

# Gairaigo Derived from English in Japanese Robotics Terminology

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## ABSTRACT

The objective of this research is to identify and classify Gairaigo derived from English in Japanese robotics terminology. The expected results of this study encompass deepening the comprehension of prospective entrants into the Japanese robotics sector and, more broadly, offering valuable insights to learners of the Japanese language on Gairaigo origination from English in Japanese robotics terminology. This study utilized a qualitative approach. The analysis of the gathered data involved the use of descriptive methods. The selected data was acquired from reputable websites of prominent robot developers from sources like Motoman and RoboticsBiz. The investigation identified 267 robotics terms written in English. After the data was verified by Japanese online dictionaries such as Koujien, Tangorin and Jisho, this study identified 170 Gairaigo derived from English in Japanese robotics terminology. The result of the data analysis classified the Gairaigo derived from English in Japanese robotics terminology into three main categories: robot's concepts, robot's components, and robot's movements.

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## 1. Introduction

*Gairaigo* (外来語) refers to loanwords, or borrowed words, that have been incorporated into the Japanese language from various foreign languages (Sakai & Kawai, 2018). These borrowed words have become an integral part of modern Japanese vocabulary and are used in diverse aspects of daily life. This linguistic phenomenon reflects Japan's historical and cultural interactions with other countries, leading to the assimilation of foreign terms into the language (Ishida & Guo, 2018; Maynard, 2017; Yamaguchi, 2016; Matsumoto, 2015).

*Gairaigo*, derived from English, refers to loanwords in the Japanese language that have been specifically borrowed from the English language. These loanwords play a significant role in modern Japanese vocabulary, especially in fields such as technology, business, pop culture, cuisine, fashion, medical, and scientific fields (Shibamoto-Smith, 2017; Shibatani, 2017; Tano & Takeuchi, 2014; Hasegawa, 2013; Seargeant, 2012). Some examples of *gairaigo* derived from English in Japanese are: “スマートフォン” (*sumaatofon*) for “smartphone,” “ホテル” (*hoteru*) for “hotel,” “ハンバーガー” (*hanbaagaa*) for “hamburger,” “ジーンズ” (*jiinzu*) for “jeans,” “タクシー” (*takushii*) for “taxi,” “オペラ” (*opera*) for “opera,” and “アイスクリーム” (*aisukuriiimu*) for “ice cream” (Gama, 2022; Yano, 2019; Sato & Hori, 2018; Kawakami, 2016; Matsuda, 2012).

*Gairaigo* have a long history in Japan, starting in the 16th century with the Portuguese introducing European loanwords (Matsumoto, 2012). However, the most significant surge occurred during the Meiji era (1868-1912), when Japan embraced Western technology and culture (Matsuda, 2012; Kindaichi, 2009). To modernize and integrate with the global economy, Japan borrowed words from various languages, especially English, for new concepts, technologies, and cultural imports (Miyake & Nakayama, 2015; Sugiura, 2014; Iwasaki, 2013). English loanwords have profoundly impacted Japanese (Gama, 2023; Matsumoto, 2012). With the rise of Western science and technology, English became the language of innovation, leading to the adoption of many scientific, technical, and industrial terms. Words like “テレビ” (*terebi*), which means “television,” “コンピューター” (*konpyuutaa*), which means “computer,” and “アップ” (*appu*), which means “up” or “upload” were among the many *gairaigo* terms that took root in Japanese vocabulary (Miyake, 2016; Kinsui, 2010).

The rising robotics industry in Japan signifies the nation's enduring commitment to technological innovation and automation. Japan has a long history of pioneering developments in the fields of robotics, particularly industrial automation. Its leadership is exemplified by companies like Fanuc, Yasakawa Electric, and Kawasaki Heavy Industries, which produce world-class industrial robots widely utilized in manufacturing. Japan's

dedication extends to humanoid robots, exemplified by SoftBank’s Pepper and Honda’s ASIMO, as well as the growing field of medical and healthcare robotics, essential for addressing the needs of an aging population. The country is also at the forefront of agricultural robotics, improving efficiency in farming. Government support, global collaboration, and a focus on collaborative robots (cobots) are key factors driving the industry’s growth. Japan’s influence extends to autonomous vehicles and drones, further solidifying its position as a global leader in robotics innovation (Hosoda & Takanishi, 2018; Iida, 2018; Kazuo & Takaduma, 2017; Asada, 2015).

