**Components Used :-**

Our Sprototype mainly consists of -

* Arduino Mega 2560 Controlling Board
* IC-L298N motor driver module
* DC motors
* 12V DC battery
* Servo motor
* HC-05 Bluetooth Module
* HC-SR04 Ultrasonic Sensor modules – to detect obstacles if any

**Working :-**

So, this is the basic data flow diagram –

**Flowchart pops up**

* So, we have developed an android app named ‘Ankuran’ from which each & every operation of the bot is controlled.
* Ankuran app contains data of each & every type of seed regarding its sowing depth & space to be maintained between the plants.
* The admin just needs to select the seed type he wants to sow and the bot will sow the seeds in the entire field automatically.

App :-

**App will pop up**

The app contains buttons like :-

* Forward, reverse, right, left, stop …. to operate the movement of the bot.
* Seed type …. to select the seeds to be sown where in the data of every type of seed is already fed.
* And lastly, select a device, connect, disconnect …. to establish communication with bot via a Bluetooth device.

**Bot / Seed sowing machine :-**

So basically, our seed sowing machine will perform 3 main tasks :-

1. Digging a desired depth.
2. Dropping the seed in the dug region.
3. Moving to the next place while maintaining appropriate space in between in accordance to the seed requirement.

**Digging Operation :-**

**2D design pops up**

**2D / 3D model pops up**

**Depth α angle of crank**

* So, for digging operation, we have designed a digging mechanism from taking reference of slider crank mechanism.
* The reciprocating link / the last link of slider crank mechanism will be coupled with a DC motor for its rotation for efficient digging. This link will perform 2 motions simultaneously i.e., reciprocation & rotation.
* Since, the depth acquired will be variable for every seed type, we need a controlled digging mechanism.
* And since, the depth is directly proportional to the angle attained by the crank, we have used a servomotor to control the angle ….. with respect to the seed selected.
* In this way, for every type of seed …. corresponding required depth will be attained.

**Seed Box :-**

**2D design pops up**

**2D / 3D model pops up**

* The seed box will consist of a container(for containing seeds) & a roller.
* The roller will be mounted with spikes such that it will displace the seeds from the container to the digged hole via a funnel and a pipe.
* The roller is coupled with a DC motor, which will be switched ON & OFF automatically whenever the digging operation is accomplished.

**Maintaining a space in between the sown seeds :-**

**Distance covered α given time delay**

* After the seed sowing operation is accomplished the bot will move to the next desired place to repeat the same operation by leaving some space in between which will vary with every seed selection.
* Now since, the distance covered is directly proportional to the time delay given …. the time delay of the DC motors attached to the wheels will be varied with every seed type selected because as we know, the data regarding this will be already fed in the app.
* For an instance, if the bot moves 2cm in 500ms, so, for moving 6cm it will require 1500ms …. and this shift in time delays will be adjusted automatically. The farmer just needs to select the seed type & our bot will do it as instructed.

**Internal Operation :-**

**Circuit Diagram (with labeling) will pop up**

* So, this will be the internal control of our model.
* The Bluetooth module will establish communication between bot and the app ‘Ankuran’.
* Upon the command given by the admin, the controlling board will send signals to all the components accordingly as discussed earlier.
* And lastly, we have included ultrasonic sensors to detect obstacles if any.