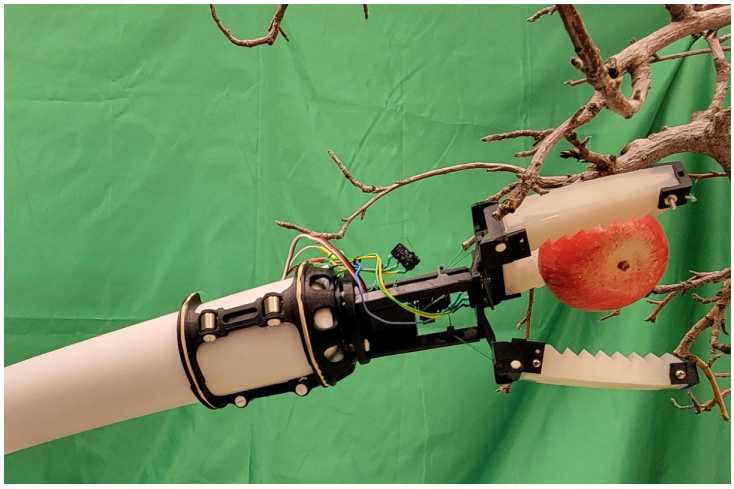
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WSU develops Robotic gripper for automated apple picking developed

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A robotic gripper developed by Washington State University researchers is able to gently grab the majority of apples out of a tree without damaging the fruit. The research is funded by the National Science Foundation, National Institute of Food and Agriculture and Washington Tree Fruit Research Commission.

The innovative gripper is part of a robotic set-up that the researchers are hoping will someday do fruit picking and other farm chores for Washington farmers to help alleviate ongoing labor shortages.

Weighing about two-thirds of a pound, the gripper uses three cables to move 3D-printed hard plastic and silicone rubber-tipped fingers. The fingers have to be gentle enough that they donâ??t damage the apples but strong enough to pull the apple off the tree. At a cost of about $30 to produce, the gripper includes a switch to grasp the apple and let go. It was able to successfully grab more than 87.5% of the apples in an orchard without damaging them.

Washington state leads the nation in apple production, and in 2022, the industry contributed more than two billion dollars to the U.S. gross domestic product. Throughout Washington, farms employ anywhere from a dozen to hundreds of workers each year for orchard operations, including for pollination, pruning, flower thinning and fruit harvesting. With an aging population and a decrease in migrant farm workers, however, farmers have struggled to meet their needs for workers during harvest season.

In recent years, researchers have started developing robotic apple harvesting systems, but the ones that have been developed are expensive and complex to use in orchards. The WSU team will next connect their light-weight gripper to a low-

cost robot system that they are developing. Similar to inflatable tube-people often used in outdoor advertising at car dealerships, the robot arm is made of a soft fabric filled with air that is similar but stiffer than the car dealership version.

As part of the project, the researchers are also working to add an onboard camera to their system that can precisely guide the arm as well as a gripper that can twist, similar to a human handâ??s rotation to reduce the damage of the apple stem. They expect to try the system out in their lab and then farm fields later this year.