The use of *gairaigo* in Japanese robotics terminology is a clear demonstration of Japan’s deep integration into the global robotics industry. Robotics, being a global field, relies heavily on English as the predominant language for technological innovation, research, and communication. To ensure precision, clarity, and efficient international collaboration, Japanese researchers and engineers have incorporated a multitude of English terms directly into their technical lexicon. This practice allows for unambiguous discussions about complex robotic systems, components, and concepts, as English terminology is widely recognized and understood by the global robotics community. Popular English-derived words, such as “ロボット” (*robotto*) for “robot” and “センサー” (*sensaa*) for “sensor,” have seamlessly integrated into Japanese robotics discussions, reflecting Japan’s position as a key player in the field and its dedication to global collaboration (Komiya & Arimoto, 2018; Matsumoto, 2015).

In Japan’s burgeoning field of robotics, many foreign workers must acquire a solid grasp of *gairaigo* to excel in their roles. English-derived terminology is widely integrated into the industry, ranging from technical jargon to research and development documentation. A comprehensive understanding of *gairaigo* is imperative for foreign workers in this sector, as it ensures effective communication with Japanese colleagues and global partners, streamlines the interpretation of technical manuals, and supports their engagement in global robotics projects. With Japan being a hub for international collaboration in robotics, proficiency in *gairaigo* is a fundamental requirement for foreign workers to navigate the cross-cultural work environment and contribute effectively to research, development, and manufacturing processes (Ogino, 2018; Rapp, 2014).

The objective of this research is to identify and classify *gairaigo* with roots in English, particularly within the domain of Japanese robotics terminology. The expected results of this study encompass deepening the comprehension of prospective entrants into the Japanese robotics sector and, more broadly, offering valuable insights to learners of the Japanese language on *gairaigo* originating from English in the context of robotics terminology. Additionally, for researchers, the aim is to provide valuable insights that can contribute to the development of their future endeavors.

## 2. Methods

This study utilized a qualitative approach to identify and classify *gairaigo* with roots in English, particularly within the domain of Japanese robotics terminology. The analysis of the gathered data involved the use of descriptive methods. The selected data was acquired from reputable websites of prominent robot developers from sources like Motoman and RoboticsBiz. The criteria for selection were based on the credibility of these websites in the field of robot development. The investigation identified 267 robotics terms written in English. Subsequently, after the data was verified by Japanese online dictionaries such as Koujien, Tangorin and Jisho, this study identified 170 *gairaigo* derived from English in Japanese robotics terminology.



Chart 1. The process of data selection

The research procedures for this study involve five steps. (1) defining research questions: focused on identifying and classifying *gairaigo* with roots in English, particularly within the domain of Japanese robotics terminology. (2) identifying relevant keywords: such as “*gairaigo*,” “loanwords,” “Japanese,” “robotics,” and “terminology.” (3) conducting a search on various robotics developer websites, such as Motoman and Roboticsbiz. (4) reviewing and selecting sources: relevant sources will be reviewed and selected based on their relevance and credibility. (5) analyzing and interpreting the finding using the descriptive method.

## 3. Results and Discussion

*Gairaigo*, derived from English, plays a significant role in Japanese robotics terminology, reflecting the

international nature of the field and the influence of English as a dominant language in science and technology. After conducting the research, the result of this investigation classified the *gairaigo* derived from English in Japanese robotics terminology into three main categories: concepts, components, and movements, each serving a distinct purpose in the field of robotics, as presented in chart 2.

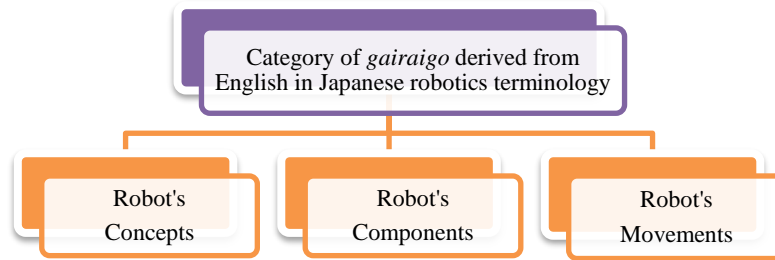


Chart 2. Category of *gairaigo* derived from English in Japanese robotics terminology

In the intricate landscape of Japanese robotics terminology, the infusion of *gairaigo*, or loanwords derived from English, plays a pivotal role in articulating and defining essential aspects of robotic science and technology. This linguistic fusion is systematically organized into three distinct categories, each serving as a gateway to a nuanced understanding of the multifaceted world of robotics. The classification is a testament to structuring of *gairaigo*, with a keen focus on encapsulating the breadth of terminology associated with robots. These three fundamental categories are delineated as “robot’s concepts,” “robot’s components,” and “robot’s movements,” and they serve as comprehensive frameworks designed to unravel the theoretical, physical, and dynamic dimensions of robotics terminology in the Japanese context. This systematic categorization underscores the precision and sophistication with which the Japanese language incorporates and adapts technical vocabulary from English, ultimately contributing to the global discourse on advancements in robotics.

