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Mechatronic- A Concept toward the Precision Planter

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SUMMARY

Farm mechanization has long been known to provide a number of economic and social advantages to farmers. The most important of the economic benefits is the enhanced yield that comes as a result of increased mechanisation. Combination of mechanical linkage or systems replacing by some electronic components it's become mechanical + Electronic = Mechatronics. Linear actuator is best example of mechatronics in term of combination of electronic and mechanical. In linear actuator no need to any hydraulic link, distributor, oil tank, hydraulic pump. In some cases, it's given better than the hydraulic control actuating devices. If we use mechatronics technologies into agriculture sector there have helpful in controlling system and compactness in whole mechanism.

INTRODUCTION

Precision seeding is a seeding technique being used agriculture that involves sowing seeds at precise spacing and depth. This differs from broadcast seeding, in which the seed is dispersed over a large region. Although accurate hand placement qualifies, precision seeding is more commonly associated with a mechanised procedure. For modest to large-scale projects, a variety of hand-push and motorised precision seeders are available. They all open the soil, deposit the seed, and then cover it to form rows, using a variety of methods. Precision seeders are also available for planting flats of seeds for indoor seed beginning. The depth and spacing can be adjusted to meet a variety of crops and plant densities; the degree of flexibility varies depending on the speeder used.

Precision seeding is a commercial alternative to dribbling seed or placing multiple seeds in each position, which is done by dribbling seed or setting several seeds in each position. Precision seeders may place only one or a few seeds per position, depending on the equipment. This has the advantage of saving seed and avoiding crowding or the need for thinning, allowing plants to grow as efficiently as possible. On the negative side, when fewer seeds are planted, a high germination rate is necessary to fully utilise the seeded area.

Concept of mechatronics sowing system

The mechatronics system works on the principle that a shaft encoder measures forward speed and sends digital signals to the microcontroller. In a 1:1 transmission ratio, the microprocessor synchronises the operation's forward speed with the metering mechanism plate. The microprocessor transmits signals to the motor driver module, which in turn sends signals to an electric motor that rotates the seed plate of the metering mechanism. A mechatronic system for a four-row planter was created by He *et al*. (2017) and includes a seed box, touch screen display, and shaft encoder. Along with the hardware, user-friendly open source software has also been created. This has inspired researchers to develop specific applications for electronics in agriculture. The microcontroller can be applied depending on the actuation and sensing requirements. Researchers place seeds using the sensors to control distance and depth (Lan *et al*., 1999). speed of travel, electric motors, and seed power supply and metres.

Broadcasting, dibbling, sowing behind a country plough, seed drill, and pneumatic planting are some of the seed placement technologies available. The most precise of these methods are seed drill and pneumatic planting. Seed singulation potential is greater with the pneumatic planter, but it takes more energy.

Mechanical metering devices have a number of drawbacks, including the system's bulkiness and vibrations imposed on the planter or seed drill as it moves through the field. The third disadvantage of the mechanically driven approach is the lack of seed distribution communication between row units on an implement. According to present metering systems, the system currently has control over only the seeding population, but not the actual timing and placement of the seed.

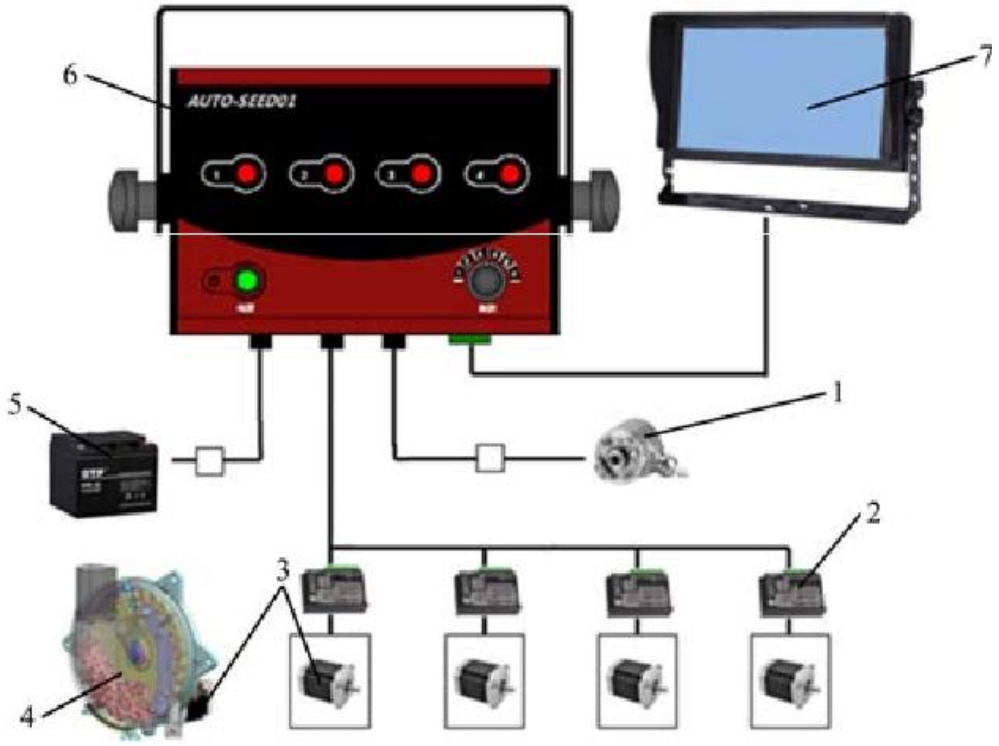

Fig. Arrangement of different components for mechatronics

This indicates that a seed falls into the furrow at a consistent rate, but the row-unit is unable to determine when and where the seed falls in relation to its neighbours. As a result, electronic seed singulation devices can address many of the inefficiencies found in mechanically driven seed metering systems, thereby boosting productivity and yield rates dramatically. The entire system will be controlled remotely, which will reduce operator fatigue and improve plant-to-plant distance accuracy.

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