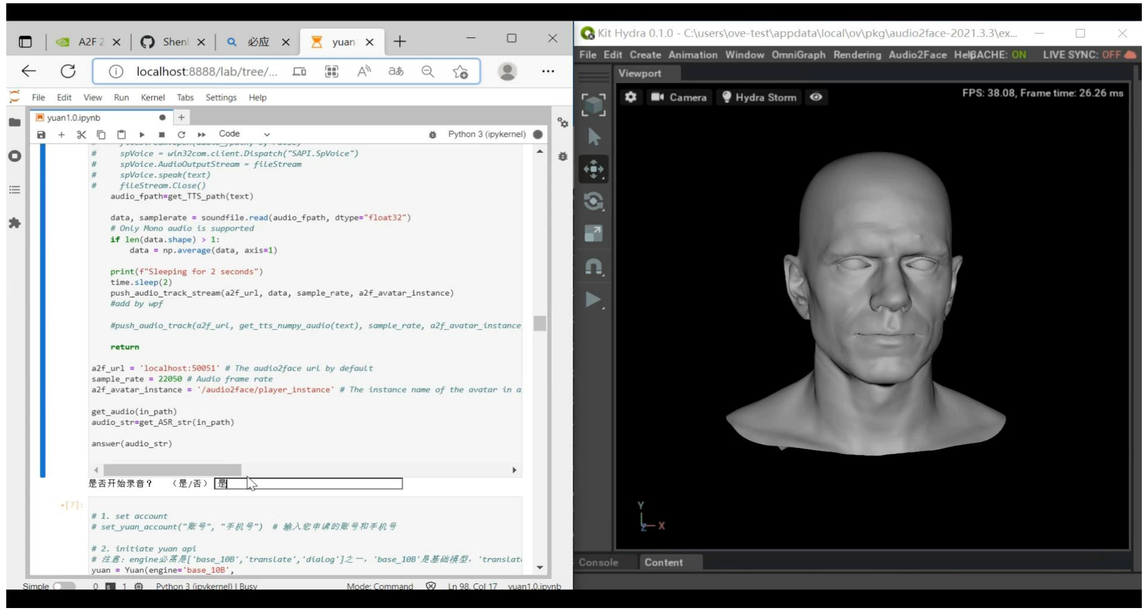
我现在点菜，我要烤鸡和玉米配菜。

Hello, this is George. I'm here tonight for your service. Would you like to order or just wait a moment?

I'm ready now, I want the roast chicken and corn as side dish.

Digital Human interaction Using Audio2face & yuan 1.0





Audio2face: Build a server for audio-to-expression animation in the APP viewport

ASR: Speech-to-text and preprocessing

Yuan1.0: Real time Q&A, writing poetry

TTS: The text answer is converted into voice

Audio2face: The voice is output to the audio2face server for real-time output

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