### 3.1 Robot’s concepts

The classification of “robot’s concepts” within the realm of *gairaigo* in Japanese robotics signifies a dedicated repository of terms intimately connected to the foundational principles that underpin the field. This specific category is envisioned as a repository for *gairaigo* expressions that encapsulate fundamental ideas, principles, and theories crucial to shaping the theoretical landscape of robotics.

Here are some examples of *gairaigo* derived from English in Japanese robotics, specifically related to “robot’s concepts”. These examples showcase how *gairaigo* terms in Japanese robotics terminology related to “robot’s concept” encompass a range of fundamental ideas, principles, and theories that contribute to shaping the overall understanding of what a robot is and how it functions.

Table 1. *Gairaigo* in robot’s concept

Written in Katakana	Written in Romaji	Written in English
ヒューマノイド	<i>Hyuumanoido</i>	Humanoid
バイオニクス	<i>Baionikkusu</i>	Bionics
オートノミー	<i>Ootononii</i>	Autonomy
デジタルツイン	<i>Dijitaru tsuin</i>	Digital Twin

In this context, one can anticipate encountering *gairaigo* terms that not only define the essence of what a robot is but also elucidate the overarching theories that govern its existence and functionality. This could involve terminology delving into the philosophical underpinnings of robotics, such as the nature of artificial intelligence, autonomy, and the ethical considerations that accompany the creation and deployment of robotic systems.

Moreover, *gairaigo* terms nested within the “robot’s concepts” category may extend to encompass innovative theoretical frameworks and cutting-edge paradigms emerging in the ever-evolving field of robotics. By examining the lexicon within this category, one gains insights into the intellectual foundations that shape the discourse among researchers, scholars, and practitioners, fostering a shared understanding of the conceptual bedrock upon which advancements in robotics are built.

In essence, the inclusion of *gairaigo* within the “robot’s concepts” category not only serves as a linguistic bridge between Japanese and English terminology but also acts as a vessel carrying the profound ideas and principles that define the very essence of robotics in the Japanese context. This categorization fosters clarity and

precision in communication, ensuring that the conceptual framework of robotics is conveyed with depth and accuracy within the Japanese robotics community.

### 3.2 Robot's components

Within the organizational structure of *gairaigo* in Japanese robotics, the category labeled “robot’s components” emerges as a specialized repository housing a lexicon intricately woven with terms that articulate the tangible building blocks of robotics entities. This categorization is anticipated to encapsulate *gairaigo* expressions specifically dedicated to the myriad physical parts and elements that collectively constitute the anatomy of a robot.

Here are some examples of *gairaigo* derived from English in Japanese robotics, specifically related to “robot’s components”. These examples provide further insight into how *gairaigo* terms in Japanese robotics terminology related to “robot’s components” encompass a diverse range of crucial elements that contribute to the functionality and operation of robotic systems.

Table 2. *Gairaigo* in robot’s components

Written in <i>Katakana</i>	Written in <i>Romaji</i>	Written in English
ヒンジ	<i>Hinji</i>	Hinge
コンジット	<i>Konjitto</i>	Conduit
サーボバルブ	<i>Saabobarubu</i>	Serve valve
アクチュエータ	<i>Akuchueeta</i>	Actuator

Delving into this category, one can expect to encounter *gairaigo* terms that precisely define and denote the diverse hardware components utilized in robotic systems. From sensors and actuators to processors and circuitry, this linguistic realm reflects a comprehensive exploration of the mechanical, electronic, and computational constituents that converge to give rise to the functionality and form of a robot.

Moreover, the inclusion of *gairaigo* within the “robot’s components” category serves as a linguistic conduit, seamlessly bridging the gap between English-origin terms and their Japanese counterparts. This cross-cultural integration not only facilitates a shared understanding among professionals in the field but also contributes to the global discourse on robotic technologies, reflecting the collaborative and interconnected nature of advancements in robotics.

By navigating the lexicon within this category, one gains insight not only into the specific vocabulary pertaining to the physical composition of robots but also into the technological innovations and advancements driving the evolution of robotic hardware. In essence, the intentional classification of *gairaigo* under “robot’s components” serves as a testament to the precision and meticulousness with which the Japanese robotics community approaches the articulation of the tangible and technical aspects inherent in the construction of robotic entities.

