The following document is a part of the Vister software developed in collaboration with SDU and LEGO and seek to help the user in setting up the system correctly.

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# Introduction

Vister utilizes Universal Robots to automate the process of conducting various experiment. Not only does it limit the hassle of manually performing the experiment it also increases the accuracy and precision for conducting the experiment under same conditions.

With that said it can however be time consuming getting to understand the Universal Robots API and different way to send information back and forth from the robot itself and the PC.

With Vister this process is made easy as it utilizes the PolyScope software, already on the Universal Robot, to create the behavior and movement of the Robot, which is called a .URP file. A few small requirements has to be fulfilled concerning the .URP in order to send information to the PC and back again through TCP communication.

This document can be seen as a guide helping you to set everything up correctly. It is therefor highly recommended that this guide is read before hand as common issues and mistakes also will be covered.

Note: It is assumed that you already have a machine with a Vister 1.0 installment on it. Else read: “Vister Installment Guide” for more information

# Installing the necessary packages on your PC

Make sure that you have a PC running Linux. We recommend either Linux Mint or Ubuntu as they have been tested to work fine with VIster 1.0. You need at least a version 3 of Python. More information on installing Python can be found on the following webpage: <https://www.python.org/>

For communication with the UR Robot, Vister utilizes its Real-Time-Data-Exhange (RTDE) in combination with the UR\_RTDE interface developed at SDU. Hence both packages need to be installed on the device running Vister.

**Complete installation of RTDE combined with UR\_RTDE on Linux:**

*Run the following 3 commands in a Terminal Window (press CTRL + ALT + T to open new terminal window)*

sudo add-apt-repository ppa:sdurobotics/ur-rtde

sudo apt-get update

sudo apt install librtde librtde-dev

**Python installation of RTDE combined with UR\_RTDE on Linux:**

*Run the following command in a Terminal Window*

pip3 install --user ur\_rtde

Note: Vister 1.0 is a Python/ROS based application and therefor is the Python installment suitable.

UR\_RTDE’s documentation can be found on the following link:  
<https://sdurobotics.gitlab.io/ur_rtde/installation/installation.html>

# TCP/IP SOCKET Communication with a PC

Vister uses a TCP/IP SOCKET connection to communicate between the PC and the Universal Robot. Hence since section shows how this is setup.

First, connect the UR robot with the PC through an ethernet cable.

## Network Settings on the UR

Go to the Network Settings tab and find the IP-address of the robot. Example of an IP-address could look like this:

Write it down as you will need it later. Other than that, you must make sure that there are no UR caps or custom name settings activated as it may cause issue.

Note: Once it has been setup on the PC end, under the Network tab it will display a checkmark when it has established the connection.

## Network Settings on the PC