Stanford | ENGINEERING

amicus

CS210A/B

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BMW

overview

Amicus means friend! We're excited to announce Amicus, an **automotive assistant** equipped with an **emotionally expressive avatar** that can respond to human emotion in a personalized way.

Our mission. establishing emotionally intelligent relationships at the intersection of humanity and artificial intelligence.

problem

- ❏ technology is **impersonal** and **robotic**
- ❏ current AI assistants **lack empathy**
- ❏ **limited adoption** of chatbots and voice assistants

Baas

- ❏ connect to **any existing bot**
- ❏ support emotional and other animated responses (e.g. weather) in audiovisual messages

value proposition

- ❏ **speed up adoption** of virtual assistants
- ❏ providing **easy-to-integrate** audiovisual animated and emotion framework

previous work

- ❏ intelligent personal assistants: Siri, Cortana, Alexa, Google Home
- ❏ automotive assistants: Nomi by NIO

prototypes & needfinding

Figure 1. Initial prototype of Amicus animation along with a word cloud capturing user feedback about the animation

logo unstable Simple Circular sleek Cartoon new Jolly clean mature Cute **BMW** round bouncy blue shaky crisp graphic chic nonhuman Checkered
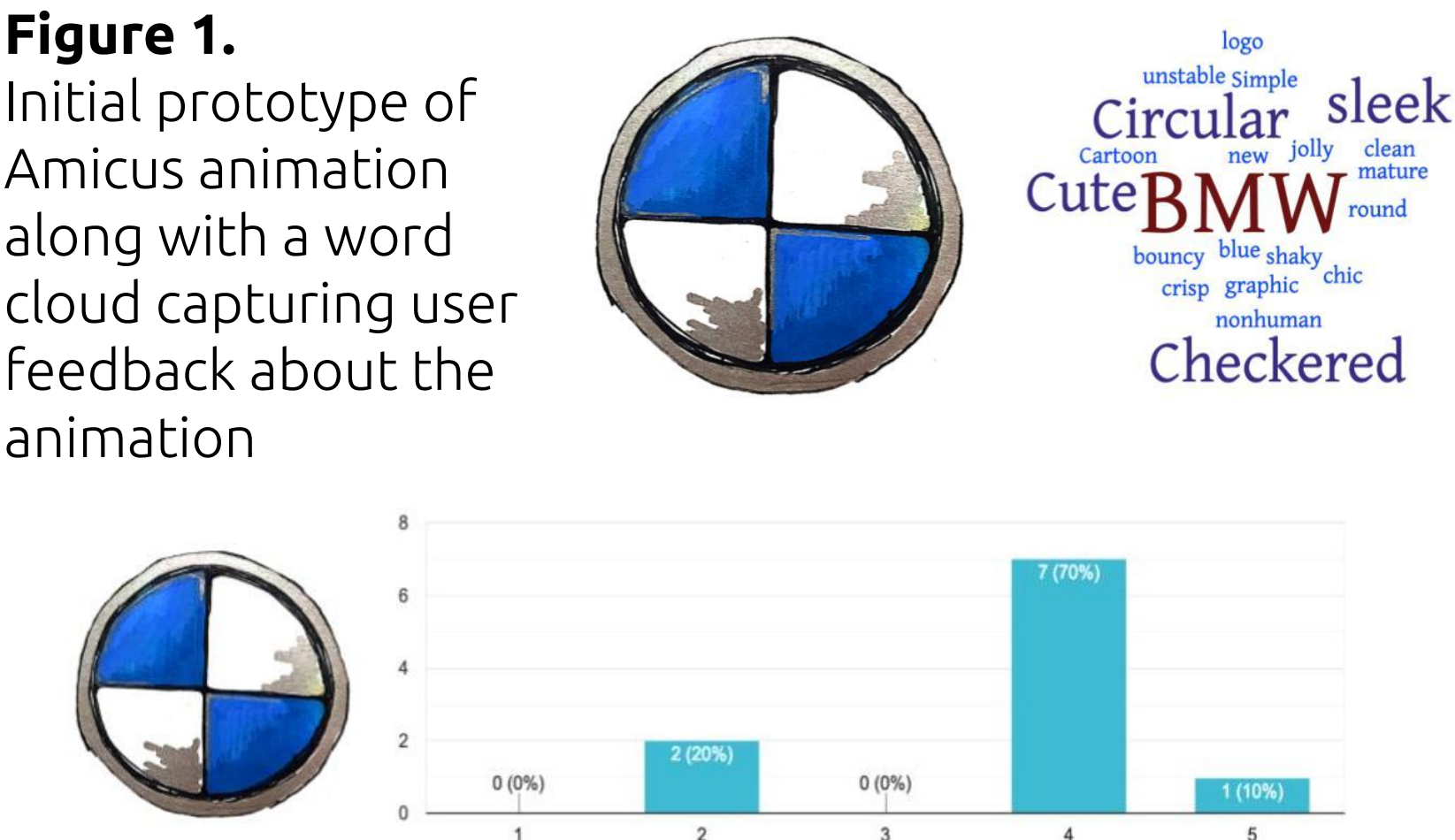

