**Motivation**

With the acceleration of life rhythm, people usually spend more time away from

home, causing more loneliness for the elderly. Under the circumstances, caregivers

will be worried about the elderly’s well-being and the elderly may feel a loss of bond

with family and children. Telepresence robot can be controlled by caregivers to communicate and provide care for the elderly with the robot when they’re away. From emotion perspective, the telepresence can play a role as a substitute of the caregivers to enhance the connection between the elderly and their families. Indeed, the robot can play a row as an alternative of personal visits and provide a real network of care

**Engineering Specification**

The robot should have enough energy to work for a long time. It needs to be able to move around the elderly with stability and safety. For remote control, the control interface should be user friendly enough so that any customer can operate the robot well. The connection between controller and robot should be set easily as long as there is Internet. In addition, the robot’s response for controller’s control signal should be quick enough so that the caregivers can operate the robot like himself. For medicine dispenser, it should keep stored medicine safe and pure and give the precise amount of medicine as required. For video call and entertainment, the quality of screen and camera of the robot should be high enough so that the elderly and controller can see each other’s face clearly.

**Concept**

For medicine dispenser, we have mixed pill manual sorting and pill blocks automatic sorting, which are all made through 3D printing of PLA materials. After our experiment, the first one, which is composed of a stepper motor, a bearing and gears, shows high simplicity and reliability. Afterwards, we add a lock and dispenser lid to it to keep the purity of stored pills.

For chassis, we use acrylic board as main structure and 3D printed pillars as support. The acrylic is cut by laser and the pillars is also made of PLA. For movement, we use two 87 RPM motors and four omni wheels to make sure the robot has enough power to move by itself and won’t turn over due to high centre of gravity.

For remote control, we use Raspberry Pi as the controller centre due to its flexibility and usability. It can output voltage to stepper motor and L298N motor driven to drive all motors stably. It also supports Internet connection so that the robot can be controlled when the caregivers are away.

For video call, we put a tablet with camera and win10 operating system at top of the robot. Users can download different software the pad for different purposes. The pad’s camera and screen’s quality are good enough for video call. We also use PLA 3D print to make a support for the tablet so that it won’t shake when the robot is moving.

**Cost**

The total cost for our robot is lower than 3500 RMB, which is under the budget. We selected and bought the electronic devices and components for the driving system on the website, which is the major cost, and write the control code by ourselves, the main structure of the robot is made by aluminum, laser-cut acrylic board and 3D print, which is quite cheap.

**Conclusion and Results**

We test our robots by combine all its functions together. The result shows that we can operate the robot to make video call, give medicine and provide entertainment to the elderly through our cell phone or computer when we’re not in a same area. Therefore, all functions work well.

Telepresence robot’s technology has a wide application. It would not only benefit the elderlies but the caregivers can do their job more efficiently as well. This would not only help in healing their disease in particular but also emotionally stabilize the patient by being connected to their loved ones or past life events.