

Industrial Human-Robot Interaction

CREATING PERSONAS FOR AUGMENTED REALITY SUPPORTED ROBOT CONTROL AND TEACHING

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Persona

- A persona is an abstract user representation.
- The persona method is an interactive technique with considerable potential for software product development.
- Personas are popular in Human-Computer Interaction (HCI), their use is not well established in Human-Robot Interaction (HRI).
- Duque et al. [2] coined the term persona variable. We use the term persona variable to describe persons' characteristics relevant to the personas context.

Persona pain points

- In an academic setting, access to domain experts is often limited.
- In an industrial context, knowledge about personas and their application is lacking.
- The creation of personas can be time consuming and costly, dependent on how the underlying data is collected.

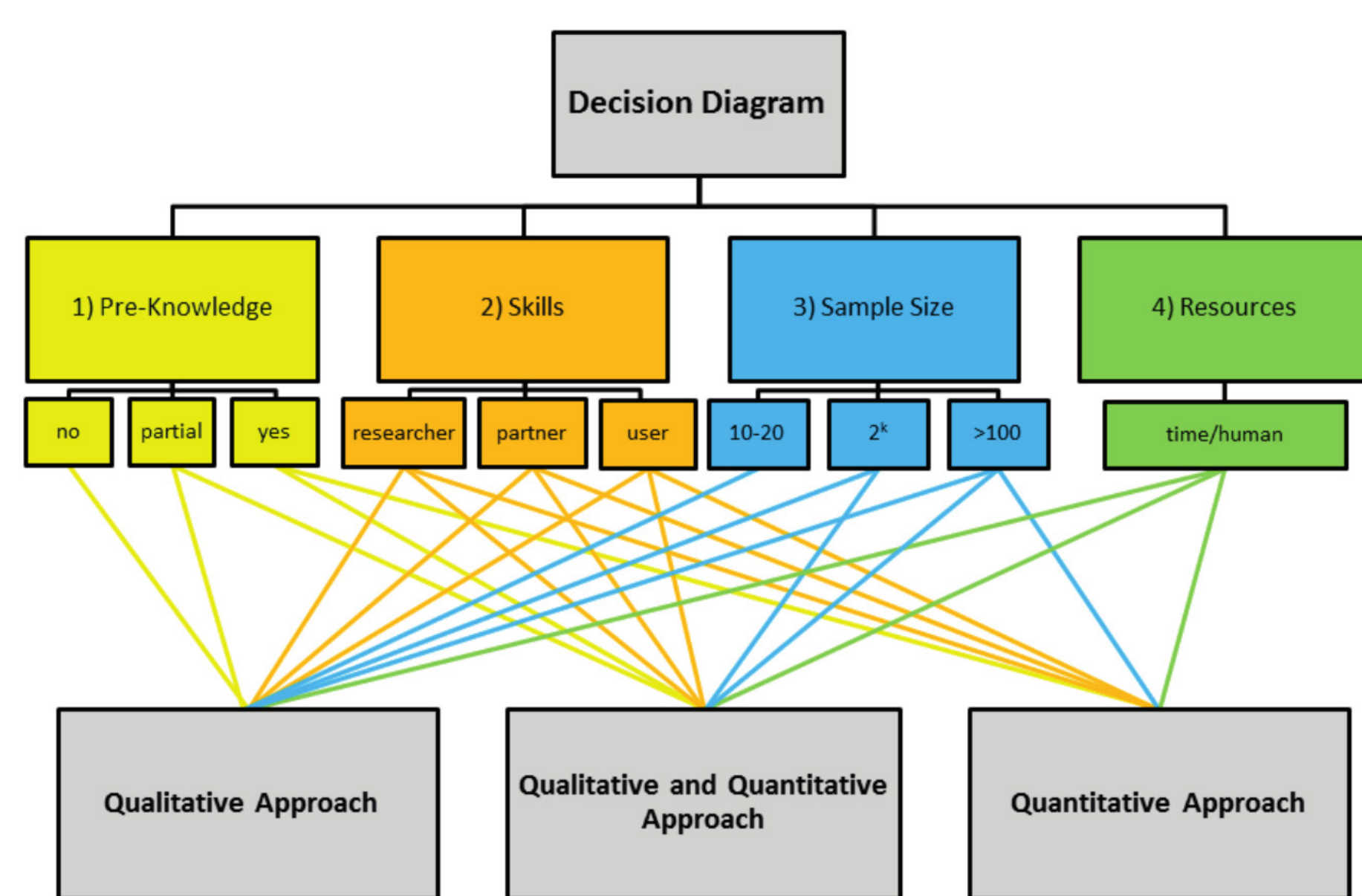


Fig. 1 : Moser et al. [1], Persona Creation: Decision Diagram for Special User Groups

The Motivation

In our research we are working on the simplification of industrial robot online programming with augmented reality support. Augmented Reality is computer-generated information overlaid onto the real world.

Personas in industrial Human-Robot Interaction

End-user expertise is more variable due to the introduction of low-cost robotics solutions and production automation in SMEs. More untrained users will have to interact with robots.

