Telepresence System For Real-Time Communication During Emergencies

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ABSTRACT:

Nowadays, communication between doctors and first responders during emergency situations is limited to voice and video conferencing. This limits the amount of critical information that a doctor can interpret, which can mean the difference between life and death of a patient. Our goal is to increase the efficiency of communication between them. We propose an augmented reality (AR) station for the first responders and a virtual reality (VR) station for the doctors. The first responders' station will scan and send 3D data to the doctors in real-time and the VR station will create a 3D reconstruction so doctors may interact with it. Any feedback provided by the doctors will be sent in real-time to the first responders. With the proposed framework, the efficiency of the communication between first responders and doctors will drastically improve.

BACKGROUND:

Telemedicine technology began in the late 1960's and early 1970's when the NASA space program provided guided medical treatment to astronauts during space flights. [1]

Telemedicine was first used in a disaster during the aftermath of the 1985 earthquake in Mexico City. [2]

One of the first places to have a large center for real-time consultation services for the general public was the University of California, Davis Health System within its California Telehealth Network. [3]

Today, there are 14 Telehealth Centers across the United States dedicated to enhancing telemedicine. [4]

FOCUS:

Create and integrate a Graphical User Interface (GUI) for zSpace to assist doctors in interacting with the 3D reconstruction created by zSpace.

TOOLS:

Graphical User Interface (GUI)

A library to create a GUI

Virtual Reality (VR)

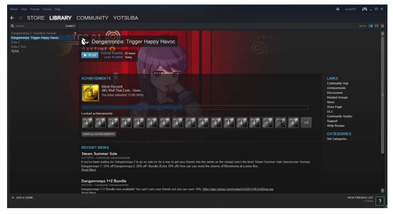
zSpace:
3D VR Display

GUI:

Graphical User Interface (GUI)

Visual way of interacting with the computer

Examples:



ZSPACE:

An off-the-shelf product.

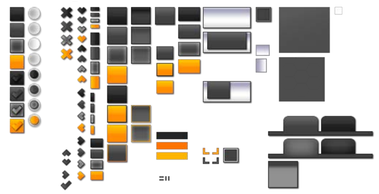
A SDK is available to developers.

Special Head Tracking Glasses:

Stylus:

MYGUI:

Comes with premade templates



Creating different parts of the interface through XML

Menus, buttons, resources

```
<Widget type="Button" skin="ButtonImage" position="80 0 64 64" name="Shapes">
    <Property key="ImageResource" value="shapesButtonResource"/>
    <Property key="NodeImage" value="true"/>
    <Property key="NeedMouse" value="true"/>
    <Property key="InheritsAlpha" value="false"/>
</Widget>

<Resource type="ResourceImageSet" name="shapesButtonResource">
    <Group name="States" texture="shapesStates.png" size="512 512">
        <Index name="normal">
            <Frame point="0 0"/>
        </Index>
        <Index name="highlighted">
            <Frame point="512 0"/>
        </Index>
        <Index name="pushed">
            <Frame point="1024 0"/>
        </Index>
        <Index name="disabled">
            <Frame point="1536 0"/>
        </Index>
    </Group>
</Resource>
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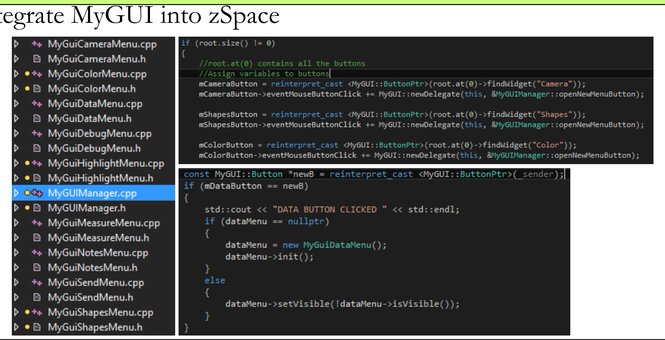
COMBINE:

Integrate MyGUI into zSpace



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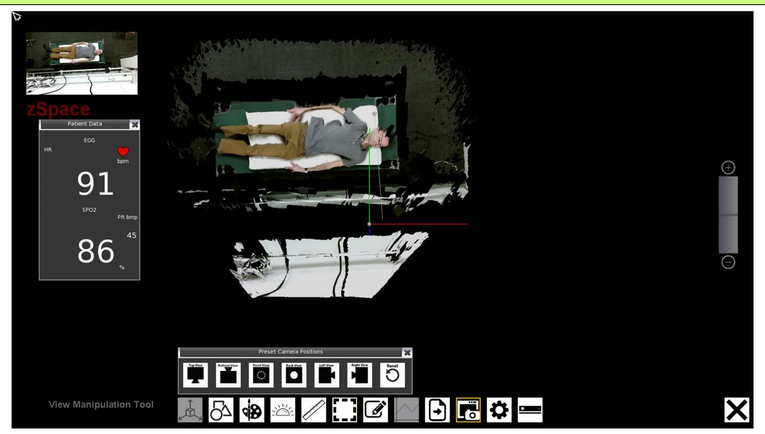
RESULTS:



Placement of buttons optimize user experience.

Icons easily communicate the purpose of a button.

Color scheme reflects the state of the buttons

FUTURE RESEARCH:

Testings with collaborating partners

Receive feedback on the functionality of the interface

REFERENCES:

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