

Embedded Systems 2010/2011 – Milestone 1: Specification

Due: Tuesday, 4th January 2011, , *before* the lecture (i.e., 10:10)

Sync Chart Model

The first Milestone is a Scade Model that captures the behavior of RoboDog. You are allowed to use both, Lustre and Sync Charts. The basic behavior is described in the project sheet. Here you find more details on the behavior and the needed interface of the model.

Interface

The inputs of your model are the following 4 sensors:

- **Light Sensor** from 0 (bright) to 1023 (dark)
- **Touch Sensor** 0 (not touched) or 1 (touched)
- **Sound Sensor** from 0 (loud) to 1023 (silent)
- **Ultrasonic Sensor** from 0 to 255, distance in centimeter

The output are

- **Motor Left** from -100 (full speed backwards) to 100 (full speed forwards), 0 means stop
- **Motor Right** from -100 (full speed backwards) to 100 (full speed forwards), 0 means stop
- **State** (Self-defined) enum to output current state of RoboDog

Detailed Behavior

Driving Forwards/Backwards, Left/Right

RoboDog drives forwards, in case both motors are set to the same positive value higher than 0, backwards in case of negative values lower than 0. To turn left (right), right motor is set to a positive (negative) value, left motor to a negative (positive).

Following a Line

In case the light sensor is below a certain threshold (LightTH), RoboDog assumes to be on a line. It then slowly moves forward. As soon as light sensor returns values higher than this threshold, it assumes it has lost track of the line. It then turns left for a certain delay. If it has not found the line again, it turns right. The delay prevents RoboDog to turn by 180° and drive backwards before trying to find the line at the other side.

Recognizing Claps

Recognizing claps is a bit tricky. A clap is given in case the sound sensor measures a loud value below a certain threshold (`ClapTH`), followed by silence (or at least, measurements higher than this threshold). Such a silent value must be measured within a certain number of cycles (`ClapDelay`)—otherwise, it was not a clap but a single loud sound.

To recognize a sequence of two claps or three claps, the claps must also occur within a certain time span (`MultipleClapDelay`). If the second (or third) clap occurs too late, it is recognized as two single claps.

Hint Define a constant for each value used within your model (e.g. `LightTH`, `ClapDelay`, `NormalSpeed`).

Submission

Create a new workspace for your RoboDog Model. Name this workspace after the name of one of the group members. Add a file “group.txt” to this directory containing the name and matr. number of each group member. Compress the whole workspace directory (to `.rar` or `.zip`) and send it to:

`altmeyer@cs.uni-saarland.de`

In addition, provide a print-out of the graphical representation of the model as well as a short explanation. Only submissions available on paper **and** via mail will be graded.