

### 1. Task 3

#### Observing my own behavior from the perspective of the frame-of-reference problem

Riding in a streetcar is a good way to observe other people. It's a place where you meet all kind of people. There are so-called weirdos, teenies, normalos, businessmen, and all kind of other creatures. Personally I always like to observe other people. Some of them make me feel laugh, some of them make me angry.

Then I'm starting to ask myself what other people would think about me. It can't be possible that I am the only observer. Other persons definitely make their thoughts about me, my appearance, and my behavior.

Sometimes I'm trying to imagine how I affect others. It's pretty hard to imagine. Throughout the whole life we're bound to our body and just see the whole environment from our own view, with our own eyes. Most people next to us we don't know well enough in order to imagine how they feel about us. If you got a real good friend you know already for a long time it may be possible to know something about his/her feelings - Then it might be possible to put oneself in his/her place. Still, it's impossible to realize what this other person is thinking because this other person just got a whole different perspective.

When we're talking into a microphone and recording our voice and then listen to it – I'm sure everyone did make this experience – it sounds weird. We don't know how our voice sounds from the perspective of another person. When we listen to the recording we start to realize that it is not the same as we thought. It's not because of the bad quality of the tape; no, it's because we hear it from a different perspective, not from our own one.

If somebody goes to a job interview he might get nervous. He wants to look nice and wants to make a good impression. The point is that he wants to make a good impression on the interviewer but he cannot imagine what the interviewer is thinking. The interviewer got his own different view and one got no control over that. This is probably the main part that makes us nervous when we go to a job interview.

Let's get back to the situation in the streetcar. Trying to imagine how other people think about oneself is a great example for the *perspective issue* of the frame-of-reference problem. It's always hard to put oneself in someone's position.

We may not even think about all this. We're getting in the streetcar, reading our newspaper, pressing the stop-button on the right train stop and getting again off without even bumping into a person or a chair. We don't need to think about all those actions. We're just doing it as we're used to and everything goes fine. That's the *complexity issue*. For us all those actions are not complicated at all and out of our view we couldn't find any problem. But for a person who has never seen a streetcar before it might be pretty complex, the whole "getting-on-reading-newspaper-getting-off-at-right-stop" kind of thing. Last but not least, there's the *behavior-vs-mechanism issue*. Riding in a streetcar is not possible without any interaction with the environment. We don't want to get stuck between the closing doors and we don't want to bump into an old man that he'd get a heart-attack. Also, we want to return a smile if someone else smiles at us. We may show happiness if we feel happy. All this is interaction with the environment.

**2. Task 5****frame problem vs. frame-of-reference problem**

The *frame problem* is about distinguishing relevant from irrelevant implications.

A human agent is able to construct appropriate frames relevant to the current situation. It is able to make decisions in a speed a robot would never acquire. A R2D1 (robot-relevant-deducer) got the ability to distinguish between relevant and irrelevant implications but it would have to go through all possible actions and would never end up with a result. A human agent knows what is relevant and doesn't even have to check any other possibility. Subconsciously it does the right thing.

An important aspect of the *frame-of-reference problem (F-O-R)* is the complexity issue. An intelligent system is able to do something that might look complex to another agent that hasn't got the same view. Here is the connection to the frame problem. For a robot it is terribly complicated to drink out of a glass. For a human agent this is not complex at all. Also the perspective issue of the F-O-R can be confronted with the frame problem. If we're looking from the perspective of the agent itself it might be clear how to ignore the irrelevant implications. If we're looking as an observer at an agent, we might not be able to understand the simplicity of the agent itself.

The behavior-vs-mechanism issue got a connection to the frame problem as the frame is kind of an environment where the agent is located. In this frame the agent has to act without thinking about the whole environment. It has to have kind of a narrow-minded view; otherwise it wouldn't stop verifying irrelevant implications.

**3. Task 6****Adaptivity, Embodiment, Situatedness, Autonomy, and Self-sufficiency**

	<b>real desert ant (Cataglyphis)</b>	<b>Sahabot</b>
Adaptivity	It can adapt to the weather. If it's too hot, it tries to hide in a gap.	not really If it rains it can't hide - well, that's no big deal, we're in the Sahara! :) In some way it can adapt. It got huge wheels, so it can clear hurdles
Embodiment	a real physical agent is always embodied	yep we got a vehicle and not just a virtual bot
Situatedness	Yes, the ant can acquire information about its environment through its sensors in interaction with the environment	The Sahabot uses the polarized light sensor module for its own navigation. It also got a omni directional camera. Still, it is more limited than the ant.
Autonomy	Almost completely autonom. The ant is free from external control. Still it depends on the environment and on other ants. Also ants feel lonely if they haven't got any partner!	It has a certain degree of autonomy as it can navigate through the Sahara Desert on its own.
Self-sufficiency	Yes. The ant can find food in order to survive.	No. Sahabot needs batteries or other external help to "survive"