



Robot Serenade: Robots in a Talent Show

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ABSTRACT

We describe how our team of four girls in middle and high school built robots and had them perform for our Full STEAM Ahead Showcase, an art and science talent show for youth 10-18 years old. We thought it would be funny and creative to make a robot sing to another robot, and then dance together, performing as if they were people at the talent show. Here we talk about how we came up with our ideas for dance moves, created the robot costumes, and learned about coding and problem solving. Finally, we talk about how we presented the dressed-up robots singing and dancing at the showcase. We liked how the robots weren't part of a competition but part of an event where everyone showed off their talents. We want to encourage other youth centers to do similar projects and be creative with robots.

Keywords

Coding; girls; technology; m-bot; robot; youth center; makerspace; making; STEAM

2. PROJECT DESCRIPTION

2.1 Project Overview

Our goal was to build robots and have them perform for our final showcase called Full STEAM Ahead. The showcase was a talent show for youth ages 10-18 to show off their art and science skills. We thought it would be funny and creative to make the robots dance rather than follow a maze. Also, this way the robots were showing off their "dance moves" and "singing abilities" the same as the other performers at our youth center. We chose a song we listened to and thought would be funny to hear a pair of robots dancing to. We worked as a team of four people, where everyone gave their ideas and helped a little with coding the dance moves. Daisy helped the most with programming the song and figuring out the dance sequence. Ashley, Kelly, and Mary helped design and create the costumes, and Kelly and Mary presented the robot dance at the showcase.

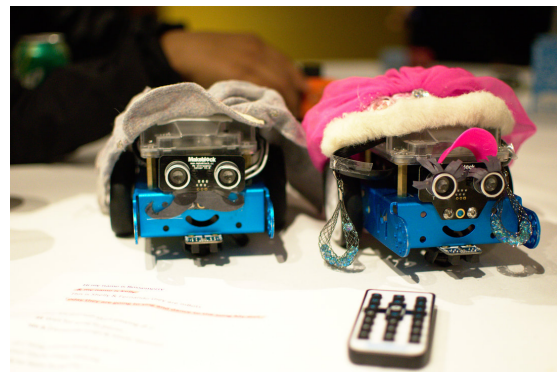


Image 1. M-bots before showcase

2.2 Project Steps and Reflections

For the project, we needed to build the robots, program the musical notes, program the dance moves, and sync the dancing and singing. We also needed to create costumes, write and practice scripts for presenting, and try out everything. We first built the m-bot robots based on our imaginations (and ability to create stuff from the pamphlets in the m-bot box). We then tried out programming and tested to see what they could do in general. Before we had the idea to make them sing and dance, we programmed them to go forwards and backwards and side to side, and use their light/dark sensors to follow a black-brick-road track. We presented at a school Maker Faire where we showed the robots to 6 year-olds and they made the robots attack and race each other, and follow the road. After the Maker Faire, we focused on having the robots work together rather than compete. We chose the song, "My Girl" because it was a good song for a serenade for our two robots. We decided one robot would sing to the other, and differentiated the robots with names and costumes. We named the robots Fernando and Shelly to rhyme with our names. We also decided to dress them up for the performance. We chose to make Shelly look the prettiest with earrings, eyelashes, a hat, and pink dress. Fernando wore a mustache, and a gray coat. These costumes turned out well, and designing and dressing up the m-bots was Kelly's favorite part.

We then coded using mBlock (which is like Scratch), where we dragged little boxes with instructions together to create dance moves and the song. We programmed the notes, whether they were half or quarter notes (the rhythm), and the tone (C, D, E, F, G, A, B). We used the song of "My Girl" with do, re, mi printed out and translated these notes into the musical alphabet that m-block used. After the song was done, we wanted Shelly to dance while Fernando played the notes. At first Daisy was programming random dance "moves" by making the m-bot go forward and spin. But then Daisy wanted the m-bots to do a wheelie. Daisy learned how to do that by making them go backward slowly and then forward at a much faster speed. She also learned how to program different types of spins, by coding a sequence of right or left turns and changing the speed. The m-bot then performed a wiggling dance move by going right then left then right again, turning at high speeds with small wait times between actions. It looked like it was glitching when it was too fast, so we slowed it down by adjusting the speed and trying it out many times. Daisy also spent a few hours trying to figure out how to make Fernando and Shelly sing and dance at the same time, so it would look like Fernando was singing as Shelly danced to his song. It was nice when everything actually worked! (Here is a video of one of our practice runs: <https://youtu.be/N17wFV-KHok>).

