Victor Augusto Kich, B.Sc.

Age: 25

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Webpage
Google Scholar
Research Gate
Github

Summary

Hi, I am Victor Augusto Kich, a believer that self-study is the best way for the modern student learn new things. I enjoy working with robotics, deep reinforcement learning, simulation, and computer vision.

Philosophy: "Education is not something you can finish". Asimov, Isaac.

Education

2023 – Current — **M.Eng. Computer Science**, University of Tsukuba, Japan – *(CGPA:* 2.83/3*).*
MEXT Scholarship. Granted by the International Program for Human-Centered AI Society.

2017 – 2023 — **B.Sc. Computer Engineering**, Federal University of Santa Maria, Brazil – *(CGPA:* 2.42/3*).*

2013 – 2017 — **Computer Technician**, Federal Institute of Education, Science and Technology – IFSUL, Brazil.

Work Experience

2022 – 2023 — **Intern.** Developer at Freedom Electric Vehicles LTDA.
Working on the autonomous navigation of a multi-articulated vehicle used for transport in warehouses.
NAUTEC Automation and Intelligent Robotics Group, Rio Grande do Sul, Brazil.

2021 – 2022 — **Scholarship.** Researcher at Garra, Automation and Robotics Applied Group.
Working on sensorial integration of quadruped robot TITAN VIII for navigation.
UFSM Federal University of Santa Maria, Rio Grande do Sul, Brazil.

2021 — **Supervising.** Computer Graphics Class Supervisor.
UFSM Federal University of Santa Maria, Rio Grande do Sul, Brazil.

2016 – 2017 — **Intern.** Computer Maintainer at Seleri Informática.
Venâncio Aires, Rio Grande do Sul, Brazil.

Research Publications

Journal and Conference Papers

1. Steinmetz, R., **Kich**, **V. A.**, Krever, H., Mazzarolo, J. D. R., Grando, R., Marini, V., Trois, C., & Nieuwenhuizen, A. (2024). From seedling to harvest: The growingsoy dataset for weed detection in soy crops via instance segmentation. *11th IEEE International Conference on Cybernetics and Intelligent Systems (CIS) - Accepted.* https://arxiv.org/abs/2406.00313

2. **Kich**, **V. A.**, Muttaqien, M. A., Toyama, J., Miyoshi, R., Ida, Y., Ohya, A., & Date, H. (2024). Precision and adaptability of yolov5 and yolov8 in dynamic robotic environments. *11th IEEE International Conference on Cybernetics and Intelligent Systems (CIS) - Accepted.* https://arxiv.org/abs/2406.00315

3. **Kich**, **V. A.**, Kolling, A. H., Jesus, J. C. d., Heisler, G. V., Jacobs, H., Bottega, J. A., Kelbouscas, A. L. d. S., Ohya, A., Grando, R. B., Drews-Jr, P. L. J., & Gamarra, D. F. T. (2024). Parallel distributional deep reinforcement learning for mapless navigation of terrestrial mobile robots. *24th International Conference on Control, Automation and Systems (ICCAS) - Accepted.* https://arxiv.org/pdf/2408.05744

4. **Kich**, **V. A.**, Bottega, J. A., Steinmetz, R., Grando, R., Yorozu, A., & Ohya, A. (2024). Advancing behavior generation in mobile robotics through high-fidelity procedural simulations. *33rd IEEE International Conference on Robot and Human Interactive Communication (RO-MAN) - Accepted.* https://arxiv.org/abs/2405.16818

5. **Kich, V. A.**, Bottega, J. A., Steinmetz, R., de Jesus, J. C., Grando, R., Yorozu, A., & Ohya, A. (2024a). Curling the dream: Contrastive representations for world modeling in reinforcement learning. *24th International Conference on Control, Automation and Systems (ICCAS) - Accepted*. https://arxiv.org/pdf/2408.05781

6. **Kich, V. A.**, Bottega, J. A., Steinmetz, R., de Jesus, J. C., Grando, R., Yorozu, A., & Ohya, A. (2024b). Kolmogorov-arnold network for online reinforcement learning. *24th International Conference on Control, Automation and Systems (ICCAS) - Accepted*. https://arxiv.org/pdf/2408.04841

7. Jesus, J. C. D., **Kich, V. A.**, Kolling, A. H., Mateus, M. G., Bottega, J. A., Grando, R. B., Guerra, R. S., & Drews-Jr, P. L. J. (2024). Image-based mapless navigation of a hybrid aerial-underwater vehicle using prioritized deep reinforcement learning. *Journal of Intelligent & Robotic Systems (JIRS) - Accepted*.

