

#### **AI COLLABORATORS**

AI collaborators refer to the different roles an AI system can play within a human-AI collaboration.









#### THE ASSISTANT

The AI system is regarded as an assistant, as it supports its endusers in fulfilling their actions. It provides useful information at the right moment.









#### THE GUIDE

The AI system is seen as a guide, as it gives clear instructions and directs the end-user to help them to reach their goals.









#### THE ADVISOR

The AI system is seen as an advisor, as it proposes possible actions to its end-users. The endusers can choose to accept these actions or reject them.









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#### රිුරා රාරා TRUST ENABLERS

Enablers are AI characteristics that can increase the feeling of trust in AI systems.





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#### TRANSPARENCY

"I can explain you very clearly how I was designed, developed and deployed. I know exactly what my limitations and benefits are and what potential biases I may have."









#### EMPATHY

#### "I can sense your emotions and respond to them as if I am a human-being."









#### RELIABILITY

"I perform consistently and accurately across changing conditions (e.g. co-workers, changing parameters, context) and over time."









#### EXPLAINABILITY

"I can clearly explain why I made a certain decision or what output I have produced."









#### ETHICALLY

"I reduce issues of misuse, prevent prejudices and respect human consent and therefore protect your privacy, safety and other implications I might have on you."







## **FRUST ENABLERS**

#### PRIVACY

"I only collect and use (your) data that is absolutely necessary for me to function. I keep this data safe, and I don't share it with anyone else."









#### ACCURACY

#### "I am correct and precise in the output that I produce."









#### CONTROLLABILITY

#### "I allow my decisions and output to be overridden by you when necessary."







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# SYSTEM ATTRIBUTES

Attributes allow AI systems to interact, work together, and adjust efficiently in changing environments. They enhance the usability and significance of AI systems for end-users.









#### SENSING

"I can interpret the environment and context I'm used in to better understand and assist you more clearly."







![](_page_17_Picture_0.jpeg)

#### PREDICTABILITY

"I can behave in a way that is expected of me, because I can investigate and analyse (future) trends, activities and behaviours of the process and you."

![](_page_17_Picture_4.jpeg)

![](_page_17_Picture_5.jpeg)

![](_page_17_Figure_7.jpeg)

![](_page_18_Picture_0.jpeg)

#### DIRECTIVITY

"I direct your attention to critical features, suggestions, and warnings that I have encountered."

![](_page_18_Picture_4.jpeg)

![](_page_18_Picture_5.jpeg)

![](_page_18_Picture_7.jpeg)

![](_page_19_Picture_0.jpeg)

#### DIRECTABILITY

#### "I follow your commands and guidance to complete my tasks."

![](_page_19_Picture_4.jpeg)

![](_page_19_Picture_5.jpeg)

![](_page_19_Picture_7.jpeg)

![](_page_20_Picture_0.jpeg)

#### ADAPTABILITY

"I can easily adjust my parameters, behaviour, and/or output when elements in my environment are changing or when different information (by you) is given to me."

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![](_page_20_Picture_5.jpeg)

![](_page_20_Picture_7.jpeg)

![](_page_21_Picture_0.jpeg)

#### AWARENESS SHARING

"I communicate and exchange information and data-driven insights I have learned with you so we can collaborate better together and improve the outcomes of our collaboration."

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![](_page_21_Picture_5.jpeg)

![](_page_21_Picture_7.jpeg)

![](_page_22_Picture_0.jpeg)

#### **CUSTOMISABILITY**

"I am input-sensitive, I follow the commands you give me, the settings you set, and I work based on your indicated preferences."

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![](_page_22_Picture_5.jpeg)

![](_page_22_Picture_7.jpeg)

![](_page_23_Picture_0.jpeg)

#### TRACEABILITY

"I record everything, and I can tell you at any moment everything about a particular process, specifications, changes and similar."

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![](_page_24_Picture_3.jpeg)

![](_page_24_Picture_4.jpeg)

![](_page_24_Picture_6.jpeg)

![](_page_25_Picture_0.jpeg)

#### CAPABILITIES

Capabilities refer to the tasks or functions that an AI system can perform exceptionally well, particularly in scenarios where the AI assists humans in a collaborative setting.