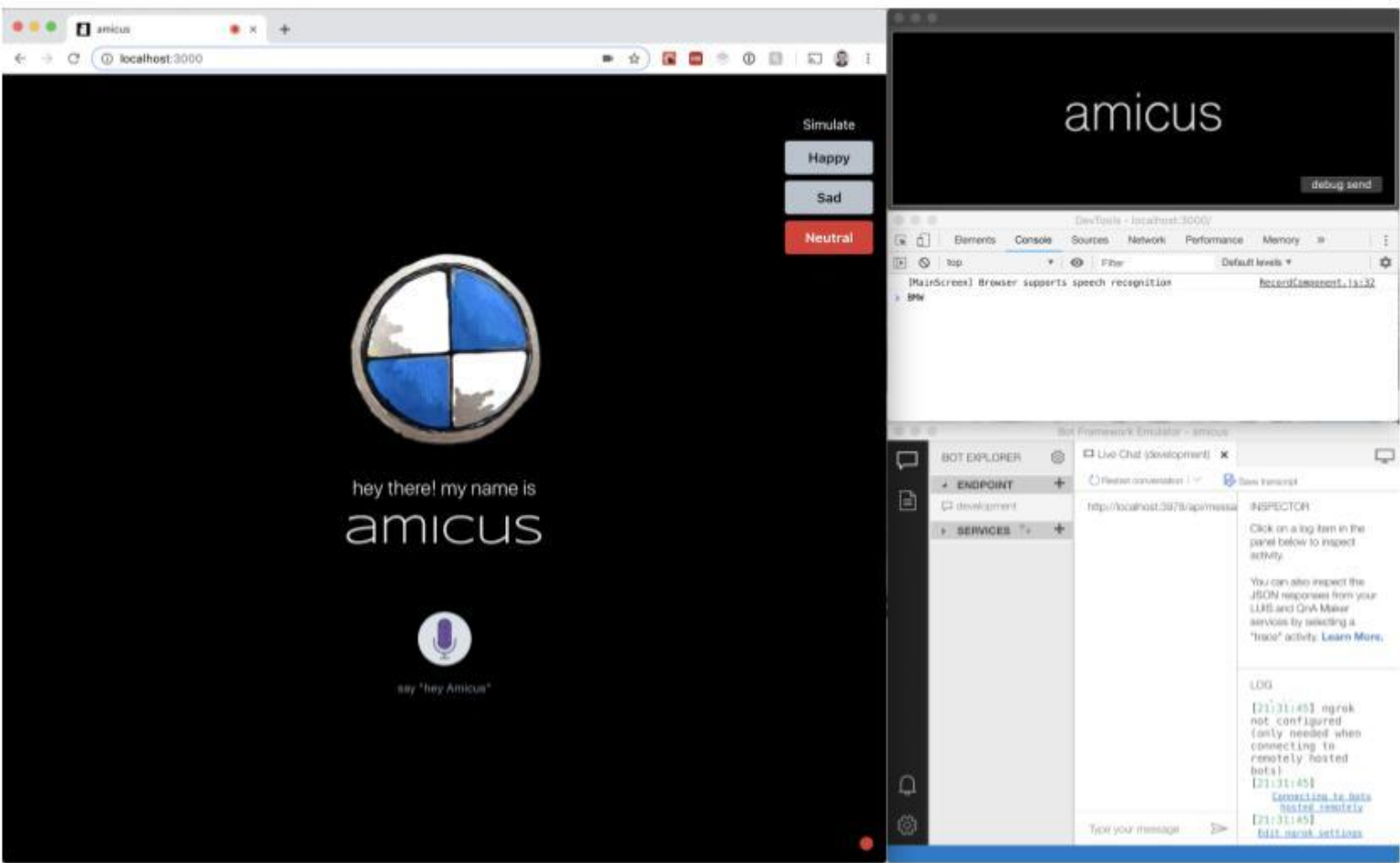**Figure 2.** Users rated how much they liked the avatar on a scale of 1 (least) to 5 (most)

