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# NAO<sup>6</sup>

## the versatile humanoid robot



### THE PIONEER

**58cm** in height, NAO is the first humanoid robot created by SoftBank Robotics. He has been gradually improving since the beginning of his adventure in **2006**. Currently in his **6th version (NAO<sup>6</sup>)**, more than **13,000** NAO are being used in over 70 countries around the world.

NAO is an interactive and customisable robot. He has become a benchmark in the world of research and education, as well as in healthcare (in retirement homes or hospitals), retail and tourism. Today, he serves as a research platform, a tool for making teaching and learning fun, a platform for developing applications, a tool to ease interaction with children with autism, or an innovative interface for providing customers with information.

His humanoid form enables him to adapt to his environment and to find his way using sonars and sensors on his head, hands and feet. Equipped with microphones and loud speakers, he can hear and speak, enabling him to interact naturally with his interlocutors.

Thanks to Choregraphe software and our NAOqi operating system, it is very easy to develop applications and solutions to personalise NAO and apply his skills in the service involving multiple tasks.

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## NAO<sup>6</sup>, A NEW AND MORE EFFICIENT VERSION

1. **POWER:** thanks to a more powerful processor and a larger memory, NAO<sup>6</sup> puts his new potential at the service of his many hardware and software capabilities. The boot-up time, as well as the system upgrades in particular have become quicker.
2. **VISION:** new cameras give NAO<sup>6</sup> improved capabilities for detecting shapes and faces, which enable him to identify an object or recognise his interlocutors more easily. In addition, the cameras now support the dual stream.
3. **AUDIO:** new omnidirectional microphones have dramatically improved the listening and understanding capabilities of NAO<sup>6</sup>. Dialogue has become enriched and more interactive as a result. NAO<sup>6</sup> can listen and understand in all kinds of situation and can speak clearly in more than 20 languages.
4. **MOVEMENTS:** NAO<sup>6</sup> can move around more easily thanks to the new motors which give increased resistance to strain and movement.
5. **ROBUSTNESS:** many mechanical improvements, especially in the fingers of NAO<sup>6</sup>, have made the robot more reliable and durable.
6. **CONNECTIVITY:** NAO<sup>6</sup> is more connected than ever with a faster and more efficient Wi-Fi connection and the addition of Bluetooth.

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## NAO IN EDUCATION AND RESEARCH

### New Ally for Teachers

#### From Primary to University Level

Ever since his debut, **NAO has won over teachers from primary schools to university.**

As a new learning tool, he can help teachers to **capture students' attention in a fun educational approach** and become a real **platform for learning to program** for college students.

Learning to count or write can be made more fun with NAO. Creating a dance routine or guiding NAO to catch objects makes learning codes more challenging, attractive and practical.

Coupled with Choregraphe, NAO offers tremendous opportunities for teaching programming. **Choregraphe is an easy-to-use graphical interface that follows a progressive learning curve for teaching programming to students.**

NAO is also a useful interactive platform to **allow new generations of scientists and technical experts to deepen their knowledge on topics related to robotics.** It arouses students' interest and motivation for team project work, problem solving or experimental approach.

#### In Special Education

Adorable and endearing, NAO **supports the development of children in special education classes.** He respects the rhythm of each child and knows how to be patient and attentive in order to maximise learning. NAO acts not only as a "friend" to children but **proves himself to be a real assistant for teachers who can easily program him to meet the specific needs of some children.**

Today, NAO has a pedagogical role as an educational tool. This approach started with specialised schools, especially to help children with autistic disorders. This was the birth of the ASK NAO project.

ASK NAO represents all the solutions designed specifically to support conventional and special education. This initiative encapsulates NAO, as well as some applications and a dedicated interface.

