



Hol'Autisme

PRESS RELEASE

2019-2020 EDITION

| PROJECT

Research Development Innovation

AUGMENTED REALITY

SIMULATION

DIAGNOSTIC

3D IMAGING

DATA ANALYSIS

EMBEDDED SOFTWARE

CONNECTED OBJECTS

A close-up photograph of a person's face, focusing on the eye and nose. The image is heavily overlaid with a teal or cyan color, giving it a monochromatic, ethereal feel. The person's hair is light-colored and appears to be blowing in the wind. The text 'BACKGROUND' is written in white, uppercase letters in the top left corner, preceded by a vertical bar.

| BACKGROUND

We want to offer an
alternative to the experiment
under practical conditions
of use, too unsafe for young
people with autism.

AUTISM: A SOCIAL HANDICAP

Autism is a severe and early development disorder that affects **1% to 2% of the world's population**, or between 75 million and 150 million people. In France, 160,000 children and adolescents are affected by autism spectrum disorders, with more than 8,000 births per year.

The main features of autism are: deficiency in the establishment of social relationships, restriction of interests, impaired verbal and nonverbal communication.

In order to improve the social skills of children with autism and help them to socialize, the key issue is their support by medical and educational staff.

Several learning methods exist (PECS, ABA, TEACCH...), tools such as games, videos, visual aids, puppets, context, imitation, are used. However, learning in real conditions is difficult.



OUR SOLUTION

Our goal is to foster, in a controlled and secure environment, **the acquisition of social codes, autonomy, immersion in public places.**

We develop, **in close partnership with researchers, educators and caregivers,** a diverse range of applications displaying varied social environments and scenarios.

| PROJECT

A CONTROL INTERFACE


Educators can intervene **during the experiment via the interface** (tablet, computer and smartphone) to pause or **modify elements of the environment**.

It will be possible to **visualize the environment in real time via a screen** in 1st or 3rd person view.

EXAMPLES OF APPLICATIONS

- Go to the park
- Take part in a birthday party
- Buy bread at the bakery
- Cross a pedestrian crossing
- Speak in class
- Go to the supermarket
- Strike up a conversation
- Take care of a pet
- Receive a medical procedure
- Improve motor skills





«We believe that skills learnt with mixed reality will be easier to transfer into the real world.»

OBJECTIVES

Improve the social, family, school and pre-vocational inclusion of young people with autism.

Improve the knowledge of social and cognitive mechanisms by using gaming principles

MONITORING TOOLS

The interface will present statistics **to measure children's progress and evaluate their behavior** during learning. Thanks to the embedded sensors, we will analyze various data (head tracker, movements in the space, speed of reaction, ECG, quantity of sweat).

To collect, visualize and interpret the data, we work with specialists in diagnostics, embedded softwares and statistics.

| SECTORS



HEALTH

We would like to provide our solution to hospitals, specialty centers and institutions that host children with autism spectrum disorders, in Europe, the United States and Canada.

EDUCATION

The French education system suffers from a significant lack of care for children with autism. Only 20% to 30% attend «classical» schooling. We want to provide an answer to this problem, and to encourage the school enrolment of children with autism.



EMPLOYMENT

Our project will generate jobs in the health, education and training sectors. In the long term, our solution may benefit adults with ASD (example of application: «prepare a job interview»).



RESEARCH

Thanks to HoloLens and its embedded sensors, we will collect data that will improve understanding of the cognitive and social mechanisms involved in autism.



A man with a beard is wearing HoloLens mixed reality glasses. The image has a blue overlay. The word 'RESOURCES' is written in white capital letters, preceded by a vertical bar.

| RESOURCES

We are currently working with HoloLens mixed reality glasses. HoloLens are light, autonomous and wireless. With mixed reality, the link is maintained with reality (unlike the immersive virtual reality) while allowing interaction with holograms (this possibility remains limited with augmented reality).

| COLLABORATORS

GUILLAUME DUMAS - INSTITUT PASTEUR

RESEARCHER

Guillaume Dumas is a researcher in social neuroscience at the Institut Pasteur, in the department «Human Genetics and Cognitive Functions». His work focuses on the synchronization of cerebral signals. At the Robert-Debré Hospital, he studies disorders of social interaction involved in autism.

NANCY'S CHRU

HOSPITAL

The regional hospital center of Nancy University is comprised of the urban hospitals of Nancy, and all hospitals from Brabois to Vandoeuvre-Lès-Nancy.

With more than 40 medical and surgical specialities, the CHRU welcomes about 700 000 patients every year. The CHRU will play a central role in Hol'Autisme by planning and managing clinical studies.

MEDICAL EDUCATIONAL INSTITUTE COGNACQ-JAY

MEI

Cognacq-Jay's MEI (Paris) welcomes 2 dozens teenagers, from 12 to 20 years old, with ASD (Autistic Spectrum Disorders), with or without mental disabilities.

The project team takes care of the teenagers while supporting them in their desire to learn, communicate and gain in autonomy. The establishment is volunteering to test Hol'Autisme and define the optimal conditions for its use.