8. Grando, R., Steinmetz, R., **Kich, V. A.**, Kolling, A. H., Furik, P. E. M., Jesus, J. C. d., Guterres, B. d. V., Gamarra, D. F. T., Guerra, R. d. S., & Drews-Jr, P. (2024). Improving generalization in aerial and terrestrial mobile robots control through delayed policy learning. *20th IEEE International Conference on Automation Science and Engineering (CASE) - Accepted*. https://arxiv.org/abs/2406.01952

9. Grando, R., Steinmetz, R., Jesus, J. C. d., **Kich, V. A.**, Kolling, A. H., Guerra, R. d. S., & Drews-Jr, P. (2024). Parallel deep reinforcement learning for hybrid mobile robots. Journal of Intelligent & Robotic Systems (JIRS) - Accepted.

10. dos Santos Lima, M., **Kich, V. A.**, Steinmetz, R., & Tello Gamarra, D. F. (2024). Delta robot control by learning systems: Harnessing the power of deep reinforcement learning algorithms. *Journal of Intelligent & Fuzzy Systems (JIFS)*, 1–14. https://content.iospress.com/articles/journal-of-intelligent-and-fuzzy-systems/ifs232795

11. Kolling, A. H., **Kich, V. A.**, de Jesus, J. C., Da Silva, A. C., Grando, R. B., Drews, P. L. J., & Gamarra, D. F. (2023). Parallel distributional prioritized deep reinforcement learning for unmanned aerial vehicles. *2023 Latin American Robotics Symposium (LARS)*, 95–100. https://ieeexplore.ieee.org/abstract/document/10333051

12. **Kich, V. A.** (2023). Aprendizado por reforço profundo distribucional paralelo para navegação sem mapa de robôs móveis terrestres [Undergraduate Thesis, in Portuguese. Title in English: "Parallel Distributional Deep Reinforcement Learning for Mapless Navigation of Terrestrial Mobile Robots"]. *Federal University of Santa Maria Repository*. https://repositorio.ufsm.br/handle/1/28310

13. Grando, R. B., De Jesus, J. C., **Kich, V. A.**, Kolling, A. H., Mateus, M. G., Guerra, R. S., & Drews, P. L. (2023). Docrl: Double critic deep reinforcement learning for mapless navigation of a hybrid aerial underwater vehicle with medium transition. *2023 Latin American Robotics Symposium (LARS)*, 53–58. https://ieeexplore.ieee.org/abstract/document/10333008

14. de Moraes, L. D., **Kich, V. A.**, Kolling, A. H., Bottega, J. A., Grando, R. B., Cukla, A. R., & Gamarra, D. F. T. (2023). Enhanced low-dimensional sensing mapless navigation of terrestrial mobile robots using double deep reinforcement learning techniques. *2023 Latin American Robotics Symposium (LARS)*, 337–342. https://ieeexplore.ieee.org/abstract/document/10333028

15. de Moraes, L. D., **Kich, V. A.**, Kolling, A. H., Bottega, J. A., Steinmetz, R., da Silva, E. C., Grando, R. B., Cukla, A. R., & Gamarra, D. F. T. (2023). Double deep reinforcement learning techniques for low dimensional sensing mapless navigation of terrestrial mobile robots. *Intelligent Systems Design and Applications (ISDA)*. https://link.springer.com/chapter/10.1007/978-3-031-35507-3_16

16. Bottega, J. A., **Kich, V. A.**, Jesus, J. C. d., Steinmetz, R., Kolling, A. H., Grando, R. B., Guerra, R. d. S., & Gamarra, D. F. T. (2023). Jubileo: An immersive simulation framework for social robot design. *Journal of Intelligent & Robotic Systems (JIRS)*, *109*(4), 91. https://link.springer.com/article/10.1007/s10846-023-01991-3