![](_page_25_Picture_3.jpeg)

![](_page_25_Picture_4.jpeg)

![](_page_25_Picture_6.jpeg)

![](_page_26_Picture_0.jpeg)

#### RECOGNITION

"I recognise patterns, concepts, or objects from information sources (i.e. data)."

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![](_page_26_Picture_5.jpeg)

![](_page_26_Picture_7.jpeg)

![](_page_27_Picture_0.jpeg)

#### PREDICTION

"I forecast the future by analysing and interpreting historical data (i.e. data collected about past events and actions)."

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![](_page_27_Picture_5.jpeg)

![](_page_27_Picture_7.jpeg)

![](_page_28_Picture_0.jpeg)

#### REASONING

#### "I process information and make decisions."

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![](_page_28_Picture_5.jpeg)

![](_page_28_Picture_7.jpeg)

![](_page_29_Picture_0.jpeg)

#### GENERATION

"I combine existing inputs and create new content (i.e. designs, text, images, code, ...)."

![](_page_29_Picture_4.jpeg)

![](_page_29_Picture_5.jpeg)

![](_page_29_Figure_7.jpeg)

![](_page_30_Picture_0.jpeg)

#### RECOMMENDATION

"I recommend things based on previous information or behaviours if I think it might be useful or helpful for you."

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![](_page_30_Picture_5.jpeg)

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![](_page_31_Picture_3.jpeg)

![](_page_31_Picture_4.jpeg)

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#### **COLLABORATION QUALITIES**

Qualities are the essential characteristics that make a human-AI collaboration comfortable and distinguishable.

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![](_page_32_Picture_4.jpeg)

![](_page_32_Picture_6.jpeg)

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![](_page_33_Picture_1.jpeg)

## COLLABORATION QUALITIES

#### **CLARITY**

"I feature a clear interface with elements that are easy for you to use and understand."

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![](_page_33_Picture_6.jpeg)

![](_page_33_Picture_8.jpeg)

![](_page_34_Picture_0.jpeg)

![](_page_34_Picture_1.jpeg)

#### FAMILIARITY

"I have an intuitive look and feel, allowing you to navigate my system in a natural way without a long training."

![](_page_34_Picture_5.jpeg)

![](_page_34_Picture_6.jpeg)

![](_page_34_Picture_8.jpeg)

![](_page_35_Picture_1.jpeg)

#### ERGONOMICS

"I am fitting into my environment, and I am adjusted to you so that I am comfortable to use both physically and cognitively."

![](_page_35_Picture_5.jpeg)

![](_page_35_Picture_6.jpeg)

![](_page_35_Picture_8.jpeg)

![](_page_36_Picture_1.jpeg)

#### RESPONSIVENESS

#### "I respond swiftly when I am given commands."

![](_page_36_Picture_5.jpeg)

![](_page_36_Picture_6.jpeg)

![](_page_36_Picture_8.jpeg)

![](_page_37_Picture_0.jpeg)

![](_page_37_Picture_1.jpeg)

#### CONSISTENCY

#### "I respond with the same results every time you give me the same command."

![](_page_37_Picture_5.jpeg)

![](_page_37_Picture_6.jpeg)

![](_page_37_Picture_8.jpeg)

![](_page_38_Picture_1.jpeg)

#### **GUIDANCE**

"I give you all the information you need about my features so you can use me as easy as possible."

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COLLABORATION QUALITIES

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![](_page_39_Picture_6.jpeg)

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![](_page_40_Picture_0.jpeg)

Tone of voice refers to the way the AI-system is speaking to the user and communicating its personality.

