SNAPS

Applied MedTech technologies

Diagnostic robot

Technological developments are optimising the healthcare system, among other things, by continuously expanding the potential of medical robots to new areas of application and exploiting them more and more. While robots are already used in a variety of ways in operations, rehabilitation measures and in the laboratory, the field of robot-assisted diagnostics has not yet been greatly developed.

In the future, diagnostic robots will be used to interact with patients in order to autonomously determine specific disease patterns based on existing symptoms, give advice on how to improve one's own state of health and suggest further treatment steps without having to consult a doctor. In addition to pre-screening, the robot must also fulfil social components so that patients willingly and trustingly share content and naturally interact with the medical assistant.

Modern social robots have reached the technological stage where they can take on and mirror human facial features, carry on conversations and evaluate and respond to their content. Due to the robots' impartiality, diagnoses can be made rationally by simply asking for the symptoms and their context.

What technological subtleties make the medical robot a social assistant? Furhat Robotics & Merck are working together on a diagnostic robot that combines human facial features through a unique combination of facial animation and individually interchangeable masks. To make this possible, a projector is integrated side the robot head that projects a 3D animation onto a translucent mask. In this way, it is also possible for lifelike expressions, head movements and facial expressions to be recreated. Thanks to the high resolution and contrast of the mask, light coming from an optical projection position can be directly absorbed, which is why the digitally animated face appears real and alive. The state-of-the-art Advanced 3D Face Engine is able to modify the facial textures using graphic tools and a system of character parameters to create different facial geometries and thus control expressive facial expressions.

The robot is equipped with a camera, powerful speakers and an external USB microphone array. It also has a precise facial recognition system and multi-user tracking that allows interaction with up to 10 people at the same time. As a result, the diagnostic robot is able to hear patients and precisely recognise them through a single-shot detector, as well as concretely distinguish them from others. With the help of advanced computer vision, it is also able to perform facial expression analysis. The combination of image and audio input, as well as the ressonse to eye contact and smiles and the use of conversational intelligence enables interpersonal communication in several languages thanks to the integrated NLU engine.

INNOVATIVE TECHNOLOGICAL APPROACH

- **Company:**
  Furhat Robotics & Merck KGaA
- **Product:**
  Petra (Prescreening Experience Through Robot Assessment)
- **Field of application:**
  Detection and pre-diagnosis of diseases (alcoholism, prediabetes, hypothyroidism)
- **Advantages:**
  AI diagnostics provide patients with information about their state of health without having to consult a doctor in advance
- **Website:**
  https://furhatrobotics.com/