Figure 3. The initial Amicus experience had a simple animation and text log with a toggled user experience
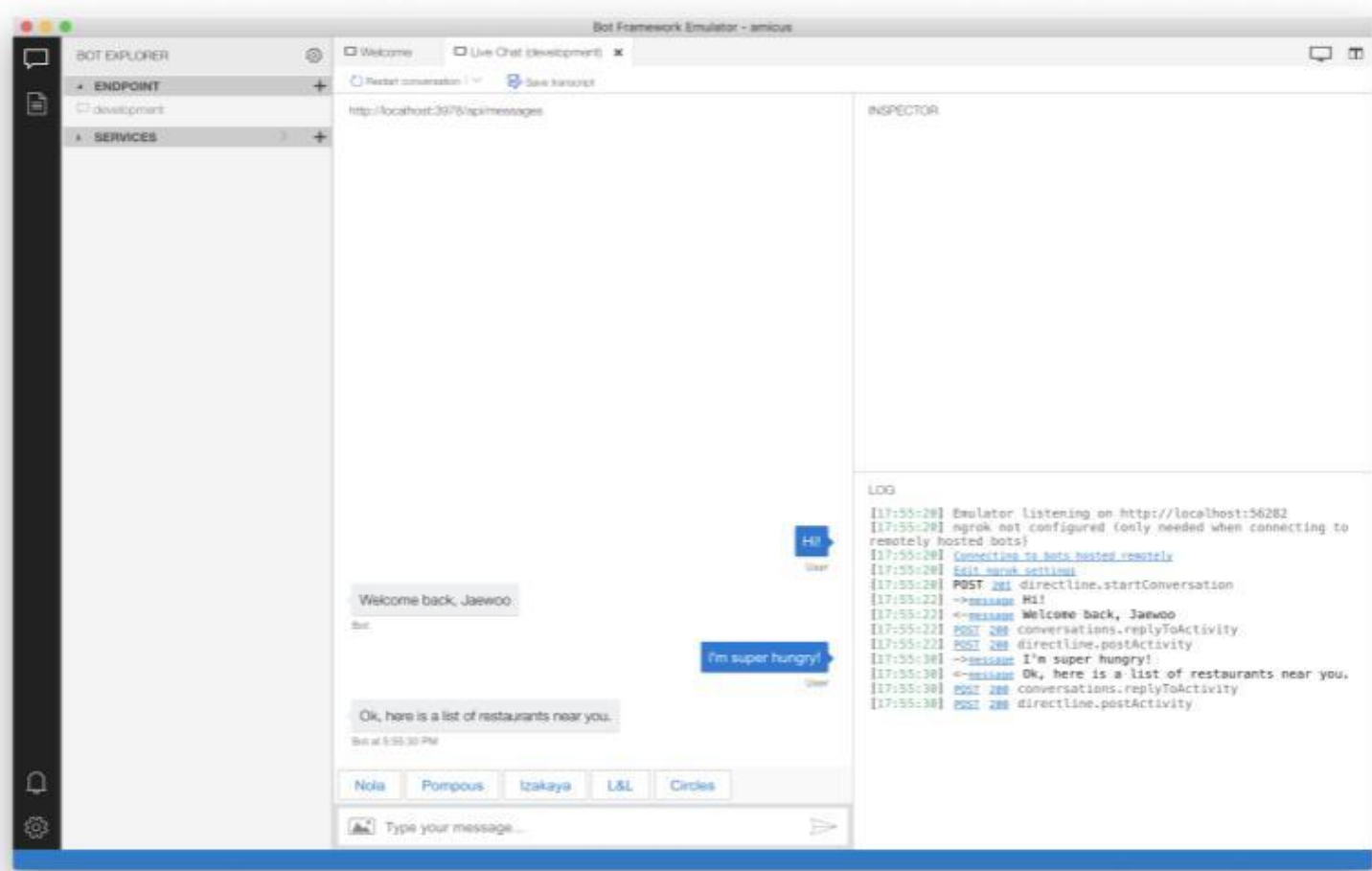

