

Video:

Members:

- Julia;
- Maria;
- Larissa;
- Vinicius.

Main Points:

- Robôs/Sistemas robóticos sem fantasias.
- Demonstrar capacidades gerais do robô, incluindo os quatro recursos escolhidos;
- Superação de desafios no processo design e quais foram as soluções;
- Funções dos membros da equipe e suas contribuições para os sistemas (software, hardware, eletromecânico).
- Vídeo bem polido com materiais de acompanhamento bem apresentados;
- Comunicação clara e concisa sobre as capacidades técnicas do robô, conceitos tecnicamente incomuns, criativos e ambiciosos;
- Inovação alcançada com evidências claras de testes, pesquisas e desenvolvimento para qualquer dos quatro recursos.
- A inovação pode ser uma inspiração para futuros competidores.
- As equipes são capazes de explicar como consideraram as práticas sustentáveis durante o desenvolvimento do seu projeto. ✓

Screenplay (Teleprompter):

INTRODUCTION:

Hello! We are the SCOOBY-ITU team, students from SESI school, SP, Brazil.

My name is Julia and I'm the designer of the team;

My name is Larissa and I'm the mechanical of the team;

My name is Maria and I'm the screenwriter of the team;

My name is Vinicius and I'm the programmer of the team.

PRODUZIR VÍDEO DE TODOS JUNTOS

Comentado [UC1]: Sugestão da Fernanda: Para os jurados, é irrelevante a informação do número do CE 031. Então, acredito que seja importante colocar que vocês são do estado de São Paulo, Brasil.

Logo, a primeira frase de apresentação ficaria assim:

Hello! We are Team SCOOBY-ITU, students from SESI School in the city of Itu, São Paulo, Brazil.

Comentado [UC2R1]: Outro ponto: é melhor escrever **Team Scooby-Itu**, pois soa mais natural em inglês. Sei que vemos em alguns exemplos, o "team" após o nome da equipe. Porém, o "team" antes do nome acaba fluindo melhor para quem é nativo.

Today, we will explain the process of creating and developing our project up to the final product. Inspired by the animated series SpongeBob SquarePants, we are anxious for presents for you. **(Gravação)**

CONTENT:

VÍDEO Demonstra sistemas robóticos em pleno funcionamento sem fantasias.

OK Explica como os quatro recursos escolhidos foram selecionados pela equipe

OK Demonstra as capacidades gerais do(s) robô(s), incluindo os quatro recursos escolhidos

The four chosen features that we would like to be evaluated on are: Visual recognition of the scenario, location and mapping, locomotion and human, robot and/or prop interaction.

Vídeo Julia

We chose visual/audio recognition because of our convolutional neural network that, through visual recognition and together with the ultrasonic sensor, activates the opening of Patrick's house. **(Gravação+áudio)**

Bob ativando a casa do Patrick

Our second feature is "Localization and Mapping", in our scenario we have lines that the robots follow and activation squares, we're using PID technology (Proportional, Integral, Derivate), which is based on a sum of equally proportional calculations for more dynamic and precise movement which does the locomotion of our robots more precise and with a lower error rate. **(Gravação+Áudio)**

Robô seguindo a linha+gráficos PID

Along with our third feature, we have the "Locomotion". Counting all robots we used 6 Lego inventor 4.3 V tension, 10 NXT motors 4.3 tension and 2 servo motors, all of them

counts with an encoder. For battery control in NXT and Lego Inventor motors, whenever the microcontroller has a low charge, that appears on the screen, we charge it to avoid inaccuracy. For the servo motor, it follows the voltage of the microcontroller, in the case of ESP32, 3.3V. In that case the control of battery is by a custom battery with a display that shows how charge it is. (áudio) **OK**

MOSTRAR BMS MOTORES

The fourth feature focuses on human robot a/or prop interaction, with the key challenge being ensuring that the doors and scenery function properly and at the right time. The SpongeBob-inspired houses include a pineapple (SpongeBob's house), a moai (Squidward's house), and a rock (Patrick's house), all interacting with the SpongeBob robot. The doors are automated using ultrasonic sensors connected to an ESP32, which activates motors to open them, a mechanism also used in Squidward's house. (SHOWS EACH OF THE ROBOTS Recording)

GRAVAR CADA ROBÔ SENDO MOSTRADO **OK**

Explicar os processos de design utilizados durante o desenvolvimento dos sistemas robóticos, incluindo as escolhas de design eletromecânico, de sensores, de comunicação e de software.

OK Destacar como a equipe superou os desafios em seu processo de design, com foco especial na resolução de problemas e no trabalho em equipe.

PROBLEMA-SOLUÇÃO-FEEDBACK

OK Comunicar as funções dos membros da equipe e as contribuições para os diferentes sistemas (eletromecânicos, de software etc.). Já fala lá em cima, na introdução.

