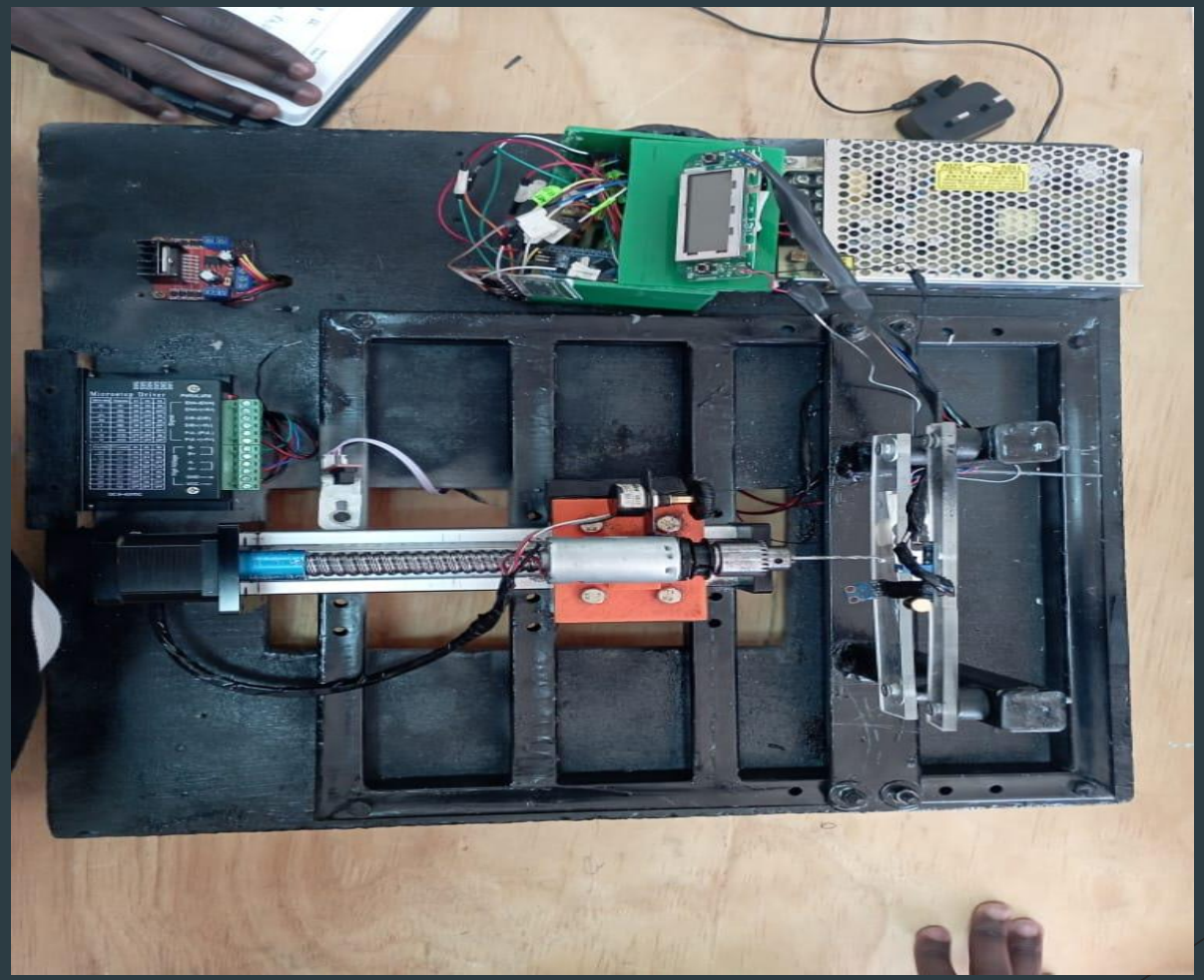
ONE AXIS DRILL PROJECT

PROGRESS

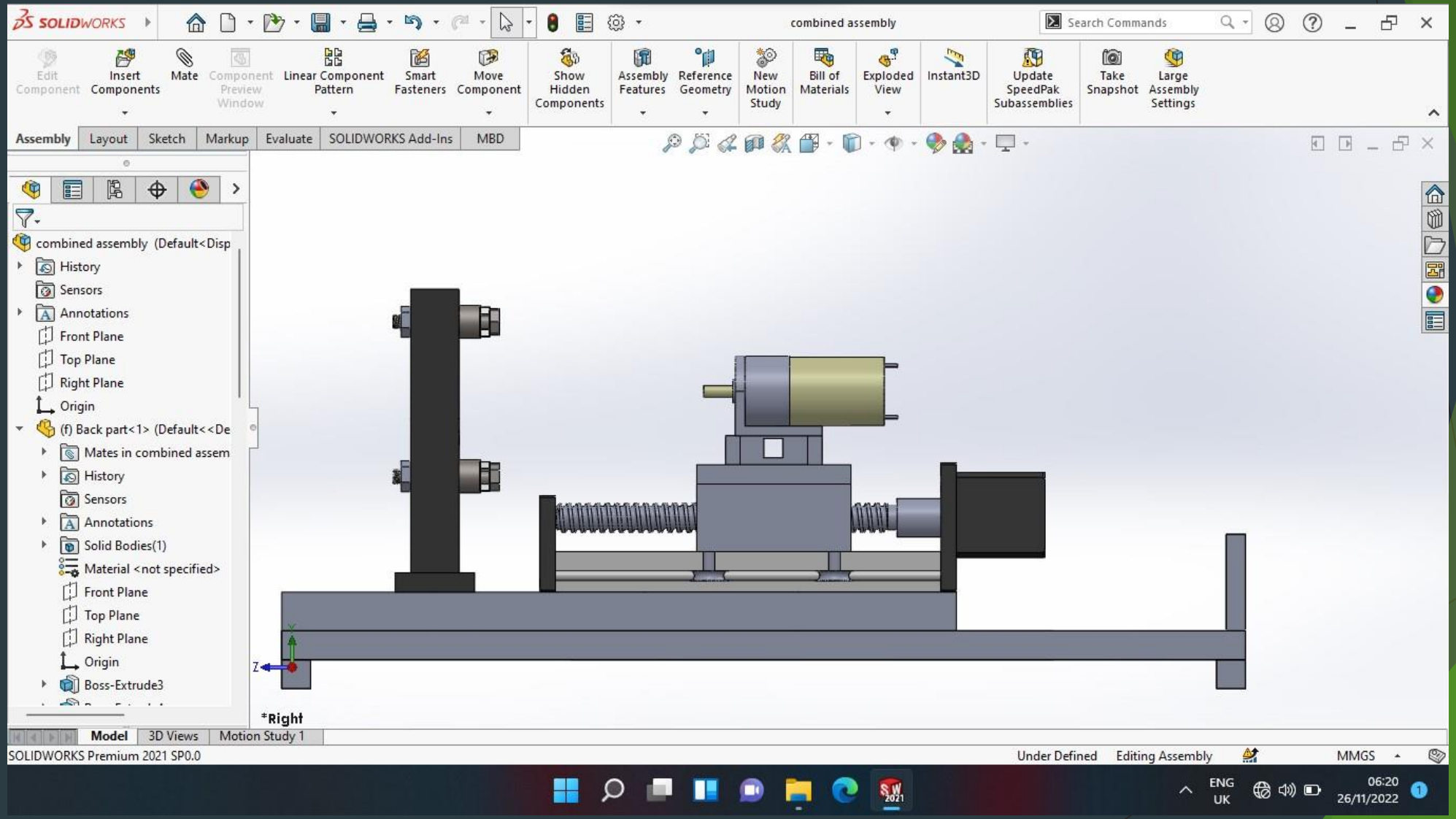
