

Containing and Sensitive Interaction Systems:

A first step towards adaptive interfaces

מערכות אינטראקציה מכילות ורגישות: צעד ראשון לקראת ממשקים אדפטיביים

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Research Question

In current technological systems, users need to learn, change, and adapt their own interaction patterns in order to work with machines. In order to enable users to utilize and enjoy modern technological systems, we need to make interaction systems adapt themselves to fit the users. The goal of this research is to develop a framework for interaction adaptation that will enable users to better interact with modern systems and bring out their full potential.

Containing and Sensitive Interaction

Our new Interaction model implements two main and important points for improved human-machine interaction – Containment and Sensitivity:

Containment

Containment is the system's ability to act according to the user's real wants. A containing interaction system will be able to understand the user's wants and underlying intentions (the user's "Precursor") and, and this is the main point, act according to *them* instead of the user's explicit inputs. This way the user will be able to receive a response that is closer to that he or she expects, thereby reaching a higher level of satisfaction, regardless of his level of understanding of the system and its behavior.

Sensitivity

Sensitivity is the system's ability to modify itself according to parameters of the user's physical feeling instead of the system's mechanical parameters. In a sensitive interaction model, the user would be able to tell the system how he wants the state to change according to what he feels, and the system would modify the settings to best achieve the wanted change.



Applying the Containing and Sensitive Interaction Model

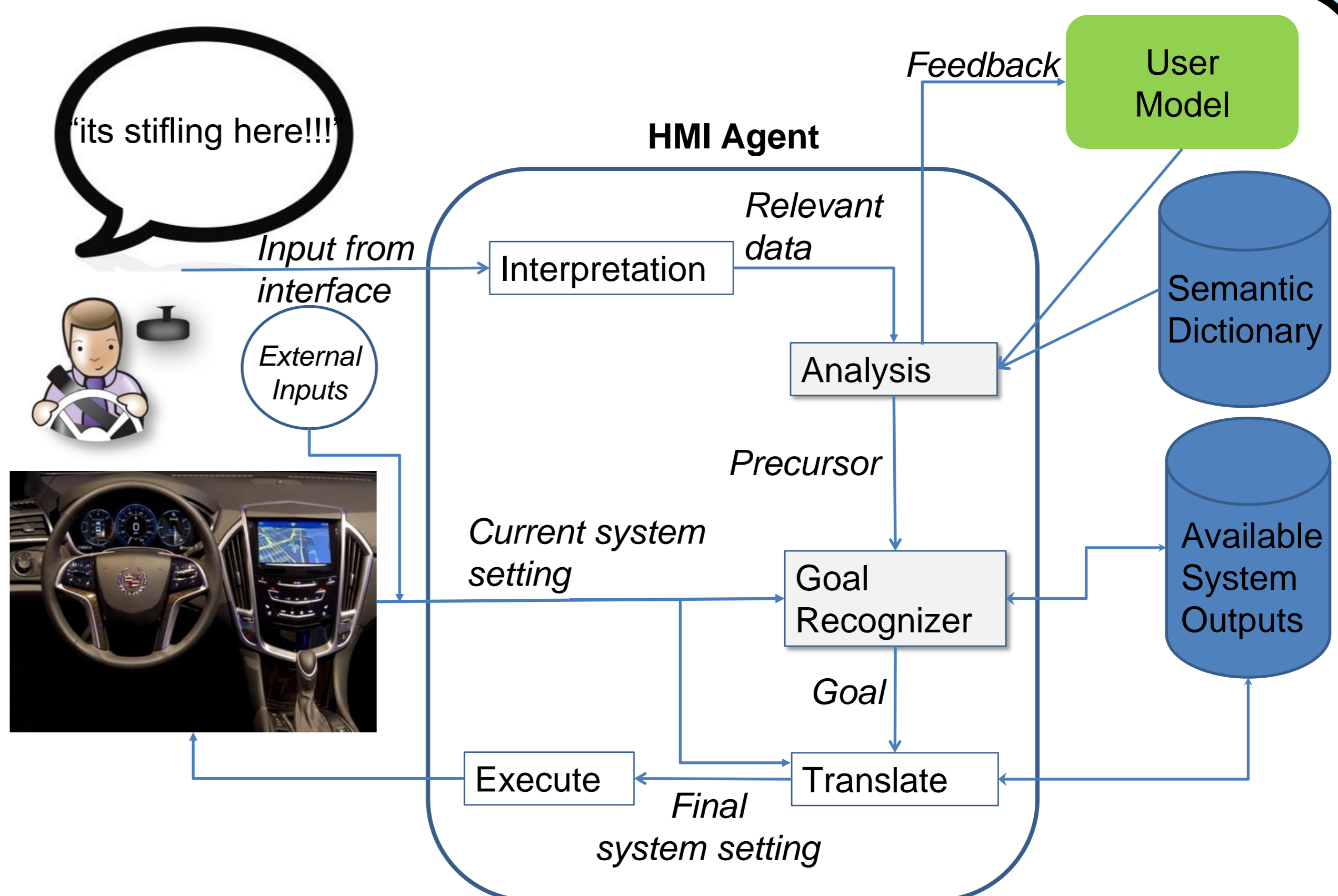
The model for containing and sensitive adaptive interaction consists of five software components: Interpretation, Analysis, "Goal Recognizer", Translation and Execution.

Interpretation is the component that is in charge of collecting the data from the interface, and transforming it into relevant data that can be passed into the analysis.

Analysis then takes the data and analyzes it using a user model (data about the user) and a semantic dictionary (that helps understand the user input) in order to find out the user's *precursor*, meaning his real wants and needs.

The Goal Recognizer component then tries to find an available system output ("Goal") that will best satisfy the user's precursor.

The Translate component then translates the output into the matching system setting, and then passes it to the **Execute** component which executes the setting and completes the process.



Implications

The new Sensitive and Containing interaction model proposed here will hopefully improve interaction in future technological systems, making them easier to use, more comfortable to interact, and more satisfying. The model can be implemented on a variety of systems, such as automotive infotainment systems, autonomous driving, diagnostic and prognostic systems, and also in areas of aviation, medical equipment, and electrical home appliances (washing machines, microwaves, etc.).

Future Thoughts

Our proposed Containing and Sensitive interaction model is a first step towards the creation of "Adaptive Interfaces". By using this model to adapt interaction, we believe that a very strong base is created for the adaptation of the Interface, meaning the visual/auditory/haptic information that the user experiences. Future research will create methods that will use this model in order to arrange multimodal information in a way that will fit the user's interaction style, and will further enhance interaction effectiveness and satisfaction.