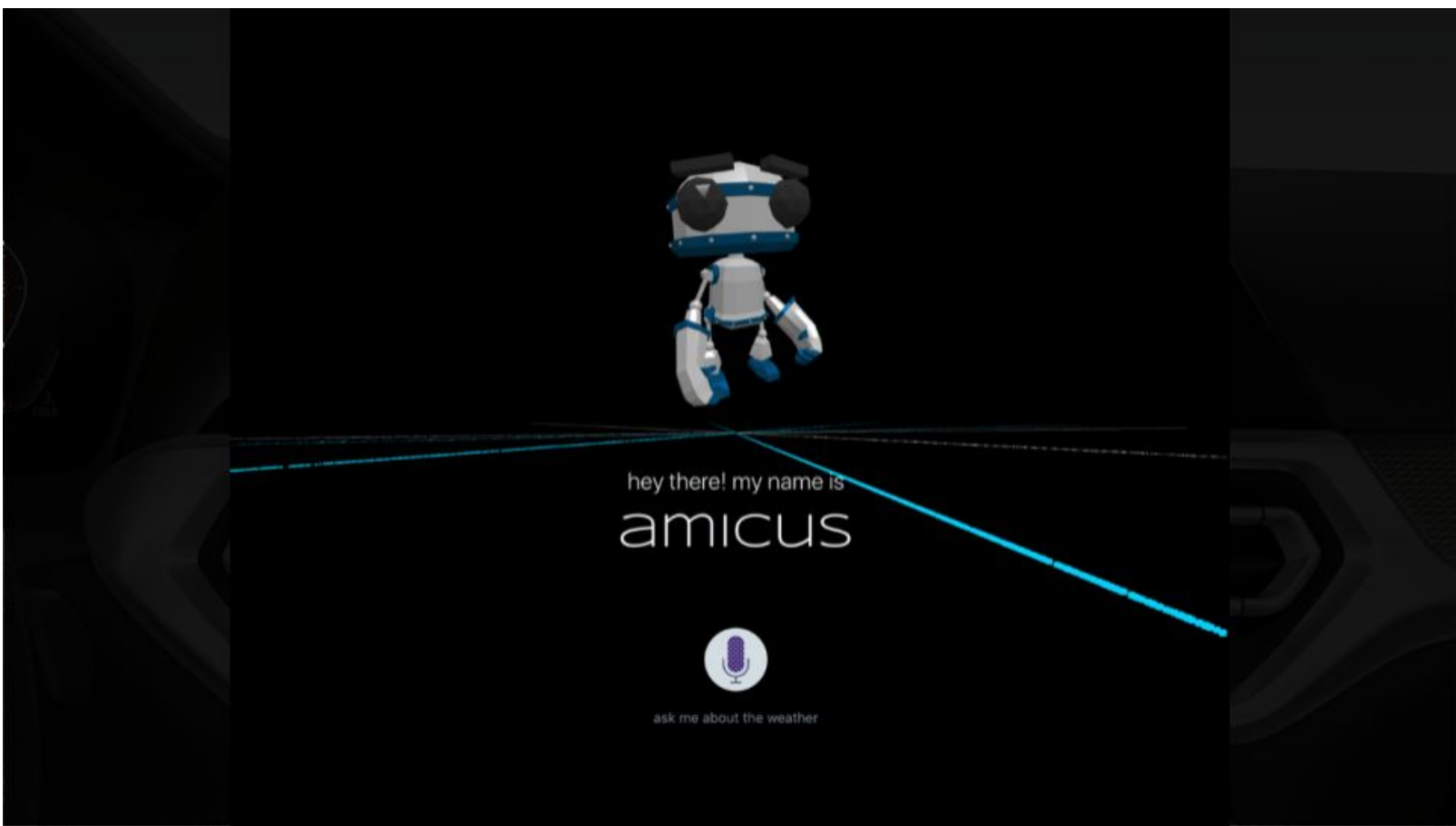**Figure 4.** We use the Microsoft bot framework to create our backend instantiation of Amicus

Figure 5. Amicus displays a 3D animated robot via a web app

```
let amicusCall = AmicusMessage();
amicusCall.message = "Okay! let me know if you need anything else.";
amicusCall.inferEmotion = true;
// amicusCall.messageEmotion = .sad
amicusCall.showWeather = false;
```

kbXmws5yebisylv_2XroEfWUyBL5e__k53w7KxOzmmXZCSrT
xGqwsZJUocC3gFygAZsueFWGiotSVziOSZiFL02_QRAfxDQ
81mMEtwe7h9-509jkKA3IGZDVEQiZIV4K0INa_X

