



DigiEduHack Solution Turin - Improving the learning experience through Robotics Challenge: Turin - Improving the learning experience through Robotics Challenge 2020

Open Cube

An easier way to use e.Do cube

A solution that will help people to use e.Do cube in a more convenient way, both through an app and a website.

Team: DKV

Team members

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Members roles and background

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Solution Details

Solution description

We will develop a cross-platform app which will work on windows mac linux and raspbian, we want to make the app easy to use and accessible to people. This app will give you the option of running the simulation locally on your pc through emulation or remotely on a server if needed. To run the program locally we will need to use an open source emulator for arm systems called Qemu which works on all main platform and its used to emulate the rasperry py system on a pc. this app will be used as a compiler for the e.Do arm and can run both the arm and the simulation simultaneously. we will develop a website that can be also used as simulation tool for an easier access.

Solution context

The main problem we were facing was the fact that the library of the e.Do arm are ARM libraries while our pcs run on x86. We solved this problem by emulating the rasperry py os on an emulator called Qemu and running the program on a virtual machine of your pc. This is a very simple and effective solution as it gives developer the freedom of working with the existing library while ensuring very high compatibility on the host system as the library doesn't need to be recompiled and doesn't risk to be damaged.

Solution target group

Our solution was thought for school and people getting into programming, by making the app easier to use and a website it will be a lot more accessible for schools to use. You will have access to an easy to use app and website. By doing this we can make e.do cube more accessible to people and it can be even used as a didactic tool to learn about the basics of robotics. school will start with the simulation and later can expand to use the actual robot arm to learn more about mechanics and electronics and the differences between a simulation and a real world test.

Solution impact

Our solution is tailored to improve the experience of using e.Do cube while giving the customer option on how he wants to use the product. we are focused on a easier more convenient way of using e.Do cube while giving people option depending on their needs. this will impact school as it will be also used a learning tool for pretty much all ages starting from kids where they can play with the online simulator, all the way up to university using the robot arm to learn programming and robotics while observing the differences between simulations and real world experiments.

Solution tweet text

We will be porting the experience of e.Do cube to all platform while making the access more convenient to get people to learn faster and easier.

Solution innovativeness

Our solution is very innovating because we are bringing to the market an application which can both simulate and compile code at the same time and lets you compare the 2 outcomes. We are also being very innovative by using a old technology which is emulation and applying it to a new enviroment to make an easier development of both the app and website as it will not require to rewrite the code from scratch. This is used also to improve compatibility with multiple operating systems and the only thing which changes will be the emulator and it doesn't require for the library to get written again.

Solution transferability

Our solution can be applied in other context. By having a simple to use simulation system of a robotic implement we can use it for pretty much anything as a test to see how a robot will behave in the real world before actually spending the money to build it and risk to damage it, or worse, hurting people. This can be applied in a lot of sector ranging from: medical , to schools and even cars. The technique wich we used to run the library on a different architecture can also be used inside the robot as maybe in the future the robot will switch from using the ARM architecture for a more powerful cpu without having to rewrite all the code for the arm.

Solution sustainability

The implementation of our solution will be very easy as it doesn't require to write a lot of new code but uses preexisting code to do what we need. As for sustainability because this is all run on a open source emulator it will be very easy to maintain as the main code needs to be done only once and it gets emulated on all the systems. for long therm we envisioned a universal app where you can modify the physical structure of the robot and personalize it depending on your needs. This might help a lot of company to find a solution tailored exactly for what they are looking for.

Solution team work

We split our task in 3:analyzing the problem, finding the best solution, and present our solution. We worked very efficiently as a group and we can still work together in the future. We are all 3 students from a technical institute in vicenza and all 3 of us study IT.