

# Mobile World Congress

## SOCIAL WEB OF THINGS

Collaboration with Ericsson and LEGO® System A/S

By Iluisgib



**ERICSSON**



*In the near future everything that benefits from being connected will be connected. This is Ericsson's vision of the Networked Society.*

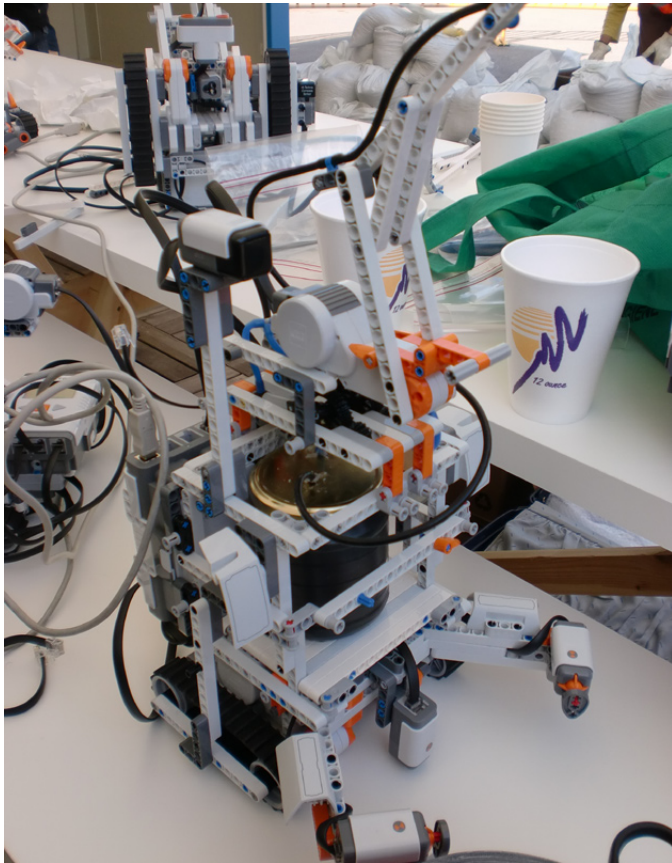
*The SOCIAL WEB OF THINGS is like a social network where our connected products and services meet, talk and collaborate. By intuitively interacting with us and each other they provide context and meaning to a 'network of everything' and make life simpler, more practical and fun for us humans. Ericsson and LEGO® MINDSTORMS® have partnered up to show a few examples to tickle your imagination. Enjoy!*

From February 27 till March 1 the Mobile World Congress, the most important congress concerning mobile phone technology and connectivity in the world, took place in Barcelona. HispaBrick Magazine® was invited to collaborate in an activity named SOCIAL WEB OF THINGS.

In December I received a rather cryptic email message requesting collaboration for the Mobile World Congress in Barcelona. It mentioned building "something" and LEGO® needed a local LUG to help build it up. No further information was given. After consulting my fellow club members we decided to accept the proposal, disregarding the doubts we might have.

Until January 10 we didn't start to receive any information about what was going on. There would be a collaboration with a large telecommunications company involving a display with LEGO robots and decoration. I started looking for AFOLs who were interested in participating, both during the weekend for set-up and during the week for maintenance and supervision.





A few days later it became apparent that it wasn't feasible to build the decoration with LEGO® elements. Initially the idea was to build a cabin, trees, pots, and other elements with LEGO bricks, but it was going to be difficult to get so many pieces and we wouldn't have enough time to build all these elements so the idea was discarded.

On the other hand there were the robots and with little more than a month to go we knew next to nothing about what needed to be built. Until one day we got an email from Marcus and Borbála, from Ericsson, who put us up to speed about what they wanted to do. We needed to design 4 robots to carry out specific tasks in order to show the concept of the SOCIAL WEB OF THINGS:

