Christian Arzate Cruz

Ph.D. Computer Science

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Research Interests

Human-robot interaction, human-computer interaction, interactive AI, and reinforcement learning.

Professional Experience

Honda Research Institute Japan, Scientist — Japan
Social Robotics Lab — April 2023 – Present

- Developing social robotics applications utilizing adaptive AI techniques to enhance human-robot interaction.

Ritsumeikan University, Assistant Professor — Japan
Reality Media Lab — Apr 2022 – Mar 2023

- Researched and developed human augmentation technologies, improving user capabilities through AI and human-computer interaction (HCI) methods.

The University of Tokyo, Researcher — Japan
Takeo Igarashi Lab — Apr 2019 – Mar 2022

- Designed AI and HCI solutions to reduce the need for human feedback, including reinforcement learning-based agents capable of explaining their decision-making processes.

Hewlett Packard Labs , Research Assistant — USA
Mobile and Immersive Experiences Lab — Jan 2012 – Mar 2013

- Engineered artificial vision-based technologies for Hewlett-Packard, optimizing real-time data visualization on 3D displays to enhance human-machine interaction.

Education

Ph.D. **Tecnologico de Monterrey**, Computer Science — Mexico
Jan 2013 – Dec 2018

- Thesis: HRLB2: A Game AI Architecture For Believable Bots That Unifies the Elements of Flow and Reinforcement Learning.
- Advisor: Jorge Adolfo Ramirez Uresti.

M.Sc. **Tecnologico de Monterrey**, Computer Science — Mexico
Jan 2010 – Dec 2011

- Graduated with honors.
- Thesis: Body Part Detection Using a Low Cost Depth Camera.
- Advisor: Isaac Rudimín Goldber.

B.Sc. **Tecnologico de Monterrey**, Mechatronics Engineering — Mexico
Jan 2004 – May 2009

- Graduated with honors.

Teaching Experience

Ritsumeikan University, Part-Time Faculty Member — Japan
Apr 2023 – Dec 2024

- Lecturer in Human-Computer Interaction – Taught undergraduate students in the international program, delivering lessons in English.

Universidad Mexicana de Innovacion en Negocios, Part-Time Faculty Member — Mexico
Jan 2016 – May 2016

- Taught undergraduate courses on Operating Systems and Computer Architecture.

Awards

JST CREST AIP Challenge 2021

- Recipient of the Young Researcher Grant $(10,000)$ from the Japan Society for the Promotion of Science (JSPS).

Tecnologico de Monterrey Scholarship 2013 – 2018

- Awarded full tuition support for Ph.D. studies in Computer Science.

CONACYT Studies Support 2013 – 2018

- Received full living expenses support for the duration of Ph.D. studies, awarded by the National Council of Science and Technology (CONACYT).

COMECYT Studies Support 2017 – 2018

- Received full living expenses support throughout doctoral studies.

Skills

- **Programming:** Python.
- **Deep learning toolkit:** PyTorch.
- **Languages:** Spanish (native), English (fluent), and Japanese (beginner).

Publications

International Venues

1. **Christian Arzate Cruz**, Edwin C. Montiel-Vázquez, Chikara Maeda, Darryl Lam, and Randy Gomez. "Empathetic Robots Using Empathy Classifiers in HRI Settings" in ACM/IEEE International Conference on Human-Robot Interaction (HRI) LBR, 2025 (accepted).
2. Edwin C. Montiel-Vázquez, **Christian Arzate Cruz**, Jorge Adolfo Ramírez Uresti, and Randy Gomez. "EmpatheticExchanges: Toward Understanding the Cues for Empathy in Dyadic Conversations" in IEEE Access, vol 12, pp. 2024.
3. **Christian Arzate Cruz**, Yotam Sechayk, Takeo Igarashi, and Randy Gomez. "Data Augmentation for 3DMM-based Arousal-Valence Prediction for HRI" in IEEE International Conference on Robot and Human Interactive Communication (Ro-Man), 2024.
4. Daichi Kariyama, **Christian Arzate Cruz**, Miki Matsumuro, Fumihisa Shibata, and Asako Kimura. "Generating Haptic Textures with Vibrotactile Under-clothing Wearables" in Asia-Pacific Workshop on Mixed and Augmented Reality (APMAR), 2023.
5. **Christian Arzate Cruz**, Tatsuya Natsume, Mizuto Ichihara, Fumihisa Shibata and Asako Kimura. "Sequential Eyelid Gestures for User Interfaces in VR" in IEEE Virtual Reality (VR), 2023.
6. Hayato Nozaki, Yuta Kataoka, **Christian Arzate Cruz**, Fumihisa Shibata, and Asako Kimura. "Analysis and Considerations of the Controllability of EMG-based Force Input" in The 25th International Conference on Human-Computer Interaction (HCI International), 2023.
7. **Christian Arzate Cruz** and Takeo Igarashi. "Interactive Reinforcement Learning for Autonomous Behavior Design" in: Li Y., Hilliges O. (eds) Artificial Intelligence for Human Computer Interaction: A Modern Approach. Human–Computer Interaction Series, 2021.
8. **Christian Arzate Cruz** and Takeo Igarashi. "Interactive Explanations: Diagnosis and Repair of Reinforcement Learning Based Agent Behaviors" in IEEE Conference on Games (CoG), 2021.
9. **Christian Arzate Cruz** and Takeo Igarashi. "MarioMix: Creating Aligned Playstyles for Bots with Interactive Reinforcement Learning" in Extended Abstracts of the Annual Symposium on Computer-Human Interaction in Play (CHI Play), 2020.
10. **Christian Arzate Cruz** and Takeo Igarashi. "A Survey on Interactive Reinforcement Learning: Design Principles and Open Challenges" in Proceedings of the 2020 on Designing Interactive Systems Conference (DIS), 2020.