REVISAR

In our presentation, we showcase 8 robots: Bob, Patrick, Squidward, their respective houses—with automated doors using sensors and AI—and an additional robot

featuring dual microcontrollers for pneumatic integration. We prioritized sustainable and optimized design, using PVC for structural strength and 6mm MDF for durability during transport, we reutilized the old houses in the new ones. The houses were precision-cut, with the help of Adobe Illustrator for design. The robots were redesigned with center of mass calculations to enhance stability and equipped with gyroscope, color, and encoder sensors.

COLOCAR FAZER LARISSA FALAR

GRAVAR ROBÔS E CASAS NOVAS TODOS JUNTOS

We believe that a satisfactory result was not achieved with the latest technologies, which was a great challenge for us in the beginning, so we focused on being able to communicate effectively between the different technologies, always seeking the constant evolution of our robots. With this in mind, we used IEEE802.15.1 communication, one of the types of Bluetooth communication, to establish a good connection between the robots and, thus, increase safety. // SHOW ROBOTS WITHOUT CLOTHES AND THE BACKS OF HOUSES (áudio)

Clarity and quality of the presentation

Clareza e qualidade da apresentação.

OK Apresenta uma demonstração bem elaborada. GRÁFICO DE COMPARAÇÃO ARDUINO E ESP

- Comunica eficazmente as capacidades técnicas do robô ao público de forma concisa e clara.

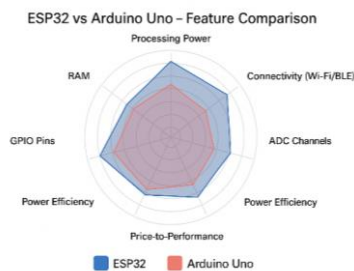
OK Conceitos tecnicamente incomuns, criativos ou ambiciosos no desempenho robótico da equipe são explicados com clareza. REDE NEURAL EXPLICADA DE FORMA CLARA

To demonstrate the monitoring of our data clearly, we made a graph that led us to the analysis before using the correct material for the effectiveness of the

movements, we made a comparison of the Arduino material previously used to activate the houses and the ESP 32, the board we currently use.

GRAVAR E APONTAR

That's one of many advancements in our project, here we have a graphic of a comparison chart of pictoblocks and our AI built for visual recognition, and a PID test chart of our presentation. **(Gravação-fazer um take apontando os objetos da fala+o gráfico)**



The most ambitious, creative and unusual parts of our project is the visual recognition in Patrick's house, we used the Raspberry Pi Zero microcontroller. We turned it into a "minicomputer" by installing an operating system called Raspbian. On it, we programmed a neural network using TensorFlow, OpenCV, and Keras to detect colors and objects. Since the Raspberry Pi Zero is one of the weakest models in its line, we overclocked it — which basically means pushing it beyond its normal limits — so it could run at full power and handle the tasks better **(Gravação)**

CASA DO PATRICK ATIVANDO

Ilustrar tecnologias novas e/ou inovadoras para a competição OnStage

OK Inovação alcançada com evidências claras de testes, pesquisa e desenvolvimento dos quatro recursos escolhidos (Puxa o tema da tabela/gráfico de testes)

OK A inovação pode servir de inspiração para futuros competidores

REVISAR As equipes podem explicar como consideraram práticas sustentáveis durante o desenvolvimento do projeto.

Innovation and Sustainability

We chose the neural network on a Raspberry Pi 0 as an innovation, despite the device's performance limitations. To make the project feasible. As far as our research shows, no one else has implemented a similar application using this board. The exchange of materials during development was essential to achieving the desired result for the neural network, after several tests.

to open the house, we have the EV3 that reads the ultrasonic sensor and if the neural network and the ultrasonic sensor detect the BOB, it activates the motors

VINI GRAVAR URGENTE.

We decided to apply the process of our discovery to a GitHub, where anyone interested can access and study it through the comments provided, you can access it through our Instagram @sesi.scoobyitu, this way we can inspire future competitors for free. **(Gravar tela de computador ou celular)**

Our project includes sustainable practices, focusing on critique the disposal of waste in the oceans. That practice is not only present in the presentation but throughout the entire project. **(Áudio)**

We highlight the importance of the three R's (Reduce, Reuse, and Recycle). To maintain consistency with this theme, we decided, along with the Scooby-Itu team, to use only biodegradable materials in our presentation, such as cardboard and MDF. **(Gravação-fazer um take apontando os objetos da fala)**

This approach allows us to explore the interaction between robotics, sustainability, and environmental awareness.

CONCLUSION:

We are excited about this next step in our project. The support and encouragement we have received has been essential to strengthening our community. By integrating art and technology, we are not only developing robots, but also contributing to building a more innovative and inspiring future. This multidisciplinary approach allows us to explore new possibilities and drive significant advances. **(Gravação com duas pessoas junto)**

GRÁFICO COMPARAÇÃO PICTOBLOCKS E IA