17. Seibt, K. I., **Kich, V. A.**, & Heisler, G. V. (2022). Bibliographic analysis of the capacity and applicability of li-fi networks (D. Tang, J. Zhong, & D. Zhou, Eds.). *Mobile Wireless Middleware, Operating Systems and Applications (MOBILWARE)*, 33–44. https://link.springer.com/chapter/10.1007/978-3-030-98671-1_3

18. Grando, R. B., de Jesus, J. C., **Kich, V. A.**, Kolling, A. H., & Drews-Jr, P. L. J. (2022). Double critic deep reinforcement learning for mapless 3d navigation of unmanned aerial vehicles. *Journal of Intelligent & Robotic Systems (JIRS)*, *104*(2), 1–14. https://link.springer.com/article/10.1007/s10846-021-01568-y

19. Grando, R. B., de Jesus, J. C., **Kich, V. A.**, Kolling, A. H., Pinheiro, P. M., Guerra, R. S., & Drews, P. L. (2022a). Deterministic and stochastic analysis of deep reinforcement learning for low dimensional sensing-based navigation of mobile robots. *Latin American Robotics Symposium (LARS)*, 193–198. https://ieeexplore.ieee.org/abstract/document/9995792

20 Grando, R. B., de Jesus, J. C., **Kich**, **V. A.**, Kolling, A. H., Pinheiro, P. M., Guerra, R. S., & Drews, P. L. (2022b). Mapless navigation of a hybrid aerial underwater vehicle with deep reinforcement learning through environmental generalization. *Latin American Robotics Symposium (LARS)*, 1–6. https://ieeexplore.ieee.org/abstract/document/9995813

21 de Jesus, J. C., **Kich**, **V. A.**, Kolling, A. H., Grando, R. B., Guerra, R. S., & Drews, P. L. (2022). Depth-cuprl: Depth-imaged contrastive unsupervised prioritized representations in reinforcement learning for mapless navigation of unmanned aerial vehicles. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 10579–10586. https://ieeexplore.ieee.org/abstract/document/9982161

22 Bottega, J. A., Steinmetz, R., Kolling, A. H., **Kich**, **V. A.**, De Jesus, J. C., Grando, R. B., & Gamarra, D. F. T. (2022). Virtual reality platform to develop and test applications on human-robot social interaction. *Latin American Robotics Symposium (LARS)*, 1–6. https://ieeexplore.ieee.org/abstract/document/9996025

23 Bottega, J. A., **Kich**, **V. A.**, Kolling, A. H., Dyonisio, J. D., Corçaque, P. L., Guerra, R. d. S., & Gamarra, D. F. (2022). Jubileo: An open-source robot and framework for research in human-robot social interaction. *IEEE-RAS 21st International Conference on Humanoid Robots (Humanoids)*, 149–154. https://ieeexplore.ieee.org/abstract/document/10000224

24 **Kich**, **V. A.**, de Jesus, J. C., Grando, R. B., Kolling, A. H., Heisler, G. V., & da Silva Guerra, R. (2021). Deep reinforcement learning using a low-dimensional observation filter for visual complex video game playing. *Brazilian Symposium on Computer Games and Digital Entertainment (SBGames)*. https://www.sbgames.org/proceedings2021/ComputacaoShort/218372.pdf

25 Grando, R. B., de Jesus, J. C., **Kich**, **V. A.**, Kolling, A. H., Bortoluzzi, N. P., Pinheiro, P. M., Neto, A. A., & Drews, P. L. (2021). Deep reinforcement learning for mapless navigation of a hybrid aerial underwater vehicle with medium transition. *IEEE International Conference on Robotics and Automation (ICRA)*, 1088–1094. https://ieeexplore.ieee.org/abstract/document/9561188

26 de Jesus, J. C., **Kich**, **V. A.**, Kolling, A. H., Grando, R. B., Cuadros, M. A. d. S. L., & Gamarra, D. F. T. (2021). Soft actor-critic for navigation of mobile robots. *Journal of Intelligent & Robotic Systems (JIRS)*, *102*(2), 1–11. https://link.springer.com/article/10.1007/s10846-021-01367-5