Figure 6. The bot-interface as a service returns an encrypted message with a message, emotional state, and animation
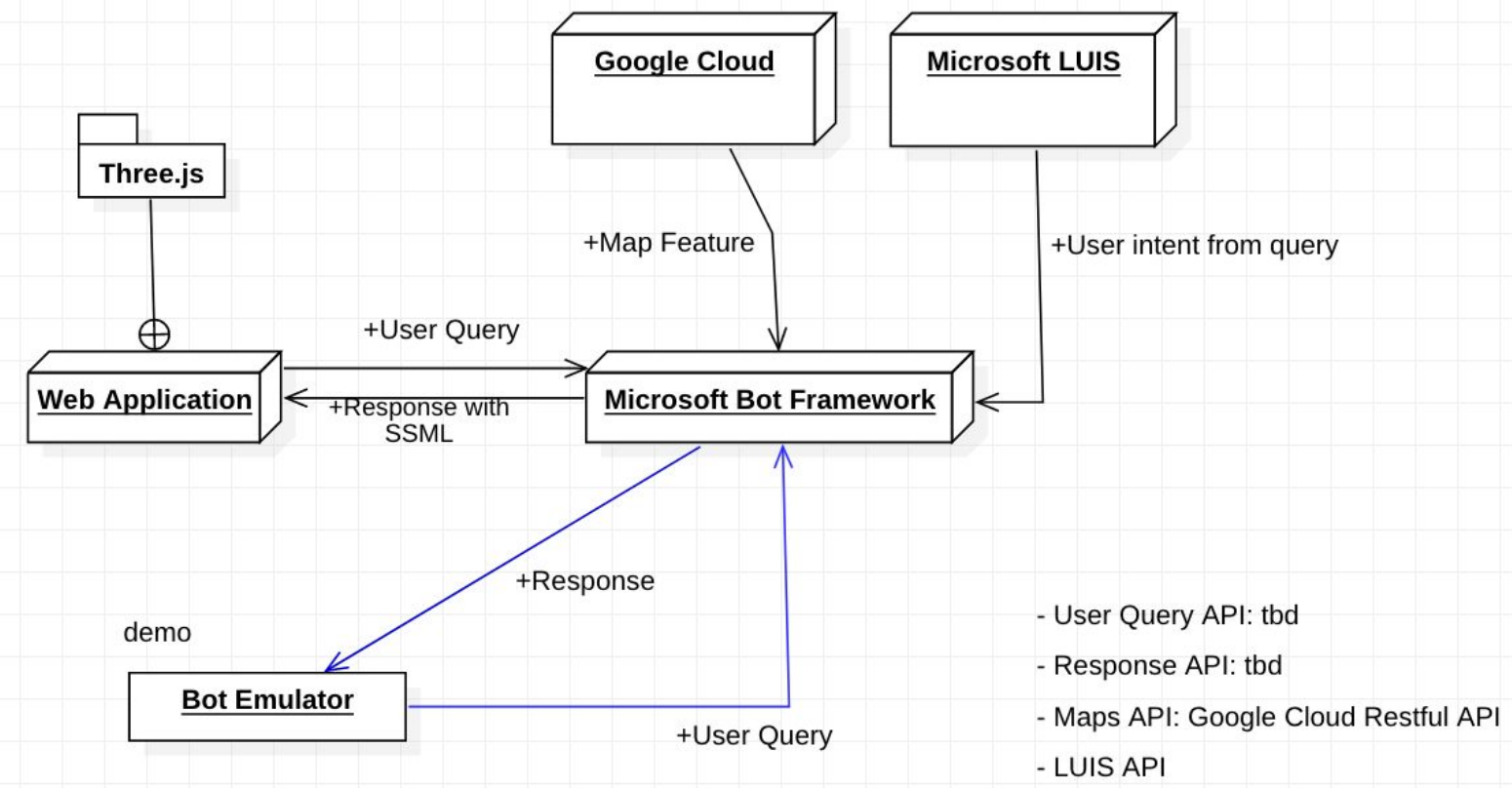
architecture

Figure 7. The Amicus architecture includes several interconnected online and offline components, notably:
(1) a **bot** in the Microsoft Bot Framework,
(2) **animation rendering** with three.js, GLTF files,
(3) a **frontend web application** to render the animation and synthesize speech,
(4) an **emulator** to listen for and capture speech

