Dancing robot

Two differential drive robots that work in the concept of inverted pendulum must dance with each other

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Context of use: Education
Level of education: Bachelor

Technology Impact Cycle Tool

Dancing robot

Impact on society

What impact is expected from your technology?

What is exactly the problem? Is it really a problem? Are you sure?

The project is not a problem. It is more like a challenge to Advanced Motion Control students. The idea behind it is to apply the learn material from the classes in a hands-on experience. Thus, connecting the theory with the practicality of the subjects thought in school.

Are you sure that this technology is solving the RIGHT problem?

Yes. The robots are a perfect example of control engineering. It is the basis from start to finish of analysing a system and controlling it.

How is this technology going to solve the problem?

It is not going to solve a problem. It is for education purposes.
Each week new material is thought in school, which then applied to the development to the robots. So, the progress of the project is synchronized with the subjects, making it easier for the students to not lose track, and efficiently using the gained knowledge.

What negative effects do you expect from this technology?

The robots could be hardcoded. The main idea behind the project is to be creative and programm systems that are aware of their environment. This could be bypassed by simply coding each movement, eventually simulating adaptive behaviour of the system. However, this is not considered out of the limits. The client is satisfied with such final design. But the group is adviced to use the project in their benefit, and try to be innovative by not choosing the easiest path.

In what way is this technology contributing to a world you want to live in?

It does not contribute directly to the world. It is a initial step from student engineers to professianals

Now that you have thought hard about the impact of this technology on society (by filling out the questions above), what improvements would you like to make to the technology? List them below.

A possible improvemnt would be designing a real system that can be used my humans that works on the same principle. A segway is a perfect example. This could be an outcome of the project, if the project on its own was not repetitive each year.

Hateful and criminal actors

What can bad actors do with your technology?

This category is not applicable for this technology.

Privacy

Are you considering the privacy & personal data of the users of your technology?

This category is not applicable for this technology.

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Human values

How does the technology affect your human values?

This category is only partial filled.

How is the identity of the (intended) users affected by the technology?

The project is not going out to cusmoters or users. It's intended use is only for the developers to broaden their knowledge of Motion Control

How does the technology influence the users' autonomy?

It provides good experience with the topics of State Space matrices, and understanding of physical parameters of a system, that could be used to identify behaviour.

What is the effect of the technology on the health and/or well-being of users?

It consists of two small robots (30x10x30cm) that present no harm to a user.

Now that you have thought hard about the impact of your technology on human values, what improvements would you like to make to the technology? List them below.

This question has not been answered yet.

Stakeholders

Have you considered all stakeholders?

This category is not applicable for this technology.

Data

Is data in your technology properly used?

This category is not applicable for this technology.

Inclusivity

Is your technology fair for everyone?

This category is only partial filled.

Will everyone have access to the technology?

No. The technology in the project will not be open to the public. Currently, the group does not have official permission to upload the approach and development of the project on the internet or elsewhere. However, there are examples of other similar projects that are currently in use by the community.

Does this technology have a built-in bias?

No.

Does this technology make automatic decisions and how do you account for them?

It depends on what do is understood by "automatic decisions". The robots have inputs and outputs. It takes the input, analysise it and then provides an output based on the written software. So, arguebly the robots make the decision to try and stay upright by balancing themselves. However, this behaviour is possible because of half a dozen matematical equations for motion. The robots are not expected to do anything else, except fall when they fail to balance.

Is everyone benefitting from the technology or only a a small group? Do you see this as a problem? Why/why not?

The only people benefitting from this project are the students working on it. The product is not going to be sold or given to others in its finished state. The following year after the end of the current project, it will restart with new hungry for knowledge students.

Does the team that creates the technology represent the diversity of our society?

No. But the team was not chosen, rather the members applied for it.

Now that you have thought hard about the inclusivity of the technology, what improvements would you like to make? List them below.

This question has not been answered yet.

Transparency

Are you transparent about how your technology works?

This category is only partial filled.

Is it explained to the users/stakeholders how the technology works and how the business model works?

Yes. The project owner is aware of each step within the process. Meeting are held every week to discuss the current situation of the system.

If the technology makes an (algorithmic) decision, is it explained to the users/stakeholders how the decision was reached?

Every decision is well explained with given arguments. Also, other options are presented with a reason for not going with them.

Is it possible to file a complaint or ask questions/get answers about this technology?

After the project is done, there will be a report describing the system from A to Z. This report wil be given to the project owner. Then he decides where to upload it or who to give it to.

Is the technology (company) clear about possible negative consequences or shortcomings of the technology?

This question has not been answered yet.

Now that you have thought hard about the transparency of this technology, what improvements would you like to make? List them below.

A good addition will be for the final report of the project to be posted only in a forum to inspire other students or schools to try and recreate the system on their own.

Sustainability

Is your technology environmentally sustainable?

This category is only partial filled.

In what way is the direct and indirect energy use of this technology taken into account?

The energy consumtion is not taken into account in any way. The robors use small 9V batteries that are charged every week.

Do you think alternative materials could have been considered in the technology?

One of the robots is bought from a company, and we are not allowed t omake any hardware changes to it. The other is a prototype built with 3D printing.

Do you think the lifespan of the technology is realistic?

The robots are not subjected to loads greater than their specified ratings.

What is the hidden impact of the technology in the whole chain?

Since the project is about education the students, energy consumtion is not being calculated. It consists of two small robots that do not require too much power to run. Of course, there is the energy used by the developers laptop/ PC to research all topics, and that is a significantly bigger percentage than the power used by the robots. However, the system was never intended to be used in a different way.

Now that you have thought hard about the sustainability of this technology, what improvements would you like to make? List them below.

This question has not been answered yet.

Future

Did you consider future impact?

This category is not applicable for this technology.