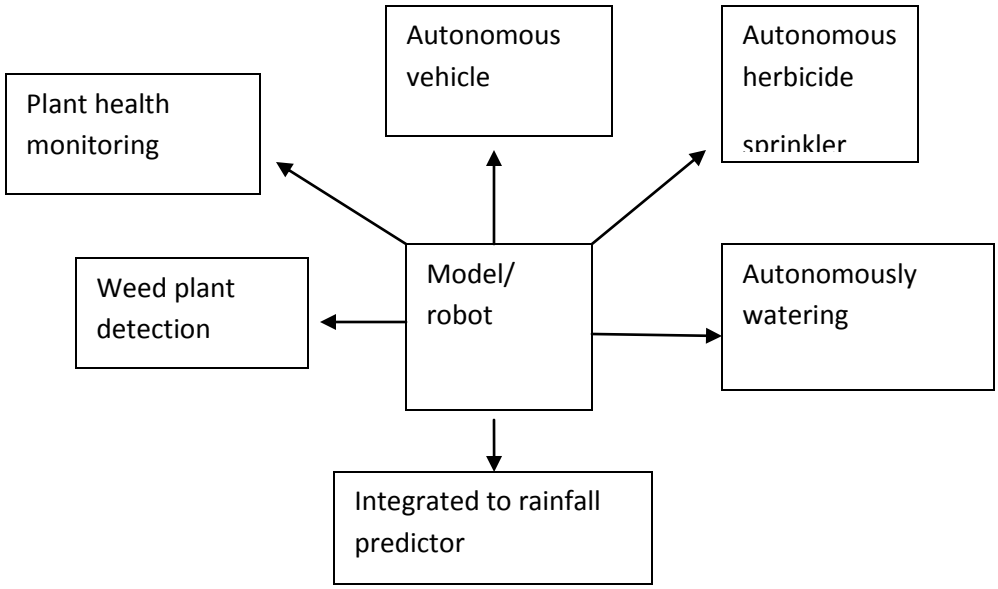
-:AGROBOT:-

INTRODUCTION:

Our project is based on robotics combined with agriculture where we are proposing a robot which serves as a farmer and yields crops. This robot is directly integrated to Rainfall predictor which helps it to forecast rainfall. This we keep track of every possible event in the farm from water levels to plant health. This data can be further used to re-train the model so that it can be more accurate of predicting things.



PROJECT DESCRIPTION:

In this project the robot is commanded remotely by a machine-learning model. The robot is mainly made to focus on particular things like weed plant detection ,water level observation, autonomously driving through farm without damaging crop and monitor plant health

Main functions:

1) Plant health monitoring:

This robot constantly monitors plant health by analyzing crop leaves and spots on various parts on crops and reports if it founds any so that we can be spontaneous and be extreme cautious about plant health . This functionality uses cameras which on installed on robot and sends them to firmware to analyze the plant health and these data can be used to retrain the analyzing model in firmware

2) Soil moisture:

This robot collects soil moisture data across the farm and uses it analyze whether more water is required or not because excess soil moisture has negative effects like loss in yield , soil erosion and during seed phase he seeds may even wash up

3) Autonomously watering crop:

This robot maintains the optimal water level in plant by taking soil moisture data across the field. This helps to save water and use them when required by diverting them to under water tank digged at a corner of farm .

4) Weed plant detection:

This function uses the cameras that are pre installed . This process is done on live while robot is moving across the farm.

5) Integrated to Rainfall detector:

This part makes this robot more environmental friendly because plants mainly depend on sunlight and water. For most farms rain in the main source of water, so by forecasting rain we can make optimal decisions in maintaining crop

6) Autonomously herbicide sprinkler:

By getting the data from weed detection we can autonomously sprinkling the herbicide and pesticide so that we can decrease the unnecessary usage of herbicide by targeting the particular area where the weed is grown.

Status:

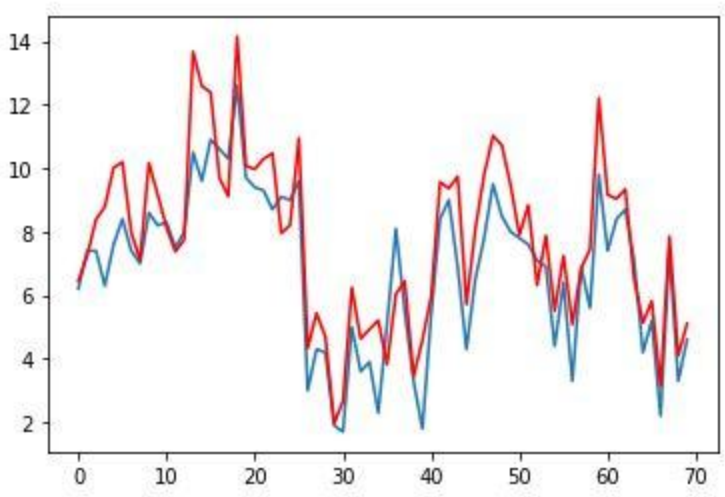
Currently we are working to develop a perfect machine learning model (Rainfall predictor) for detecting the rainfall that is best fitted to local area.