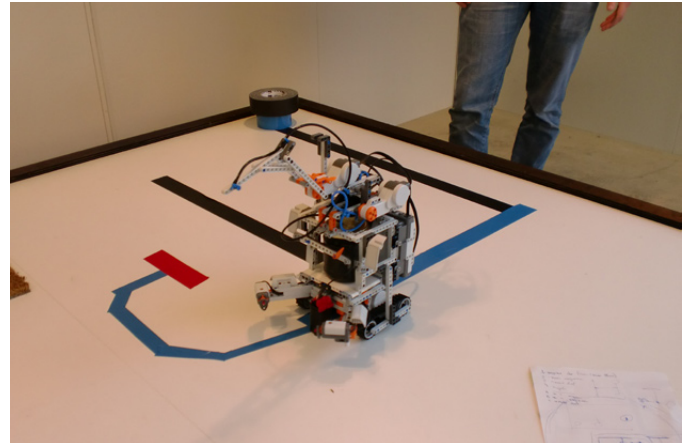
- A coffee cup collecting robot
- A robot to water plants
- A robot to pick up a newspaper
- A robot to sort dirty laundry

These robots not only had to carry out the above mentioned tasks but maintain a Bluetooth connection for interaction. They needed to be able to receive information for their next action and relay information about their status in order to show how robots can help us in our daily life.

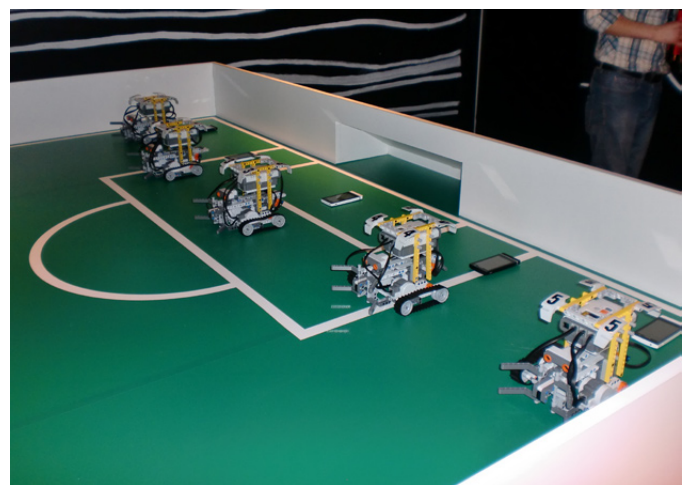
In addition to these robots we needed to design another 10 (identical) robots for the social event that would take place on the night of Tuesday 28 at the Ericsson stand where employees and guests of Ericsson were to have an entertaining night. These robots should allow them to play a game of soccer, controlling them with mobile phones.

At this point we knew what had to be done and had to assign the work. Jetro and Koldo took care of the 4 robots that carried out domestic activities. I took care of the soccer bots. Of course the whole project had to be kept a secret, so we had to keep it in a small circle to make as little "noise" as possible.

Jetro and Koldo developed the robots starting from the Snatcher bot created by Laurens Valk, although the only element that was not altered was the mechanism of the pick-up arm and the tread construction as the rest was modified to add one or two colour sensors and make some other changes that required quite a bit of trial and error. It would have been difficult to make such a spectacular looking robot without using Laurens' robot as a starting point (by kind permission), but even so it took the better part of three weeks to develop four versions for the different tasks.



The soccer bots were rather easier to make. The main problem in this case was my (very) limited experience with MINDSTORMS. I started with a base Koldo designed and added a mechanism that allowed the robot to kick the ball. But after some modifications I wasn't satisfied. I took it apart and started again. This time I started with the mechanism for kicking the ball and built the robot around it. When I reached a version I was happy with I improved the 'kicking' mechanism and was ready (although Koldo had to reinforce the base during the event as it turned out to be a little weak. It goes with the territory...). Once I had the model I could start building 'clones'. Since my goal was to build the robot with the parts contained in a single NXT set, I only needed to gather the required parts from the remaining 11 NXT sets and build the robots (5 robots for each team and two spares). It took me the better part of a Saturday to build them. I used some coloured liftarms to be able to distinguish the teams.



Having built the robots and sorted out the mechanical part, what was left was programming. In this regard, a few days before the event Marcus told us he had prepared a Java application that used Bluetooth to hook up the robots with another app on the PC Koldo had to go through his agenda and contacted with some Koldo students from La Salle Barcelona



who have participated as referees in the FIRST LEGO® League and who had experience with Java. Santi and Sergi helped out during the week leading up to the event and spent the Friday prior to opening working with Marcus on the programming.

