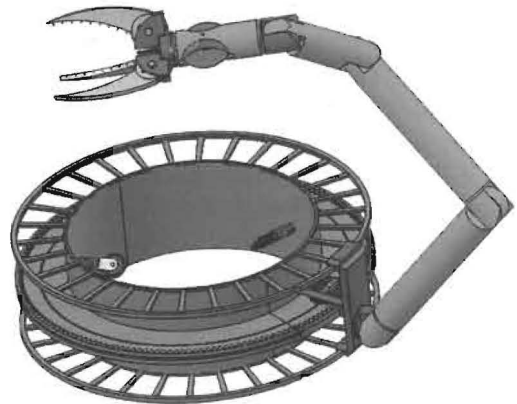


## KERA- Automated Coconut Harvesting Machine



**K**erala, which literally means the land of coconut tree, is synonymous with breath-taking back waters and coconut trees. Traditionally professional climbers are engaged for harvesting the nuts. But with time, the profession of tree climbing has lost its lustre and is now it is quite difficult to get professional climbers. This lack of professional climbers has led to sharp increase in coconut harvesting cost, which in turn cuts down the farmer's profit.

All coconut growing regions offers huge market for innovations in coconut harvesting. Almost all existing technologies for automated tree climbing are too complicated. It is in this context that a group of students of Government Engineering College, Thrissur, Kerala under the guidance of Prof. Manesh K K is developing a automatic coconut harvesting machine by making use of a robotic climbing unit along with computer vision and image processing techniques.

The project is undertaken by Amal T P, Ajinsyam S, Amruthakumar P, Amjad Khan, Amal S Kumar, who are final year mechanical engineering students of Government Engineering College Thrissur. The project is being done under the guidance of Prof. Manesh K K and co-guided by Prof. P P Lalu.

The mechanical climbing unit named Kera has a cylindrical structure for gripping the tree trunk as well as a mechanical arm for plucking coconut from trees. The mechanical arm is equipped with cutters for cutting the fronds. A camera and high speed processor is also mounted on the climbing unit. The machine makes use of helical climbing which makes it easy for climbing. Once the unit is fixed at the base of a tree, it is given command to move up. The unit automatically detects the tree top and stops. The machine then completes a rotation around the tree and the camera on top of the machine captures a panoramic view of the tree top.

The image is sent to android device of the operator. The operator identifies the coconuts which are ripe for harvest and selects them through the android control device. This data is relayed back to the machine which translates the 2d location of the selected coconuts to the 3d co-ordinates. Once these co-ordinates are

obtained, the mechanical arm moves through the 3d space and pluck the coconut. Also further rotations which may be necessary to arrive at proximity of the coconuts are also carried out. Once all the selected coconuts are plucked, the device waits for further instructions such as instructions to cut the fronds. If no further tasks are required, the device comes down to the base of the tree.

Kera has numerous advantages over other traditional methods of harvesting. It is much safer than all other alternatives prevailing at present. One controller can handle more than one machine at a time allowing for parallel operation and thereby enhancing efficiency. Moreover it is free of any considerable human effort making it an easy to use product when it is difficult to get professional workers. What really makes this product special is its incredible possibility for expansion. In the future the machine can even be used for spraying against diseases and furthermore the need for a human operator can be avoided using advanced image processing techniques and thermal scanning to automatically identify ripe coconuts.

What Kera offers is a new possibility of low cost and safer alternative to all traditional coconut harvesting methods. Kera offers a rift of fresh hope in the niche of coconut farming and may mark a new dawn of agricultural excellence.

The project concept was presented before the Project Approval Committee (PAC) of the Coconut Development Board (Ministry of Agriculture, Govt of India) Kochi and the PAC has approved the project for financial assistance for carrying out the research on the concept. ■