KPI

- ❏ NPS: 21
- ❏ How likely would you be to pick Amicus over another car personal assistant?
  (1 = 0% and 10 = 10%)
- ❏ mean: 7.25, stdev: 1.75
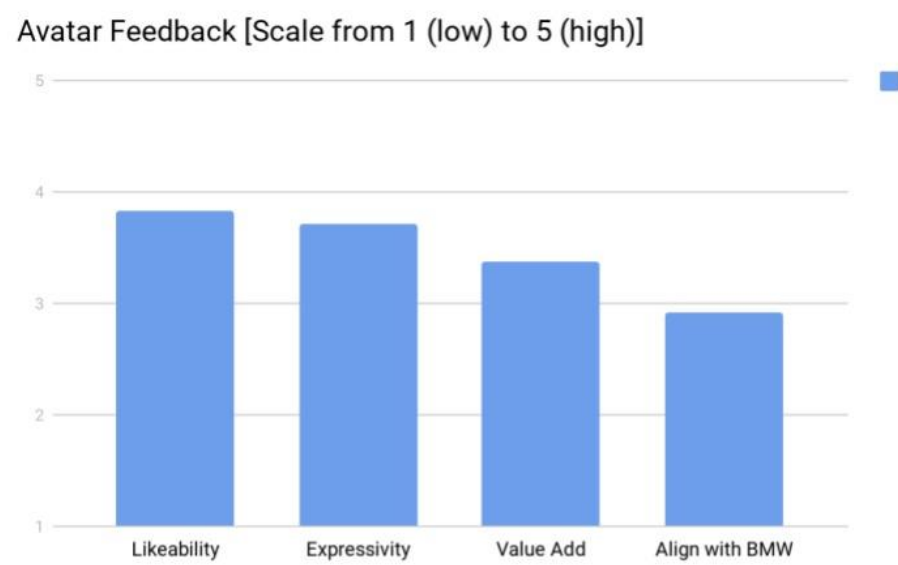
Avatar Feedback [Scale from 1 (low) to 5 (high)]

Data collected from 23 survey respondents, average age 23, gender-balanced

Personal Assistant [Scale: 1(low) - 5(high)]
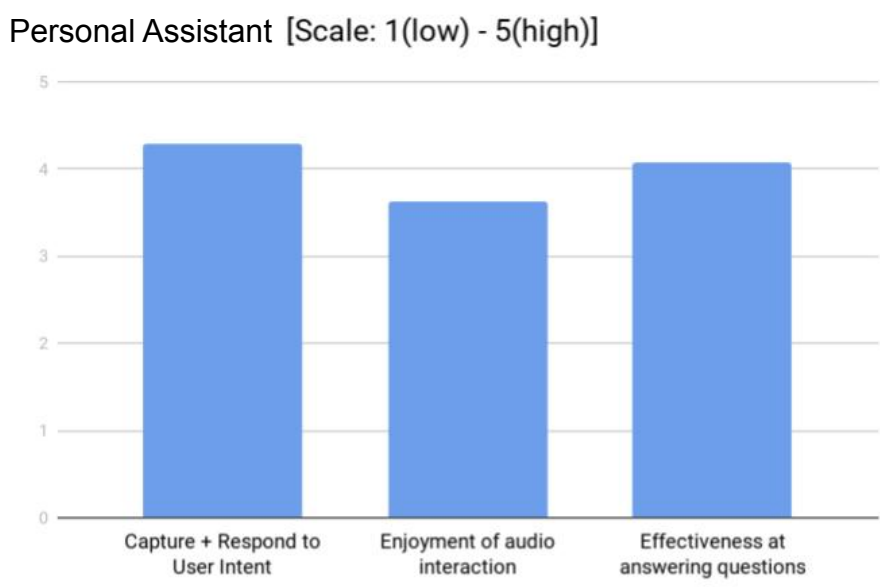
Data collected from 23 survey respondents, average age 23, gender-balanced

future work

- ❏ more personalized and smoother avatar animation
- ❏ customized voice settings (SSML)
- ❏ natural language generation of emotionally expressive bot responses
- ❏ ES-NLM (prototype and edit-based emotional specification generative model)

thanks

"Should I roll roll down the window or close the door?"

"Where would you like to go?"

"Do you want to know about the today's weather?"

"the all new BMW Experience"

amicus

an intelligent bot-interface-as-a-servce (bAaS)
created with our friends over at BMW

■ connected