It is necessary to build up a deep understanding of the user, in order to provide the right information at the right time.

We proactively use personas as a tool for human-robot interaction design, the communication of study results and the discussion of findings with industrial partners.

The personas had to be developed starting from scratch, we think this is not necessary.

The Idea

The idea is to develop a shared platform for HRI personas to provide several basic personas for varying contexts and for each context a list of domain- and technology-specific persona variables to simplify the persona creation process.

References

[1] C. Moser, V. Fuchsberger, K. Neureiter, W. Sellner, and M. Tscheligi. Revisiting personas: The making-of for special user groups. In *Extended Abstracts on Human Factors in Computing Systems, CHI '12*, p. 453-468, New York, NY, USA, 2012.

[2] I. Duque, K. Dautenhahn, K. L. Koay, I. Willcock, and B. Christianson. A diherent approach of using personas in human-robot interaction: Integrating personas as computational models to modify robot companions' behaviour. In *Proc. of the International Symposium on Robot and Human Interactive Communication, RO-MAN '13*, p. 424-429, Aug. 2013.

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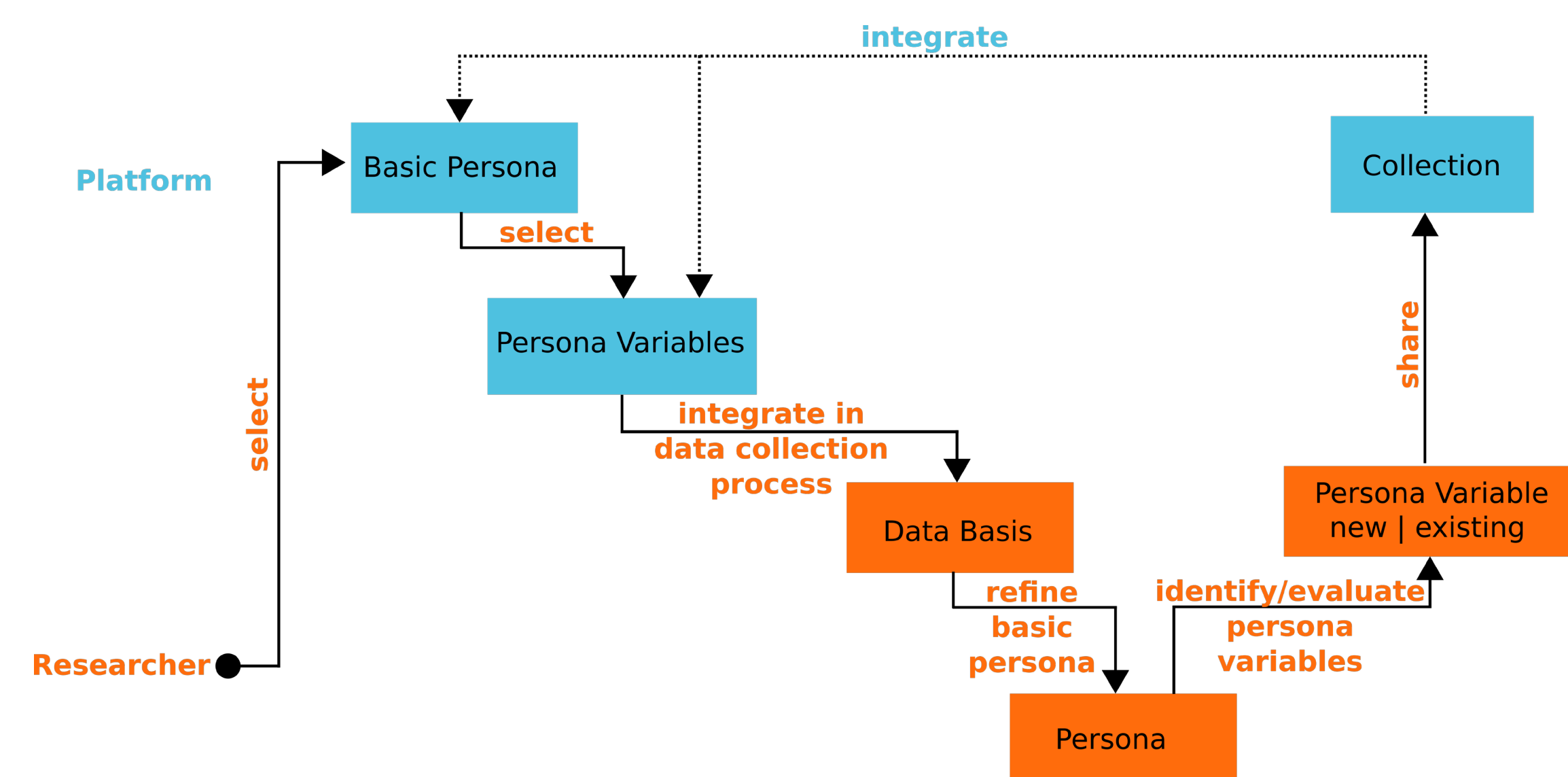


Fig. 2 : Refining and sharing personas and variables

Results

We have collected data from 80 end-users. This data basis was collected through the qualitative and quantitative analysis of professional online-programmers (teaching) and maintainers (robot control), but also developers of such robotic systems are included. We gathered data starting with questionnaires and interviews from our user studies.