11. Hirotaka Suetake, Tsukasa Fukusato, **Christian Arzate Cruz**, Andy Nealen, and Takeo Igarashi. “Interactive Design Exploration of Game Stages Using Adjustable Synthetic Testers” in Proceedings of the 15th International Conference on the Foundations of Digital Games (FDG), 2020.
12. **Christian Arzate Cruz** and Jorge Adolfo Ramirez Uresti. “HRLB2: A Reinforcement Learning Based Framework for Believable Bots” in Applied Sciences, 2018.
13. **Christian Arzate Cruz** and Jorge Adolfo Ramirez Uresti. “Player-centered game AI from a flow perspective: Towards a better understanding of past trends and future directions” in Entertainment Computing, 2017.
14. **Christian Arzate Cruz** and Jorge Adolfo Ramirez Uresti. “Personalized AI for Groups of Non-PlayerCharacters” in Doctoral Consortium of the Mexican International Conference on Artificial Intelligence (MICAI), 2013.

Domestic Venues

1. Yotam Sechayk, Gabriela Penarska, Isa Randsalu, **Christian Arzate Cruz**, and Takeo Igarashi. “MyStoryKnight: A Character-drawing Driven Storytelling System Using LLM Hallucinations” in Information Processing Society of Japan Symposium (INTERACTION), 2024.
2. 市原瑞士，**Christian Arzate Cruz**，夏目達也，橋口哲志，柴田史久，木村朝子。“VR 空間操作コマンドとしてのアイジェスチャ UI 特性分析 (6)--並列型アイジェスチャ UI のタスク指向分析” in 情報処理学会研究報告，Vol. 2024-HCI-206, No. 2, pp., 2024.
3. 夏目達也，内村裕也，**Christian Arzate Cruz**，柴田史久，木村朝子。“VR 空間操作コマンドとしてのアイジェスチャ UI の特性分析” in 情報処理学会論文誌，Vol. 64, No. 2, pp. 312 - 325, 2023.
4. 林佑一，**Christian Arzate Cruz**，柴田史久，木村朝子。‘‘先端伸縮型仮想物体接触デバイス ExtickTouch の拡張 -平面方向へのブレーキ機構の導入-’’，in 第 27 回日本バーチャルリアリティ学会大会論文集，2022.
5. Hirotaka Suetake, Tsukasa Fukusato, **Christian Arzate Cruz**, Andy Nealen and Takeo Igarashi. ‘‘ゲーム AI によるパラメータ空間解析を活用した難易度調整用インターフェース” in The 27th Workshop on Interactive Systems and Software (WISS), 2019.
6. **Christian Arzate Cruz**, Isaac Rudomin Goldberg, and Jorge Adolfo Ramirez Uresti. “Método Robusto para Detectar Dedos Usando Profundidad” in Congreso Mexicano de Inteligencia Artificial (COMIA), 2013.

Reviewer

PC Member, IEEE Conference on Games (CoG).
Reviewer, The ACM Symposium on User Interface Software and Technology (UIST), IEEE Conference on Games (CoG), IEEE Transactions on Games (ToG), Elsevier Entertainment Computing, and Springer 3D Research.

Academic Activity

Student Supervisor

Undergraduate student, Ritsumeikan University Apr 2022 – Mar 2023
- Worked on generating haptic textures with vibrotactile under-clothing wearables.

Master student, Technical University of Munich Jan 2022 – Feb 2023
- Co-creating game levels with RL-based adaptive agent styles.

Master student, The University of Tokyo Oct 2021 – Feb 2023
- Gameplay search using a large language model.

Intern Supervisor

Doctoral student, Tecnologico de Monterrey Jan 2024 – Sep 2024
- Developed multimodal empathy classifiers to enhance human-robot interaction.

Master’s student, The University of Tokyo Sep 2023 – Mar 2024
- Developed deep learning-based methods for enhancing human understanding in human-robot interaction technologies.