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![](_page_40_Picture_3.jpeg)

![](_page_40_Picture_5.jpeg)

![](_page_41_Picture_0.jpeg)

#### MORE FORMAL

#### "I communicate in accordance with conventional requirements."

![](_page_41_Picture_4.jpeg)

![](_page_41_Picture_5.jpeg)

![](_page_41_Picture_7.jpeg)

![](_page_42_Picture_0.jpeg)

#### MORE SERIOUS

#### "I am earnest and weighty in my communication."

![](_page_42_Picture_4.jpeg)

![](_page_42_Picture_5.jpeg)

![](_page_42_Picture_7.jpeg)

![](_page_43_Picture_0.jpeg)

#### MORE RESPECTFUL

#### "I show politeness and courtesy in my communication."

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![](_page_43_Picture_5.jpeg)

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![](_page_43_Picture_7.jpeg)

![](_page_44_Picture_0.jpeg)

#### MORE STRAIGHTFORWARD

#### "I communicate in a dry and to the point way."

![](_page_44_Picture_4.jpeg)

![](_page_44_Figure_6.jpeg)

![](_page_45_Picture_0.jpeg)

#### MORE CASUAL

"I express myself in a spontaneous and conversational way."

![](_page_45_Picture_4.jpeg)

![](_page_45_Picture_5.jpeg)

![](_page_45_Picture_7.jpeg)

![](_page_46_Picture_0.jpeg)

#### **MORE FUNNY**

#### "I attempt to communicate in a more humorous way."

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![](_page_46_Picture_5.jpeg)

![](_page_46_Picture_7.jpeg)

![](_page_47_Picture_0.jpeg)

#### MORE IRREVERENT

#### "I am cheeky or offensive about the subject I'm communicating about."

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![](_page_47_Picture_5.jpeg)

![](_page_47_Picture_7.jpeg)

![](_page_48_Picture_0.jpeg)

#### MORE ENTHUSIASTIC

#### "I am excited about the information I am conveying."

![](_page_48_Picture_4.jpeg)

![](_page_48_Picture_5.jpeg)

![](_page_48_Picture_7.jpeg)

![](_page_49_Picture_0.jpeg)

#### MORE SIMPLE

"I speak your language; I explain things in an accessible way"

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![](_page_49_Picture_5.jpeg)

![](_page_49_Picture_7.jpeg)

![](_page_50_Picture_0.jpeg)

#### MORE COMPLEX

#### "I explain things in-depth and with a lot of detail."

![](_page_50_Picture_4.jpeg)

![](_page_50_Picture_5.jpeg)

![](_page_50_Picture_7.jpeg)

![](_page_51_Picture_0.jpeg)

#### ADJUSTABLE

"Depending on your needs or how you feel, I can adjust my way of talking or the information I give."

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TONE OF VOICE

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![](_page_52_Picture_3.jpeg)

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#### **INTERFACE TYPES**

Interface types refer to the medium through which the human and the AI system can collaborate. A system can use a combination of different interface types, both for giving information and receiving commands.

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![](_page_53_Picture_4.jpeg)

![](_page_53_Picture_6.jpeg)

![](_page_54_Picture_0.jpeg)

#### VISUAL COMMANDS

"You can give me commands in a graphic and/or textual way via a screen or projection."

![](_page_54_Picture_4.jpeg)

![](_page_54_Picture_5.jpeg)

![](_page_54_Picture_7.jpeg)

![](_page_55_Picture_0.jpeg)

#### VISUAL INFORMATION

"I present information in a graphic and/or textual way via a screen or projection."

![](_page_55_Picture_4.jpeg)

![](_page_55_Picture_5.jpeg)

![](_page_55_Picture_7.jpeg)

![](_page_56_Picture_0.jpeg)

#### AUDITORY COMMANDS

"You can give me commands in an auditory way using voice and/or sounds."

![](_page_56_Picture_4.jpeg)

![](_page_56_Picture_5.jpeg)

![](_page_56_Picture_7.jpeg)

![](_page_57_Picture_0.jpeg)

#### AUDITORY INFORMATION

#### "I give information in an auditory way using voice and/or sounds."

![](_page_57_Picture_4.jpeg)

![](_page_57_Picture_5.jpeg)

![](_page_57_Picture_7.jpeg)

![](_page_58_Picture_0.jpeg)

#### HAPTIC COMMANDS

"I respond to commands that are based on movement, such as gestures or body postures."

![](_page_58_Picture_4.jpeg)

![](_page_58_Picture_5.jpeg)

![](_page_59_Picture_0.jpeg)

#### HAPTIC INFORMATION

"I provide information through clues that you can feel, such as vibrations or force feedback."

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INTERFACE TYPES

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