### 3.3 Robot's movements

Within the structured taxonomy of *gairaigo* in Japanese robotics, the designated category known as “robot’s movements” emerges as a linguistic repository tailored to house a spectrum of terms intricately linked to the dynamic actions and motions exhibited by robotic entities. This particular classification is likely to encompass a lexicon that not only captures the nuances of robotic movements but also articulates the various behaviors and functionalities inherent in robotic systems.

Here are some examples of *gairaigo* derived from English in Japanese robotics, specifically related to “robot’s movements”. These examples showcase how *Gairaigo* terms in Japanese robotics terminology related to “robot's movements” encompass a range of concepts and techniques crucial for understanding and implementing diverse robotic motions.

Table 3. *Gairaigo* in robot's movements

Written in <i>Katakana</i>	Written in <i>Romaji</i>	Written in English
トラジェクトリ	<i>Torajekutori</i>	Trajectory
グリップ	<i>Gurippu</i>	Grip
ホイールモーション	<i>Hoiru Mooshon</i>	Wheel Motion
ステッピングモーター	<i>Suteppingu Mootaa</i>	Stepping Motor

Upon exploration of this category, one anticipates encountering *gairaigo* terms crafted to articulate the specific actions executed by robots, ranging from basic locomotion to more complex maneuvers. This linguistic realm may delve into expressions that delineate the intricacies of robotic movements, encompassing elements such as precision, speed, and adaptability, reflecting the diverse capabilities of modern robotic systems.

Furthermore, the inclusion of *gairaigo* within the “robot's movements” category serves as a linguistic bridge, facilitating a seamless exchange of terminology between Japanese and English-speaking communities in the field. This cross-cultural integration not only enhances communication within the Japanese robotics community but also contributes to the global discourse on the capabilities and advancements in robotic technologies.

By navigating the lexicon within this category, one gains insight into not only the technical vocabulary associated with robotic movements but also the innovative functionalities that characterize cutting-edge robotic systems. In essence, the intentional classification of *gairaigo* under “robot's movements” underscores the precision and foresight with which the Japanese robotics community delineates and communicates the intricate and evolving landscape of robotic actions and behaviors.

Understanding these loanwords in the context of robotics terminology can be essential for professionals, researchers, and enthusiasts in the field, as it allows for effective communication and collaboration in the global robotics community.

#### 4. Conclusions

In conclusion, the exploration of *gairaigo*, borrowed words incorporated into the Japanese language specifically derived from English, unveils its profound impact on the linguistic landscape of modern Japan. These loanwords have become integral to various aspects of daily life, reflecting Japan's historical and cultural interactions with the global community.

The focus on robotics in Japan exemplified the nation's commitment to technological innovation. The robotics industry, encompassing industrial automation, humanoid robots, medical robotics, and more, positions Japan as a global leader. The incorporation of *gairaigo* into Japanese robotics terminology further demonstrates the country's deep integration into the global robotics community.

For foreign workers in Japan's robotics sector, proficiency in *gairaigo* is crucial. English-derived terminology permeates the industry, from technical jargon to research documentation, emphasizing the necessity for effective communication with Japanese colleagues and global partners. The cross-cultural work environment necessitates foreign workers' understanding of *gairaigo* to contribute effectively to research, development, and manufacturing processes.

The research's objective, to identify and classify *gairaigo* with roots in English within Japanese robotics terminology, has led to insightful results. The classification into “robot's concepts,” “robot's components,” and “robot's movements” provides a comprehensive framework for understanding the theoretical, physical, and dynamic dimensions of robotics terminology. This intentional categorization showcases the precision with which the Japanese language adopts technical vocabulary from English, contributing significantly to the global discourse on robotics advancements.

In essence, the study of *gairaigo* in Japanese robotics terminology is not merely linguistic but reflects Japan's broader commitment to technological innovation, global collaboration, and the cultivation of a cross-cultural environment in the ever-evolving field of robotics. Understanding these loanwords is essential for professionals, researchers, and enthusiasts, facilitating effective communication and collaboration in the global robotics community.

For future research, it is recommended to explore the cross-cultural impact on the usage and adaptation of *gairaigo* in Japanese robotics terminology. This research could shed light on the socio-linguistic aspects of language adoption in a globalized context.