Due to COVID-19 restrictions we are working on the software part of our project

ATTEMPT 1- We are working with neural networks to forecast the rainfall

```
m=tf.keras.models.Sequential([tf.keras.layers.Dense(1,activation='relu'),
                    tf.keras.layers.Dense(1024,activation='relu'),
                    tf.keras.layers.Dense(512,activation='tanh'),
                    tf.keras.layers.Dense(1024,activation='relu'),
                    tf.keras.layers.Dense(1024,activation='tanh'),
                    tf.keras.layers.Dense(1,activation='relu')])
m.compile(optimizer='adam',loss='mean_squared_error')
m.fit(t11,h11,epochs=100)
Epoch 92/100
3/3 [==============================] - 0s 19ms/step - loss: 764.5529
Epoch 93/100
3/3 [==============================] - 0s 20ms/step - loss: 764.5529
Epoch 94/100
3/3 [==============================] - 0s 19ms/step - loss: 764.5529
Epoch 95/100
3/3 [==============================] - 0s 18ms/step - loss: 764.5528
Epoch 96/100
3/3 [==============================] - 0s 19ms/step - loss: 764.5529
Epoch 97/100
3/3 [==============================] - 0s 19ms/step - loss: 764.5529
Epoch 98/100
3/3 [==============================] - 0s 18ms/step - loss: 764.5529
Epoch 99/100
3/3 [==============================] - 0s 19ms/step - loss: 764.5529
Epoch 100/100
3/3 [==============================] - 0s 18ms/step - loss: 764.5529

<tensorflow.python.keras.callbacks.History at 0x11630688>
```



This is its forecasting graph to Original plot of rainfall

Due to limitation of available data we have shifted from regular neural networks to Classical model.

ATTEMPT-2 : Here we are working with classical machine learning technique called Linear Regression using statistics to forecast the rainfall

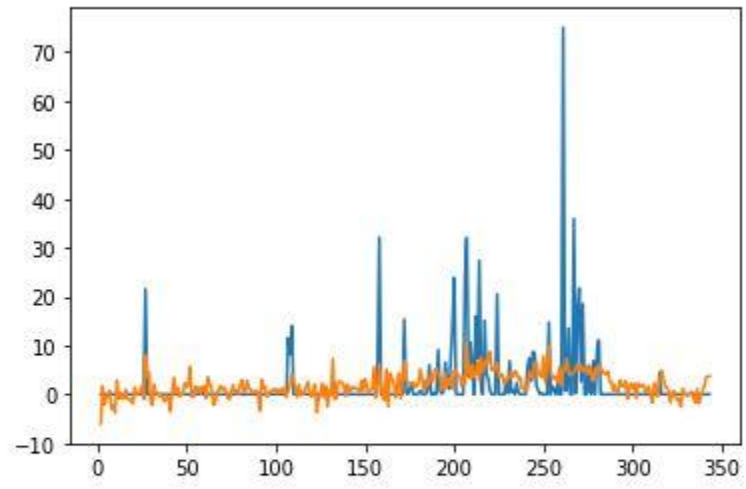
TRAINING

```
x1=[]
y1=[]
t1=[]
for i in range(2,344):
    x1.append([d['r'][i-2], d['tmin'][i-2], d['tmax'][i-2], d['hmin'][i-2], d['hmax'][i-2], d['wmin'][i-2], d['wmax'][i-2],
              d['r'][i-1], d['tmin'][i-1], d['tmax'][i-1], d['hmin'][i-1], d['hmax'][i-1], d['wmin'][i-1], d['wmax'][i-1],
               d['hmax'][i-2]-d['hmax'][i-1],
                d['hmin'][i-2]-d['hmin'][i-1],
               d['tmax'][i-2]-d['tmax'][i-1],
                d['tmin'][i-2]-d['tmin'][i-1],


               d['date'][i],d['month'][i],2019])
    y1.append(d['r'][i])
    t1.append(i)
```

```
reg=LinearRegression().fit(x1,y1)
```

```
[<matplotlib.lines.Line2D at 0x87729c8>]
```




```
print('error is '+str(s/len(yp)))
```

```
error is [-0.01089493]
```

Plot of forecasted rainfall to original rainfall

ATTEMPT-3 (TO BE DONE): Here we are using L.S.T.M'S to forecast the rainfall so that the prediction can be more precise.

Conclusion:

This robot can be very useful in maintaining the farm with less human effort and make plant yield high . This could change the scope and growth in the sector of agriculture