27 Richards, D. R., **Kich**, **V. A.**, & da Silva Guerra, R. (2020). Antagonistic torsion spiral springs variable stiffness actuator - atoss vsa. *III Brazilian Humanoid Robot Workshop and IV Brazilian Workshop on Service Robotics, BRAHUR-BRASERO*. https://web.archive.org/web/20200815111131id_/http://www.acso.uneb.br/brahurbrasero2020/uploads/Main/BRAHUR__BRASERO_2020_paper_23.pdf

Papers Under Review

1 Steinmetz, R., Rosa, F., **Kich**, **V. A.**, Bottega, J. A., Grando, R., & Gamarra, D. F. T. (2024). *Encoded representations and world modeling for autonomous terrestrial robot navigation*. Manuscript under review for the Journal Machines.

Team Description Papers

1 Castro, B. S., da Costa, C. B., Werlang, C. D., Richards, D. R., Brum, D. S., Niederauer, G. N., Nascimento, G. H., Maurell, I. P., Jardim, J. P. C. R., Guimaraes, K. H., Jesus, J. C., Avila, L. S., Junior, L. A. C., França, L. F. T., Drews-Jr, P. L. J., Fonseca, R. T., Grando, R. B., Guerra, R. S., & **Kich**, **V. A.** (2021). Butia larc/cbr 2021 robocup@home team description paper. http://sistemaolimpo.org/midias/uploads/3db833dd0eb46cb24dcd203eaa8.pdf
Experience: This event was very significant for me as a great experience. Together with my colleagues, we worked nonstop from home for several days to prepare our algorithms well, trusting in our robot's excellent performance in the competition, and getting our spot in the world competition in Thailand in 2022.

2 Castro, B. S., da Costa, C. B., Werlang, C. D., Richards, D. R., Brum, D. S., Niederauer, G. N., Nascimento, G. H., Maurell, I. P., Jardim, J. P. C. R., Guimaraes, K. H., Jesus, J. C., Avila, L. S., Junior, L. A. C., França, L. F. T., Drews-Jr, P. L. J., Fonseca, R. T., Grando, R. B., Guerra, R. S., & **Kich**, **V. A.** (2020). Butia larc/cbr 2020 robocup@home team description paper. http://sistemaolimpo.org/midias/uploads/72b82c0a024098dbf19de03633f94832.pdf
Experience: Due to the abnormal circumstances caused by the global pandemic, this event happened 100% online. In that atypical year I ended up working solely on the computer vision of our robot, getting first place in the subcategory where I worked, making the team very happy with the result obtained. In this event, with the excitement of our coordinator, we were challenged to get the second place in the year 2021, and if this goal was reached we could participate in the world competition in Thailand in 2022.

3 Castro, B. S., da Costa, C. B., Werlang, C. D., Richards, D. R., Brum, D. S., Santada, E. R., Niederauer, G. N., Nascimento, G. H., Maurell, I. P., Jardim, J. P. C. R., Guimaraes, K. H., Jesus, J. C., Avila, L. S., Junior, L. A. C., França, L. F. T., Drews-Jr, P. L. J., Fonseca, R. T., Grando, R. B., Guerra, R. S., & **Kich, V. A.** (2019). Butia larc/cbr 2019 robocup@home team description paper. http://sistemaolimpo.org/midias/uploads/3ddcb833dd1520eb46cb24dcd203eaa8.pdf
Experience: I remember being very nervous in this competition because there was a very difficult semester at the university. We ended up going 2 weeks before the event to the city of the event, where we worked around 12 hours a day to finish our animatronic face project for the competition. In the end everything went well and we were very happy with the result. Even though we were in third place again, we celebrated sleeping a lot and eating a good pizza.