## References

- Asada, H. (2015). *Advances in robot kinematics: Mechanisms and motion*. Berlin: Springer.
- Gama, F. I. (2023). Gairaigo derived from English in Japanese Advertising: benefits, drawbacks, and global implications. *JapanEdu*, 8(1), 1-9.
- Gama, F. I. (2022). *Nihongo no doshi (Verba bahasa Jepang)*. Yogyakarta: Penerbit Deepublish.
- Hasegawa, Y. (2013). *Japanese language education in the global age: Cultural identity and language diversity*. Berlin: Springer Science & Business Media.
- Hosoda, K., & Takanishi, A. (2018). *Robotics: A reference guide to the new technology*. Berlin: Springer.
- Iida, F. (2018). Robotics in Japan: A nascent industry's grand challenge. *Science*, 359, 1457-1469.
- Ishida, T., & Guo, J. (2018). Gairaigo and wasei eigo as mediators in the relationship between motivation and second language proficiency in the Japanese EFL context. *System*, 75, 68-79.
- Iwasaki, S. (2013). Globalization, culture, and the limits of Japanization: The case of English loanwords in Japanese advertising. *Journal of Linguistic Anthropology*, 23(2), 56-73.
- Kawakami, M. (2016). *Gairaigo no "Japanization" to Nihongo no henka (The "Japanization" of loanwords and the change of Japanese language)*. Tokyo: Kurosio Publishers.
- Kindaichi, K. (2009). The loanword system in Japanese. In M. Matsumoto & J. Y. Choi (Eds.), *Japanese language and soft power in Asia* (pp. 51-71). Berlin: Springer.
- Kazuo, S., & Takaduma, K. (2017). *The age of em: work, love, and life when robots rule the earth*. Oxford: Oxford University Press.
- Kinsui, S. (2010). The uniqueness of Japanese: Loanwords and levels of language. *Japan Forum*, 22(3), 369-384.
- Komiya, K., & Arimoto, S. (2018). *Robotics in Japan: From research to applications*. Berlin: Springer.
- Matsuda, M. (2012). English loanwords in Japanese. In A. De Houwer & A. Wilton (Eds.), *English in Japan in the era of globalization* (pp. 47-64). Bristol: Multilingual Matters.
- Matsumoto, K. (2015). *Borrowed words: A history of loanwords in Japanese*. London: Routledge.
- Matsumoto, K. (2012). Portuguese loanwords in Japanese. In P. O'Neill & S. Uchida (Eds.), *Handbook of Japanese applied linguistics* (pp. 217-233). Berlin: De Gruyter Mouton.
- Maynard, S. K. (2017). *Gairaigo to wasei eigo: A linguistic analysis of borrowed and made-up foreign words in Japanese*. London: Palgrave Macmillan.
- Miyake, M. (2016). *The Meiji government's policy on borrowed words and the development of Japanese vocabulary*. Tokyo: Waseda University Repository.
- Miyake, K., & Nakayama, R. (2015). Gairaigo and Japan: Globalization and Japanese culture. In J. S. Kim & J. D. Lo Bianco (Eds.), *Language, education and society in a changing world* (pp. 277-292). London: Routledge.
- Ogino, A. (2018). From English to Gairaigo to English: Localization and language contact in the information age. *International journal of Japanese sociology*, 27(1), 57-73.
- Rapp, A. (2014). *Language culture in Japan: Gairaigo and fashions in fashion*. London: Routledge.
- Sakai, H., & Kawai, M. (2018). *Language change and variation in Japan: The challenge of an increasingly diverse society*. London: Routledge.
- Sato, M., & Hori, M. (2018). *Vocabulary in language teaching*. Berlin: Springer.
- Seargenat, P. (2011). *The idea of English in Japan: Ideology and the evolution of a global language*. Bristol: Multilingual Matters.
- Shibamoto-Smith, J. S. (2017). *Multilingualism and the periphery: English in Japan and Korea*. London: Routledge.
- Shibatani, M. (2017). *Borrowing: loanwords in the speech community and in the grammar*. Oxford: Oxford University Press.
- Sugiura, M. (2014). English loanwords in Japanese: Factors contributing to their success. *International Journal of Language and Linguistics*, 1(2), 28-36.
- Tano, Y., & Takeuchi, M. (2014). *A dictionary of loanwords in Japanese*. Clarendon: Tuttle Publishing.
- Yamaguchi, Y. (2016). *The acquisition of loanwords in Japanese*. Amsterdam: John Benjamins Publishing.
- Yano, H. (2019). The role of Gairaigo in the formation of a new Japanese identity. *Journal of Japanese Studies*, 45(1), 105-132.