

# Telenoid: Tele-presence android for communication

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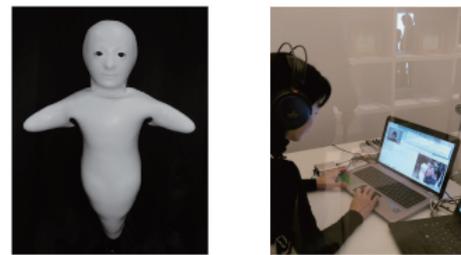
**Figure 1:** (A) & (B): A mother talking to her child through Telenoid. (C): Elementary school students discuss with Telenoid. (D): An elderly woman talking to Telenoid. (E): Dementia woman giving the Telenoid an emotion hug with tears.

## 1 Introduction

In this research, a new system of telecommunication called “Telenoid” is presented which focuses on the idea of transferring human’s “presence”. Telenoid was developed to appear and behave as a minimal design of human features. (Fig. 2(A)) A minimal human conveys the impression of human existence at first glance, but it doesn’t suggest anything about personal features such as being male or female, old or young. Previously an android with more realistic features called Geminoid was proposed. However, because of its unique appearance, which is the copy of a model, it is too difficult to imagine other people’s presence through Geminoid while they are operating it. On the other hand, Telenoid is designed as it holds an anonymous identity, which allows people to communicate with their acquaintances far away regardless of their gender and age. We expect that the Telenoid can be used as a medium that transfers human’s presence by its minimal feature design.

## 2 Telenoid

The design of Telenoid aims at creating an android with minimal human appearance. Such an appearance will allow different people to use Telenoid to transfer their presence to distant places regardless of their personal features. In order to achieve this purpose, we considered a real human model and removed as many unnecessary features as possible that were not crucial for communication with people. These unnecessary features were found from the results of previous empirical studies. The Telenoid, minimal design of human that is created by removing unnecessary features, might be able substitute any kind of person. The Telenoid system consists of the Telenoid robot and a tele-operation system. The Telenoid has nine DOF (3 for eyes, 1 for mouth, 3 for neck, 2 for hands), which is enough to represent the minimal facial expression and presence of a tele-operator. The Telenoid’s height is 80 cm, and its weight is about 6 kg. The covering skin is made of high quality silicon so that it feels as pleasant and soft as human skin when touched. The tele-operation system of Telenoid is designed in a simple and intuitive way that it can be controlled by even novice users. We have employed a face tracking technology for the tele-operation interface. The face-tracking system automatically captures the operator’s face directions, mouth movements and facial expressions. The extracted features are used to create commands that are sent to the Telenoid. Some specific behaviors, such as “bye-bye” or “happy”, can



**Figure 2:** (A): Telenoid. (B): Tele-operation interface. Operator’s face was captured by the webcam embedded on the laptop.

be controlled by GUI buttons. Also operator’s voice is outputted from a loud speaker, which is embedded inside of the Telenoid.

## 3 Field Tests

Several field tests have been run in public to investigate the reaction of people toward Telenoid. In an art museum (Fig. 1(A)(B)) and an elementary school (Fig. 1(C)), participants experienced the position of both operator and interlocutor. In most cases of interlocutor they tended to have a strange feeling toward it in the beginning but after a while they got used to it and changed their mind to positive. While operating the Telenoid, participants could adapt to operation immediately, and they seemed to enjoy their interaction with their acquaintances through Telenoid. As a remarkable point, in the elder care facilities, the elderly people had a very positive impression toward Telenoid at the first sight. (Fig. 1(D)). Although the concept of tele-operation for the Telenoid was difficult to make sense for them, they didn’t want to stop the conversation when they were talking to it. One of them especially had tears of happiness when she was giving a hug to Telenoid. (Fig. 1(E)). Therefore for the elderly, Telenoid may play the role of an attractive conversational agent. These field tests show that the Telenoid can be accepted as a communication medium for not only youth but also the elderly people. However, we need to carefully consider the specific use case for each generation.

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