Robosapien - model of AI traveler

Towards Future Society 5.0: Modeling, Exploration & Understanding

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Contents

Abstract

Today's robots excel at performing pre-programmed tasks. They work well in highly controlled environments with well-defined objects. Artificial Intelligence and Robotics have a common root and a (relatively) long history of interactions and scientific discussions. The birth of Artificial Intelligence and Robotics takes place in the same period ('50), and initially there was no clear distinction between the two disciplines. Dreams like human assisted AI, exoskeletons and robots controlled remotely with an interactive humanoid interface are already a reality.

Robosapiens is a robot that allows us to perform tasks such as other planets investigation (e.g. Mars planet - Musk plans) using a mixed reality.

The core aim of this project is to introduce the capabilities of a robo-researcher with his new capabilities to overcome various obstacles without the help of a user to manage it.

By developing this project, we hope to reduce the lifetime to Society 5.0 and to live in a smarter and easier world.

Tomorrow's robots will create increasingly rich maps of the real world and the objects in it and they will do so in human terms, allowing for a new level of human-robot interaction.

1 Introduction

"Towards Future Society 5.0: Modeling, Exploration & Understanding" is a big project which aims to represent the future technologies at the current moment. Some of these technologies which will build up *Society 5.0* are artificial intelligence, virtual reality and the humanoids/robots.

Artificial intelligence is one of the most popular techniques at the moment because of its efficiency for non-optimization problems.

On the other side we have virtual reality which allows us to create unreal environment. This immersive environment can be similar to the real world or it can be fantastical, creating an experience that is not possible in ordinary physical reality.

But humanoids is not just sci-fi. There are some big companies which are developing lots of prototypes of this kind of robots for domestic tasks and to help to people in their daily life.

So because of all of this we started working on this project and we developed a prototype of future mission to Mars by using NASA's prototype robot - Robosapien.

Our project can help in simulating the mission on Earth and make easier debugging the software of the future investigators.

2 Implementation

The project is divided into four parts:

hardware For the hardware part of the project, we use Robosapien Interactive Robot, a prototype of a real humanoid made by NASA, to which we included a variety of sensors that are either attached to a robot or on an additional device, some of them are a Object Recognition which is connected to Computer Vision, Object Capture sensor and microphone for Voice Recognition. Also, an Oculus VR set is used for robot control.

software The software part consists of Computer Vision, Voice Recognition, which is used for robot control. Moreover using QR code Recognition, serving the robot management.

algorithms To communicate with the robot adequately use a time-tested method, namely infrared control. For feedback (robot - human), we measure the vital metrics of the user using the entire Set.

communication The algorithms that we have implemented are for Computer Vision, which aims to plan the robot's path and QR recognition, which allows the robot to find a solution when find an obstacle.

3 Problems

TODO

4 Techniques

- C# for sending commands by IR to the robots

- ...some program... to record IR signal from the original remote control of the robot

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5 Future development

TODO

6 Acknowledgments

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