- Personas for different expertise levels

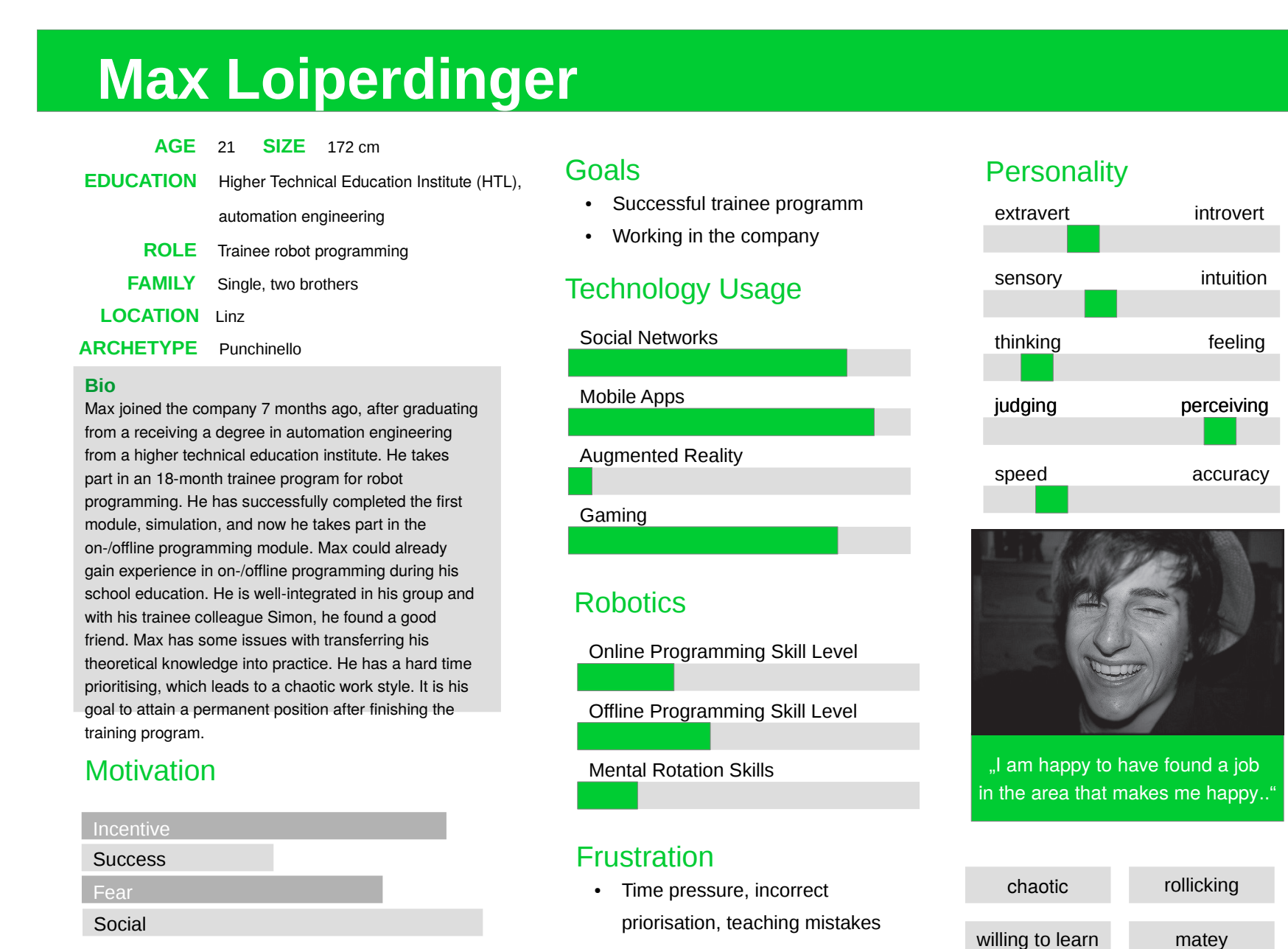


Fig. 3: Basic persona for an industrial robot programmer at a beginner level for augmented reality supported robot online programming

- Initial list of persona variables (domain-specific: online industrial robot programming, technology-specific: augmented reality).

HCI	HRI	AR
age, gender, educational level	domain practice, skill level, knowledge	mobile app experience
residence, family	knowing robots from media	AR pre-experience
leisure activities, interest in travelling	attitudes toward robots (job fear)	understanding of AR
language skills	previous experience with robots	VR pre-experience
user's personality traits (Big Five)	comfort with robots	understanding of VR
social network experience	using robot at home	user's size
technology adoption	speed/accuracy motivation	wearer of glasses
professional growth, education, career	proxemics preferences	pre-experience gameplay
professional frustration/feel good points	mental rotation skills	motion sickness
professional motivation	key robotic tasks of the user	attitudes toward AR
capacity for teamwork	frequency of doing robotic tasks	

Fig. 4 : List of persona variables

Future Work

Collaborate and share!