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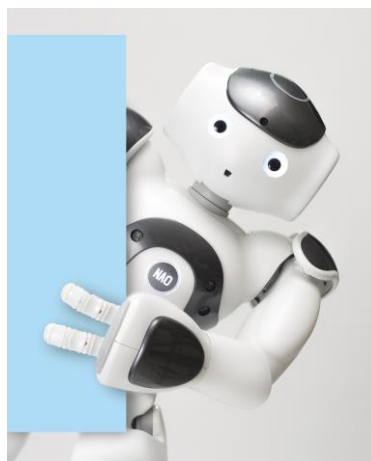
Interacting with a screen can be beneficial. NAO allows you to go further, giving children the opportunity to interact with a real 3D entity complemented by visual, tactile and verbal interaction. With NAO, children cannot only learn, but also talk, sing, dance and walk with him or even do physical exercises together. Research has shown that this enriched interaction helps children to feel comfortable and encourages them to socialise.

Moreover, the design of NAO helps his adoption by children because he has no facial expression or emotions. NAO can also repeat a word or phrase multiple times in the same tone without ever judging the child or changing his mood. He encourages and congratulates, allowing the child to progress with enthusiasm. Finally, it is possible to create customised profiles on the NAO interface, allowing parents/teachers/educators/therapists to monitor the progress of each child with the recommended exercises.

### **For Research:**

NAO assists researchers looking for an advanced robotic platform to carry out their work.

NAO is a powerful platform for conducting in situ work, be it around man-machine interaction, navigation, geolocation or motion and displacement algorithms.



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## NAO FOR BUSINESSES

### A Humanoid Robot with Multiple Applications

The robotics service market is booming and NAO is increasingly integrating into the world of businesses to welcome and inform innovatively in public spaces.

**Offering a new engaging experience, NAO welcomes visitors in a unique and proactive way and guides them with their initial requests.** He represents an ideal solution to relieve employees of simple and repetitive tasks and allow them to focus on tasks with higher added value.

NAO is **fully programmable and customisable**. It is therefore possible to create application solutions which enable him to perform tasks in different areas based on all of his capabilities, including dialogue and motion.

**Many businesses (hotels, shops, banks, airports, etc.) have already adopted NAO as a solution for reception, information, recommendation, or appointment and queue management.**



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## AN ECOSYSTEM OF PARTNERS AT YOUR SERVICE

SoftBank Robotics Europe has established a network of over **70 European certified Partners** to support its customers in the development of application solutions for their robots including NAO.

Each of our partners has expertise **in different sectors** allowing the end customer to customise their own application according to their needs, **for companies (retail, tourism, healthcare, etc.) as well as schools or universities.**

## NAO, FOOTBALL CHAMPION FOR 10 YEARS

NAO has been distinguishing himself every year **since 2007 on the football pitches of the RoboCup.**

NAO has become the star of the "RoboCupSoccer" where **robots perform in perfect autonomy during games, without computer control.** Participants come face to face by playing a game of football with their robots. The inclusion of football as a key theme of the event bring together both experts and the uninitiated to robotics in general. The ultimate goal of the event is to form a robotic football team capable of challenging the world champion "human" football team by 2050.

In the "Standard Platform" league of RoboCupSoccer, **all teams compete using the same robot, NAO.**

Operating in complete autonomy during a match, each NAO takes his own initiatives to advance in the game. But it is above all the communication between the 5 robots that enables the teams to score goals and win the match.

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## NAO<sup>6</sup> TECHNICAL FEATURES

- 58cm tall and weighing 5.6kg
- 25 degrees of freedom
- 7 tactile sensors distributed on the head, hands and feet, sonars and an inertial unit to perceive his environment and to navigate spatially.
- 2 2D cameras
- 4 omnidirectional microphones
- 2 loud speakers
- 20 languages recognised and spoken
- Wi-Fi and Bluetooth connectivity
- Autonomy of about 90 minutes

### **About SoftBank Robotics Europe**

Leader in humanoid robotics, SoftBank Robotics regroups more than 500 employees working in Paris, Tokyo, San Francisco, Boston and Shanghai. More than 25 000 SoftBank Robotics robots, NAO and Pepper, are used today in more than 70 countries worldwide, in various fields, such as retail, tourism, healthcare or education.

For more information: [www.softbankrobotics.com/emea](http://www.softbankrobotics.com/emea)

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