That weekend was the time for set-up. Gemma, Jose and Vicente were added to the team together with Koldo who had arrived the previous evening and Jetro who flew in that very morning. On the Friday the LEGO team had arrived, made up of Steven Canvin, Myra Lind and Marie Kjaer Buhl from Billund and Jenn Wagner from Canada and we met up on Saturday morning at the entrance to the fair.

We were still behind on the programming. Much of that had been done in RobotC and needed to be re-done in Java so it took some time to get everything ready. A couple of Santi and Sergi's friends, also students at La Salle Barcelona, came to lend them a hand. Marti, Xavier, Eloi, Sandra and Xavier. Thanks to their dedication and the many hours of work they put in during the week-end, on Sunday night all the robots were perfectly ready to start the show. It wasn't easy. We had problems with the ambient light and the colour sensors (the display was outside). We also experienced a curious effect with the ultrasound sensors. It turned out the material the socks were made of absorbed the ultrasound and they were not detected. So we put the socks in plastic bags and partially solved the problem. In the end the robot was not 100% ready and worked in "free" mode during the rest of the week, while the rest of the robots worked perfectly all week long.

Come Monday the event started and there were some changes in the HispaBrick Magazine® team. Jetro, Jose and Vicente had to go back home for work. In exchange for them, Victor came and spent the rest of the week with us, together with Koldo. Gemma and I also had to work, but could combine it with the event. It was very tiring but worth the effort.

During the four days of the event the robots were on 10 hours every day without any breakages or degradation of their components. They carried out their tasks perfectly and complemented the explanations Marcus gave concerning the SOCIAL WEB OF THINGS. You can see a video of the robots in action on the YouTube channel of HispaBrick Magazine (<http://www.youtube.com/user/HispaBrickMagazine>).

On Monday night we had the opportunity to test the soccer bots. Ericsson had built a 2.5 by 4 meter football field for matches of 5 against 5. Sony provided 10 Xperia S phones (which had not been officially presented) to serve as controllers for the bots using the MINDdroid app. Although we were in a remote corner using only half the field, the trials generated a lot of interest from the Ericsson employees who were having dinner in the same building.

On Tuesday, during Ericsson's official Social Event we officially presented the robots. 10 robots, 10 mobile phones, many guests and lots of fun. We had 4 hours of continuous matches and a couple of Sumo fights, but in a very relaxed and friendly atmosphere. Many people were surprised the robots were made with LEGO and even asked if the LEGO robotics set was available for sale. The matches were refereed by Steven and me.

In the meanwhile, Jenn and Marie were doing another activity with LEGO bricks. They were building a coloured QR code with the help of the guests. All who participated were asked to leave a business card and entered into a raffle of a MINDSTORMS NXT set.



On Thursday afternoon at 4 o'clock the Mobile World Congress ended. Marcus, Myra, Marie, Steven and me put the robots in boxes and I took them home in order to pack them very carefully and send them to the Ericsson Customer Center in Stockholm. There they will get a permanent place and continue to demonstrate the SOCIAL WEB OF THINGS. The football field will also go to Stockholm and Marcus has promised to organise some great matches with colleagues and customers, although in view of Marcus' playing style he'll start off with a cautionary yellow card... ;)

Everything I have told so far has only made reference to the event, the robots, the programming... but I'd like to highlight above all the great level of team spirit and commitment that all involved in this "special" event have shown. The relationship with the LEGO employees has been excellent and Marcus, as representative of Ericsson, has been a great partner. The students from la Salle BCN were totally committed (and on Sunday they would not leave before everything was in perfect order. They took it as a personal challenge). And although I know the members of HispaBrick Magazine, they have once again shown they can be counted on for just about anything.

It is a pity we have not been able there all at the same time for a family picture. In any case, I'd like to thank each and every one who has been involved in this project:

- Steven Canvin, Jenn Wagner, Myra Lind and Marie Kjaer Buhl of LEGO System A/S
- Marcus Gardman and Borbála Székely of Ericsson
- Eloi Garrido, Martí Salvador, Santi Ortega, Xavier Bassols, Xavi Benavides, Sandra Fernández, and Sergi Perdices of La Salle Barcelona
- Koldo Olaskoaga, Jetro de Château, Gemma Nin, Victor J. Buforn, Jose Manuel Ruiz and Vicente Lis of HispaBrick Magazine.

Thank you for making this event something special and for making things so easy when at times they seemed near impossible.

#