MEDICAL AND EDUCATIONAL INSTITUTE SAINT-JACQUES HOSPITAL (MOSELLE)

MEI

The Hospital operates in the territory of Moselle East and Moselle South which represents a population of 500 000 inhabitants. The establishment was selected by the ARS as part of the labeling of an autistic unit of 8 children and as an outsourced competence center with an inclusion coordinator for children with autism (6-18 years old). Educators and caregivers of the hospital intervene to write the specifications, test the device and conduct the experimentation.

MEDICAL AND EDUCATIONAL INSTITUTE OF GUISE (FORBACH)

MEI

Guise's MEI is a center that welcomes young people with ASD aged 5 to 20. Their main services are the therapeutical and educational accompaniment of the children and teenagers. Guise's MEI offers to help with the clinical investigations, in collaboration with Dieuze's MEI.

MIXED REALITY MICROSOFT PARTNER

In April 2018, Actimage became Microsoft partner thanks to its expertise in mixed reality. Microsoft is ready to offer a technological and technical support to HoloLens projects. Hol'Autisme will also benefit from a larger coverage.

Microsoft
Partner | **Mixed**
Reality

Actimage is an SME created in 1995, located in Europe and the United States, specialized in digital transformation.

We have acquired know-how in the conduct of Research, Development and Innovation projects (RDI), particularly in the areas of **health** and **home automation**.

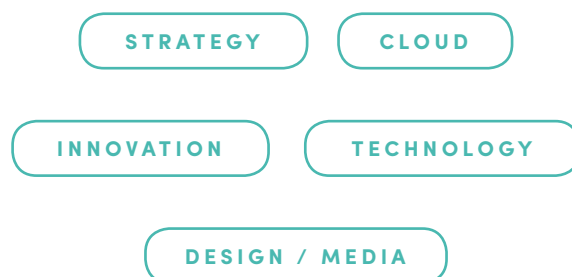
We also have expertise in mixed reality, via our **Hololize division**.

PROJECT LEADER

Established in France, Germany, Switzerland, BeneLux, the United Kingdom and the United States, **Actimage employs 180 people, including 10 in R&D with a turnover of 16 million euros (2017).**

SPECIALIST

in the digital transformation, around five pillars:



EXPERT

in the development of **mixed reality** applications via the **HOLOLIZE division**, attached to the Actimage LABS department.

OUR INNOVATIVE PRODUCTS



Mixed reality applications

SAFRAN LANDING GEAR VISUALISER

Application in mixed reality visualization of landing gear (virtual models with gesture and voice recognition) to facilitate the work of Safran Landing Systems' engineers.

CAR CONFIGURATOR

Application to configure your car as an interactive model.

HOLOPHOBIA

Application to overcome the phobia of spiders through progressive levels of difficulty.



RDI Projects

actiHOME PROFESSIONAL

Application offering a comprehensive personal assistance service: home security, lifestyle analysis, local services, family alert.

Actimage budget: €950K.

ACTELIN

Mobile application to support diabetic patients through the recognition of dishes and treatment management.

Actimage budget: €2M.

Innovation for children and young people with autism

The use of new technologies in the field of health has developed in recent years. Autistic patients, for whom human interactions are often perceived as unpredictable and emotionally too strong, respond favourably to this type of learning, via interfaces or holograms. Many smartphone applications have emerged, as well as projects with augmented reality and virtual reality.

MASSACHUSETTS' INSTITUTE OF TECHNOLOGY

The research group named « **Affective Computing** » has been working several years on the identification and the understanding of emotions through a human-to-machine interface.

[SEE THE WEBSITE](#)

HAIFA UNIVERSITY - LABORATORY OF INNOVATION IN REHABILITATION TECHNOLOGIES

has been using virtual reality since 2008 to teach young autistic people to cross a street, in a safe environment.

[SEE THE WEBSITE](#)

UNIVERSITY OF VALENCE

has launched the project « **Pictogram Room** », in 2013, to help young autistic people improving their self-consciousness and their communication skills by associating tools and signs to augmented reality.

[SEE THE WEBSITE](#)

UNIVERSITY OF STANFORD

launched in 2015 «The Autism Glass Project» a study program with Google Glass® to help autistic people recognize facial expressions through augmented reality.

[SEE THE WEBSITE](#)

