Abstract:

Create a CONSTRUCTED LANDSCAPE to activate the courtyard between the old and the new Lee hall buildings. The primary component, the “tree,” is inspired by the structural elements in the new building. The idea is to represent the creative density across the four locations of Clemson’s “Fluid Campus,” (facilities in Clemson, Charleston, Genova and Barcelona). The four trees are placed strategically in the courtyard distanced by the proportion of their real world locations.

The ‘trees’ are capable of responding dynamically to the creative energy of people inside the new Lee hall. Creative energy is defined as the presence of architects inside each building working at their workstations, studios, labs, conference halls, attending lectures and being creative in the design process. Creative energy is measured as the length of time spent by people inside the buildings. Creative energy increases with the length of time spent by each person at a workstation (as opposed to someone who spends just two minutes at his workstation). With increase in the creative energy the ‘trees’ dynamically expand. They increase in density when the creative energy of each building is at its highest and contract when the creative energy is at its lowest.
Location on Clemson Campus:

Proposed location for Constructed Landscape
Engrossed in work all morning, Maya takes a moment off, relaxes and looks around. Maya is an architect in the making and her workstation at the new Lee Hall overlooks the courtyard through glass walls. Her eyes fall on the interesting ‘tree’ like structures in the space between the two buildings. She remembers that when she had walked in that morning the ‘trees’ were of a different shapes. Now at noon, they had expanded and were dynamically changing little by little. Curiosity gets the better of her and she tries to understand what was happening. She observes that as a lecture ends and a group of people leave the building one of the ‘trees’ contracts. Another group of students enter the studio when Maya gets back to her work again leaving all her questions behind.

In the evening, when Maya decides to leave for the day she notices that the group of students in the studio are still working and that there are more people at their work desks than before. She looks into the courtyard and notices that one of the ‘trees’ has stretched to its fullest. She realizes that there is a relationship between the lengths of time spent working by the students in the new building, the number of students in the building i.e. the creative energy of the building and the ‘trees’. She walks up to one of the trees and lo and behold a video of the student working at the Geneva campus starts playing. She sees that the creative density is really high, the tree is completely expanded and the video indicated a large number of students working away to complete their design project. Impressed with the technology and with her understanding of it, Maya walks out appreciating the aesthetics of the constructed landscape.
Components Required:

Arduino Board – 1 no.
Pressure Sensing Load Cells – 2 nos.
High Impedance Amplifier – 2 nos.
5 V DC Power Source – 1 no.
Servo Motor – 1 no.
Bread Board – 1 no.
Connecting Wires

Resistors –
- 100K ohms – 2 nos.
- 10 ohms – 2 nos.

Code:

/* Code for 'Trees' */
#include <Servo.h>
Servo myservo; // create servo object to control a servo
int pos = 90; // variable to store the servo position
int sensor1Pin = A0; // Pressure sensor inputs
int sensor2Pin = A1;
int countup = 0;
int countdown = 0;
int ranonce = 0;
int coil = 0;

// Setting up the servo motor
void setup() {
  myservo.attach(9);
  myservo.write(pos);
Serial.begin(9600);
}
void loop() {
    int i;
    float temp1 = 0.00;
    float temp2 = 0.00;
    float avganalogValue1 = 0.00;  //stores the value from the pressure sensor1
    float avganalogValue2 = 0.00;  //stores the value from the pressure sensor2
    myservo.write(90);
    //Averaging 10 readings for the sensors
    for(i=0; i<10;i++)
    {
        float analogValue1 = getVoltage(sensor1Pin);
        delay(30);
        temp1 = (temp1 + analogValue1);
    }
    avganalogValue1 = temp1/10;
    Serial.print("avganalogValue1: ");Serial.println(avganalogValue1);
    for(i=0; i<10;i++)
    {
        float analogValue2 = getVoltage(sensor2Pin);
        delay(30);
        temp2 = (temp2 + analogValue2);
    }
    avganalogValue2 = temp2/10;
    Serial.print("avganalogValue2: ");Serial.println(avganalogValue2);
    //Making the tree uncoil
    if(avganalogValue1 > 1.00 || avganalogValue2 >1.00)
    {
        countup ++;
    }
if ((avganalogValue1>1 && countup>10) || (avganalogValue2>1 && countup>10) || (avganalogValue1>1 &&
  avganalogValue2>1 && countup>5))
{
  if(ranonce < 6)
  {for(i=180;i>=90;i--)
   {
     myservo.write(i);
     delay(40);
   }
   countup = 0;
   ranonce ++;
  }
}

// Making the tree coil
if((avganalogValue1 < 1.00 && ranonce>1) || (avganalogValue2 < 1.00 && ranonce>1 ))
{
  countdown ++;
  if(countdown > 50){
    if(coil < 6)
    {
      for(i=0;i<=pos;i++)
      {
        myservo.write(i);
        delay(40);
      }
      coil = coil + 1;
      countdown = 0;
    }
  }
}
float getVoltage(int pin)
{
    return(analogRead(pin) * 0.0048828125);
}

Lessons Learnt:

Load Cell requires a sensitive and a high amplification circuit being a very rudimentary mechanical sensor. Setting the sensor up was not the easiest of tasks. A slightly more sophisticated location identification sensor such as a vision sensor could have been used.