協作式智慧載具

提案人： 顏炳郎 教授

單　位： 國立臺灣大學 生物機電工程學系

簡　歷：(可列出相關連結，例如系所、研究室網頁)

http://140.112.183.102/RMML/prof.html

市場及需求：

因臺灣農業人口逐年減少與老化，針對臺灣茶葉採收領域，其現有茶園面積 16,255 公頃，年產量 17,502 公噸，產值約 45 億元(資料來源:農糧署)；然而茶葉採收為勞力密集產業，須配合採收時間，其茶葉採收時期短且密集，此外，因台灣種茶面積零散且小，同時人力成本逐年提高，茶產製成本提高，造成茶產業經營困難。

技術摘要(含成果)：

強調人機協同之功能，使機器人配合採收者進行協同式採收，專注在單茶道之採收模式，可於非特定茶園使用此智慧載具，具有較大之操作靈活性，並解決目前採茶刀具之使用缺點；此外，透過感測器對周遭茶道環境進行偵測，並進行路徑規劃，使機器人與操作者保持一定的距離行走以維持茶葉收穫的品質，並配合茶農現有的茶具尺寸與各茶園的茶樹寬度，進行適合的轉彎方式，且具避障功能，通用於各個茶園。

優勢：

臺灣茶園環境有著較小且零散的特性，其茶園場域限制較多，以致採收機器之操作使用靈活度為相當重要之關鍵；針對農業茶葉採收缺工現象，此智慧載具可減少採收時的人力消耗，並減少操作者的負擔，以及較為平易近人之售價，可使機器使用普及度提高。

競爭產品：

乘坐式採茶機，改良型龍門式採茶機

專利現況：

本研究團隊因應農業採收缺工現象，在農業機器人採收領域，開發可在田間自主或半自主移動載具，並搭載機械手臂進行採收，提供省工、提高效率、與後續生產管理之小型智慧型農機；此外，本團隊針對相關領域，參與多場國內外研討會，並發表多篇研究論文，致力於在智慧農業領域做出卓越貢獻。

聯絡方式：

臺大產學合作總中心

Tel: 02-3366-9945,　E-mail: ntuciac@ntu.edu.tw

Collaborative Smart Vehicle

PI： Prof. Ping-Lang Yen

Department of Biomechatronics Engineering, NTU.

Experience:

http://140.112.183.102/RMML/prof.html

Market Needs:

Due to the decline and aging of Taiwan's agricultural population, the current tea plantation area in Taiwan is 16,255 hectares, with an annual output of 17,502 metric tons and an output value of about 4.5 billion yuan (source: Agriculture and Food Administration). However, tea harvesting is a labor-intensive industry. The tea harvesting period must be matched with the harvesting time. The tea harvesting period is short and dense. In addition, due to the scattered and small tea growing area in Taiwan, and the labor cost is increasing year by year, the production cost of tea is increased, which makes the tea industry difficult to operate.

Our Technology:

Emphasize the function of human-machine collaboration, so that the robot cooperates with the harvester for collaborative harvesting, focusing on the single tea ceremony harvesting mode. This intelligent vehicle can be used in non-specific tea gardens, which has greater operational flexibility and solves the current problem. Disadvantages of using tea-picking knives; In addition, the surrounding tea ceremony environment is detected by sensors and path planning is performed to keep the robot and the operator walking at a certain distance to maintain the quality of the tea harvest, and to match the existing tea set size of tea farmers It is suitable for the tea treewidth of each tea plantation to make a suitable turning method and has obstacle avoidance function.

Strength:

The tea garden environment in Taiwan has small and scattered characteristics, and its tea garden fields are more restricted so that the flexibility of the operation and use of the harvesting machine is very important. In response to the lack of work in agricultural tea harvesting, this smart vehicle can reduce Time-consuming manpower consumption, and reducing the burden on the operator, and a more accessible price can increase the popularity of machine use.

Competing Products:

Self-propelled tea plucking machine, self-guided gantry tea plucking machine

Intellectual Properties:

In response to the lack of labor in agricultural harvesting, the research team has developed autonomous or semi-autonomous mobile vehicles in the field of agricultural robotic harvesting, and equipped with robotic arms for harvesting, providing labor-saving, improving efficiency, and subsequent production management. Small smart agricultural machinery; In addition, the team has participated in a number of domestic and foreign seminars and published a number of research papers in related fields in order to make outstanding contributions in the field of smart agriculture.

Contact:

Center for Industry-Academia Cooperation, NTU
Tel: 02-3366-9945, E-mail: ntuciac@ntu.edu.tw