After we finished the coding, Mary and Kelly wrote out a script for the showcase presentation to introduce the m-bot pair. They also wrote down instructions on how to trigger different sequences using different buttons on the remote. At the showcase, Mary and Kelly pressed one key on the remote to make Fernando sing while Shelly danced. Then they put on the “My Girl” music over speakers and pressed another button to start the sequences where the robots danced together. This was Daisy’s favorite part of the performance—when the robots both danced together, and then left off the stage. Kelly’s favorite dance move was when Shelly went backward quickly and spun. Especially fun was when they spun together at the same time or when Shelly kept spinning. Everyone also liked how Fernando sang by playing each note. We really liked the ending too, where Shelly played the four notes, “My Girl! MY GIRL!”. Take it away m-bots!

2.3 Lessons Learned

2.3.1 Skills and Lessons

We learned a lot while working on this project, both skills and what we’d do differently next time. Most importantly, we learned how to code, this helped us learn how to make the robots “sing” and “dance.” We also learned how to sync the robots together. Before that, we learned how to build them, how to use tools like a screwdriver, and how to read and follow instructions. Overall, we feel proud of what we did. We took a lot of photos and video so we did a good job documenting. We felt very creative with the costumes and wouldn’t change that either.

Another thing we learned was how to work through problems and keep trying. The day before the showcase felt very stressful because we worked on it for many weeks, and then it wasn’t working the day before when we needed it to actually work. The “My Girl” song that Fernando the robot sang was off-key. We tried changing the codes and re-setting the m-bot but nothing worked. Then we replaced the batteries and it was all good. We learned that when the battery was running low it slowed down the bot and made Fernando sing weird and glitchy. Lesson to self: check batteries before a big event.

2.3.2 Future Plans and Advice to Other Makers

Next time we would spend more time on syncing up the robots so that it didn’t look weird when one was singing and the other one was dancing off-beat. We would need to spend more time coding and trying it out to make sure they are synced. Another thing that was hard was getting the robots off the stage. We should have programmed them to leave the stage at a certain time in the song instead of using the remotes to manually guide them off.

If we gave advice to another youth group, we would tell them to do a similar project because it was fun. We liked figuring out how to make the robots spin and pop a wheelie and these are good challenges for others to try. They should pick a funny song they enjoy listening to, and sync up the robot so that the song lyrics match the dance moves. For example, next time we want to do the “Cha-Cha Slide” and have the robots move to what the singer is saying, like “to the right, to the right...” Another challenge for others to tackle is creating m-bot clothes that fit the robots better.

Overall, we enjoyed working as a team. We often worked on different parts of the project at the time same time and focused on what each of us found the most interesting. The different parts of the project helped us stay motivated but also pushed us to learn new things and go outside our comfort zone whether with coding or public speaking. We recommend others do projects that are creative and have different parts so everyone can find a way to contribute and learn more.

3. BIOS

Daisy Martinez is 15 years old. She loves spending time with her family, including her Grandma. She likes to bake cookies with her sister, and as a maker she likes coding robots, but not as much as building them. She has volunteered for three years at the St. George Youth Center (SGYC) and made some great memories and met some great people. Right now, she is the Change Maker Chair of the SGYC Isla Vista Leadership Group, in charge of teaching activities for 5-6th graders in public speaking, leadership, making, and engineering design.

Kelly Zamora is a 14 year-old high-schooler who likes to try new things and hang out with her family and friends at SGYC. She likes to play soccer, bake, and jump rope, and to explore science and robotic fields. She has been going to the SGYC for about three and a half years and has been part of the SGYC Isla Vista Leadership Group for two and a half years. Her position right now with the leadership group is External Events Chair. She has presented at two Maker Faire events and enjoys working and doing the science/robotic activities. Presenting about the science projects and doing public speaking has become an important skill for her.



Image 2. Building, coding, costuming, and presenting