THE PLATFORM

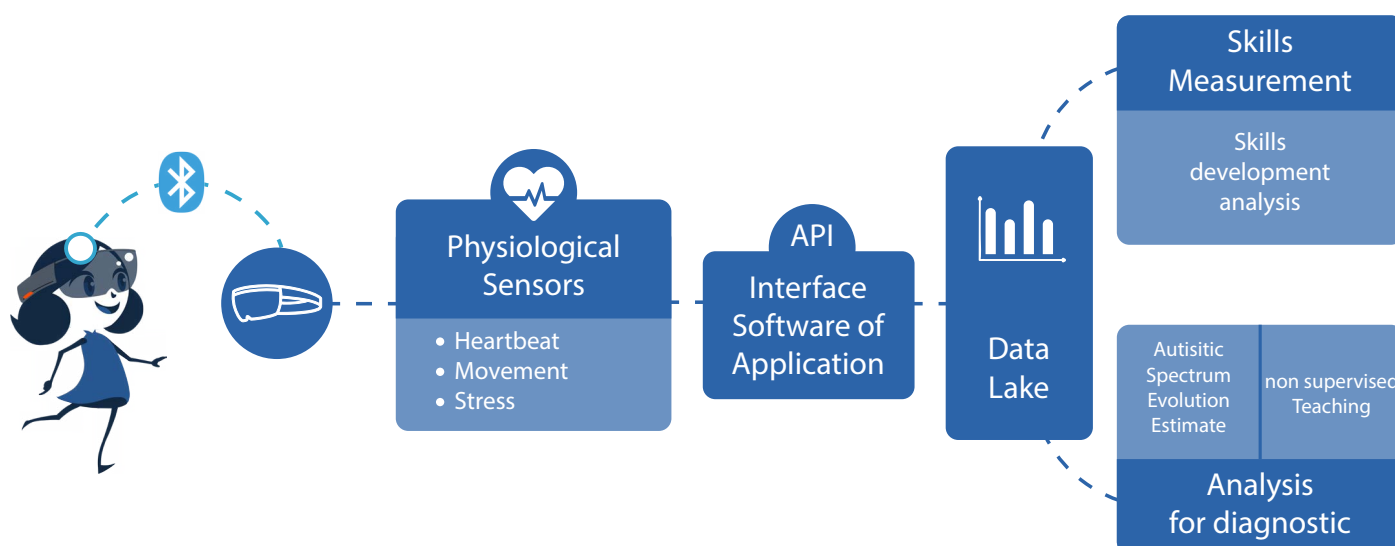


The Hol'Autisme platform is currently under development.

This interface collects data from sensors embedded in HoloLens and a connected wristband: stress level, motricity, reaction time, etc.

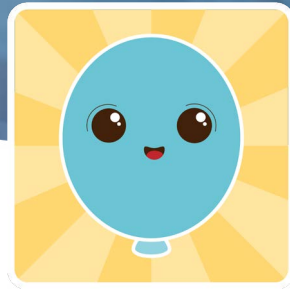
The results are translated in statistics and displayed visually to help assess the progress of the user. Access to the platform is limited to professionals. They will be able to follow their patients. The data is protected and stocked by Actimage, a company with a licence to host personal health data.

- **Control the learning curve of the patient**
- **Access to highly detailed data to visualize the progress of the patient**
- **Match the learning program to the patient needs and abilities**



POP BALLOONS

In collaboration with Guillaume Dumas, a neuroscience researcher from Pasteur Institute, and several autism specialists, we have developed a first application: Pop Balloons



Pop balloons

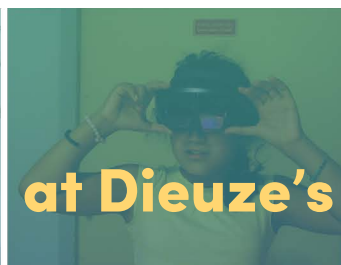
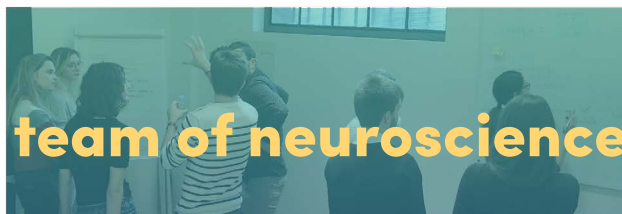
Pop balloons is the first application developed for the Hol'Autisme catalogue. It is a serious game focusing on improving motor skills.

After defining and customizing a play area, the player has to find and pop the balloons as quick as possible. The faster he is, the higher the score. By looking out for balloons, the player **opens to their environment and interacts with it**. One can thus improve **their motor skills and become more aware of their surroundings in a secured situation**.

The upper levels ask for more social skills by adding **an avatar whose emotions the user has to decypher**.

The game design and game flow of Pop balloons are suitable for younger ASD. The scenario is designed to fit non-verbal autistic people and its rules are easy to grasp. The feedback is provided by the avatar. The avatar will be encouraging when succeeding and neutral when failing.

**Codesign
with a team of neuroscience experts**



**Test
at Dieuze's MEI**

SM!LE COLÈRE

As a follow-up to pop-balloons, we developed a second application using the latest Microsoft technologies: Sm!le



Sm!le

For someone with ASD, decyphering emotions is a challenge and an obstacle to communication. Our second application, Sm!le, uses artificial intelligence (Microsoft Cognitive Services Azure) in order to identify the facial cues and display the corresponding emotion. It can distinguish up to 8 emotions: neutral, happiness, surprise, sadness, anger, disgust, disdain, fear.

Sm!le allows the user to recognize the facial expressions of people in their surroundings. Afterward, one can witness their progress by answering a quizz and associating emotions to pictures. The goal of the application is to develop one's skills in non-verbal communication and make visual contact easier.





SEE OUR WEBSITE

WATCH OUR VIDEO

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actimage | digital intelligence

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