

HARD & SOFT 2019

ASSIGNMENT

IoT & SPEECH RECOGNITION TECHNOLOGY

The basis of the *IoT & SPEECH RECOGNITION TECHNOLOGY* assignment is the machine recognition of the sense of a sentence received as an audio recording. Based on the recognized sense of the sentence a symbol is to be publicly displayed on a provided IoT platform. The sense of a sentence is usually recognized through keywords that will be provided upfront to the contestants.

The teams are supposed to devise an algorithm that will, based on the audio output from a PC or a cell-phone, recognize the sense of a sentence. After the recognition of the sense of a sentence, it is necessary to send the required word to an IoT platform, and subsequently from the IoT platform the appropriate symbol is to be sent to a multimedia board.

The sentences can be joyful, funny, serious and sad. Each of these senses should be displayed on the IoT platform, alongside the appropriate symbol on a multimedia board.

- Joyful sentence – word “Joyful” on IoT platform, symbol ☺ on multimedia board
- Funny sentence – word “Funny” on IoT platform, symbol 😄 on multimedia board
- Serious sentence – word “Serious” on IoT platform, symbol ☹ on multimedia board
- Sad sentence – word “Sad” on IoT platform, symbol ☹ on multimedia board

The second part of the assignment is to start an autonomous robot using the multimedia board. The autonomous robot moves are based on the word received from the IoT platform. The robot is supposed to find the appropriate track to the goal. The tracks will be drawn in black, while the goals will be marked with different colors.

The sentences that the teams will receive will be displayed to the spectators and will be read by a machine. Each team will get five sentences. If keywords exist in a sentence, those keywords will convey the sense of a sentence. To interpret these keywords, a table will be provided.

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The contestants have a limited time (six minutes) to recognize the sentences and start the robot.

An example of a successfully executed task would include the following:

- After a message has been played, the contestants' system has successfully recognized the keyword and assigned the correct word to the specified field on the WolkAbout IoT Platform. The Platform can be accessed at demo.wolkabout.com
- The WolkAbout IoT Platform has successfully relayed information to the Mikromedia Board, which then displays the correct symbol
- After receiving the symbols from all five sentences, The Mikromedia Board has successfully relayed information about the total number of symbols which has been displayed on the board. The Buggy then follows a black line to a field of the correct color, after which it stops. The colors are painted to represent the companies sponsoring the event: red (MikroElektronika), yellow (Continental), and blue (WolkAbout). If the total number of symbols received is divisible by three without a remainder, the Buggy should follow the first path. If the remainder after the division is one or two, the Buggy should follow the second or the third path, respectively.
- For extra points, contestants can make the Buggy "dance" – after stopping briefly, which means the task has successfully been completed, extra points will be awarded if the Buggy can move around in a crude imitation of dance moves. This is up to the contestants' imagination.

The following equipment will be provided to each of the teams:

- Multimedia board
- Battery-powered robot
- Contestants will use their own color sensors and line-following sensors
- Contestants will use their own module to receive and send data wirelessly
- Contestants will use their own PC or cellphone on which they will develop the speech-recognition algorithm

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KEYWORDS TABLE:

Sense	Keywords	Word
Joyful	WolkAbout, MikroElektronika, Continental	Joyful
Funny	Java, C-Sharp, C-Plus-Plus	Funny
Serious	Timisoara, Novi Sad, Skoplje	Serious
Sad	Serbia, North Macedonia, Romania	Sad

SCORING TABLE:

1. Recognizing a sense and displaying the correct word on the IoT platform: 10p
2. Displaying the correct symbol on the Mikromedia board: 5p
3. Buggy moves, following the line: 2p
4. Buggy moves onto the appropriate field: 2p
5. Buggy stops on the appropriate field: 1p

These points are awarded for every sentence separately.

A further 10 extra points are available for contestants who can use their imagination and program a Buggy to do a “dance” after completing the assignment.