4 da Costa, C. B., Werlang, C. D., Nesvera, D. A., Richards, D. R., Brum, D. S., Niederauer, G. N., Christmann, G. H. G., Maurell, I. P., Jardim, J. P. C. R., Junior, L. A. C., Tavares, M. M., Santos, M. M., Drews-Jr, P. L. J., Teixeira, R. R., Fonseca, R. T., Cecchin, R. S., Grando, R. B., Guerra, R. S., Ricardo, R. D., **Kich, V. A.** Et al. (2018). Butia larc/cbr 2018 robocup@home team description paper. http://sistemaolimpo.org/midias/uploads/2b7a2f03c044985dd2cf5499911343ca.pdf
Experience: This was the first robotics competition that I participated. In this particular event, I remember working with my colleagues without stopping for 24 hours on the robot near the day of the competition to be able to finalize the last details. For this competition we innovated by being the only robot of the event to have a 3D face instead of a display.

Miscellaneous Experience

Awards

2022 **1th Place at LARC@Home Competition**, Development of service and assistive robot. Latin American Robotics Competition, São Paulo, Brazil.

3th Place at RoboCup@Home Competition, Development of service and assistive robot. International Robotics Competition, Thailand.

2021 **2th Place at LARC@Home Competition**, Development of service and assistive robot. Latin American Robotics Competition, Online.

2020 **3th Place at LARC@Home Competition**, Development of service and assistive robot. Latin American Robotics Competition, Online.

2019 **3th Place at LARC@Home Competition**, Development of service and assistive robot. Latin American Robotics Competition, Rio Grande do Sul, Brazil.

8th Place at Rosi Challenge earning a R$5,000.00 prize, Autonomous Robot Programming Challenge for Industrial Inspections, Technologic Institute VALE, Ouro Preto, Brazil.

2018 **3th Place at LARC@Home Competition**, Development of service and assistive robot. Latin American Robotics Competition, São Paulo, Brazil.

Technical Certifications

2024 **Stochastic Processes: Data Analysis and Computer Simulation**, The course deals with how to simulate and analyze stochastic processes, in particular the dynamics of small particles diffusing in a fluid. KyotoUx online course, Kyoto University, Japan.

2021 **Monozukuri: Making Things**, This course introduces the design and fundamental topics in mechanical engineering. Topics covered include thermodynamics, fluid dynamics, and the dynamics of machinery. Also, shown some insights into Japanese philosophies of design and fabrication. TokioTechX online course, Tokyo Tech University, Japan.

2020 **Microsoft Azure - Introduction to Artificial Intelligence**, National Service to Industrial Learning, SENAI. Online course, Brazil.

Presented Workshops

2022 **Deep Learning:** In this workshop we introduce students to deep learning techniques using neural networks to solve real problems.

Reinforcement Learning: In this workshop we introduce students to the theoretical and psychological concepts of reinforcement learning, as well as a brief simulation implementation of these concepts.

Miscellaneous Experience (continued)

- **Deep Reinforcement Learning:** In this workshop, we introduce students to deep reinforcement learning methods, their subdivisions and a brief simulation implementation combining the concepts of reinforcement learning and deep learning.

  The full content of all workshops can be seen here: https://github.com/victorkich/Workshops.

Scientific Initiation Groups

2023 – Current
- **Roboken.** Intelligent Robot Laboratory.
  Active member. University of Tsukuba.

2019 – Current
- **VersusAI.** Deep reinforcement learning research group.
  Co-founder.

2018 – 2023
- **ButiaBots.** Robotics competition group. Scientific initiation working with Paulo L. J. Drews-Jr, Ph.D.
  Retired member. Federal University of Rio Grande.

2017 – 2023
- **TauraBots.** Research and extension robotics group. Scientific and technological initiation working with Rodrigo da Silva. Guerra, Ph.D, and Daniel Fernando Tello Gamarra, Ph.D.
  Retired member. Federal University of Santa Maria.

Skills

Languages	I am able to talk, write, read and listening in English and Portuguese.
Coding	Python, C++, Java, C#, Arduino, Android, C, and LaTeX.
Systems	Linux and Windows.
Modules	Pytorch, Keras, Torchvision, OpenCV, Matplotlib, Pandas, and Numpy.
Tools	Robot Operating System (ROS and ROS2), GitHub, Unity, Gazebo, and Docker.
Misc.	Academic research, teaching and competition.

Academic References

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