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WOLKABOUT IOT PLATFORM USER GUIDE

The platform on which the contestants are supposed to connect to is located at demo.wolkabout.com

After that, the steps that should be followed are listed below:

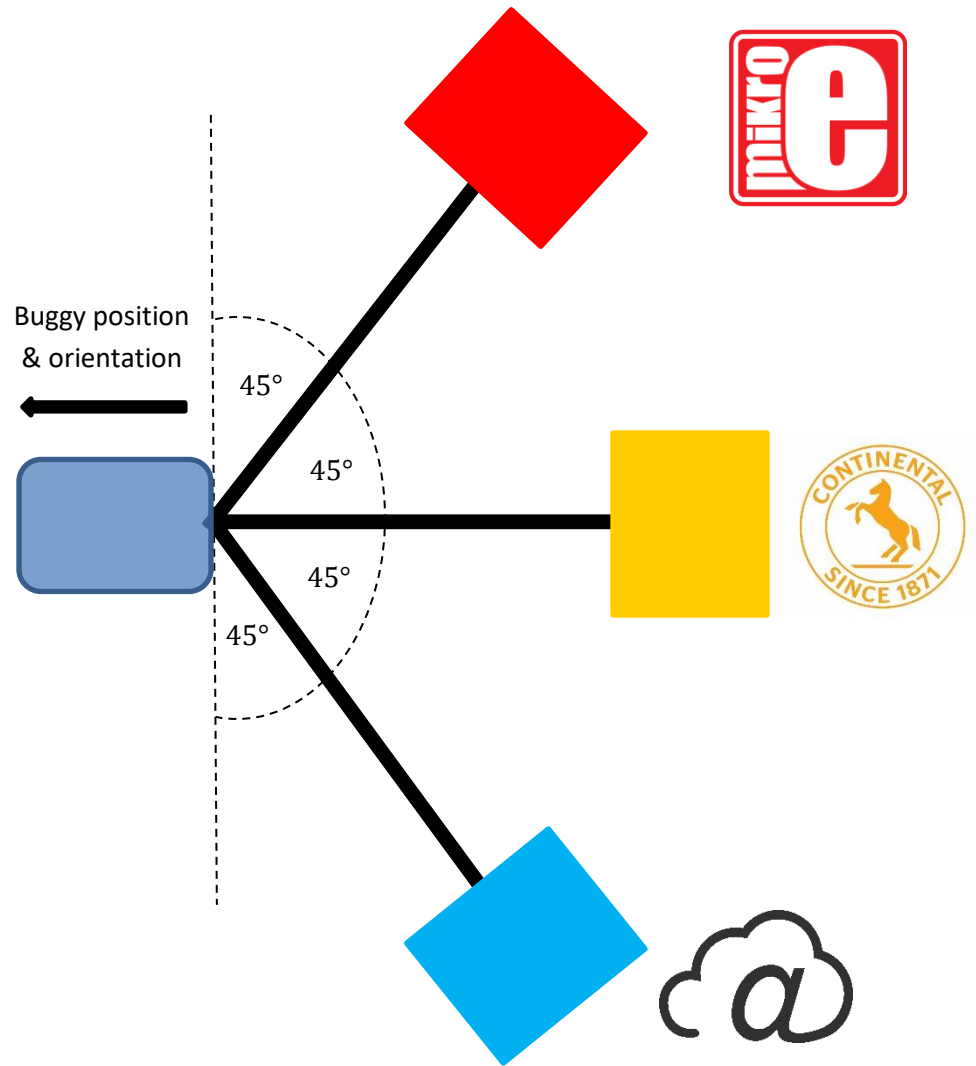
1. Create an account for the platform - [User Guide](#)
2. Connect both devices (PC and Mikromedia Board). A short [YouTube](#) video explanation is provided, further detailed description can be found at the following links:
 - a. Template creation for each device – [User Guide](#)
 - b. Device creation – [User Guide](#)
 - c. Connect the device using WolkConnector in the desired programming language - [LINK](#)
3. Create a Dashboard – [User Guide](#)
4. Add a Layout Widget – [User Guide](#)
5. Create Rules for every sensor reading from the device – this is necessary so that the platform can relay the information from the PC to the Mikromedia Board – [User Guide](#)

The whole example together with mockups can be found on the official website in *H&S Example.zip* file.

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BUGGY TRACK



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SCHEMATIC DIAGRAM