OBJECTIVES TO BE MET:

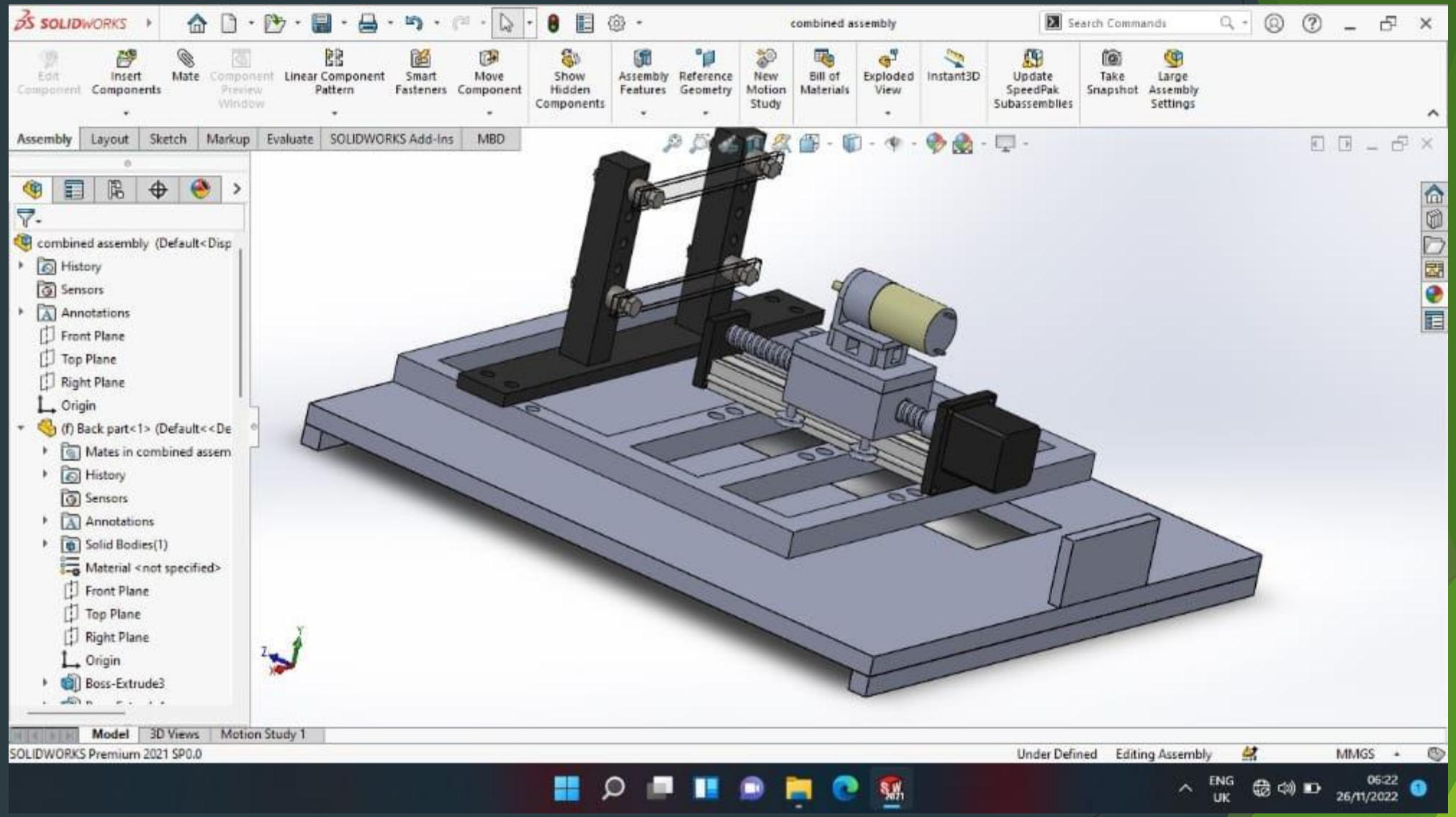
- Full analysis of existing physical model done by previous groups.
- Mechanical design of the physical model in Solid works software.
- Finite element analysis in Abaqus and Ansys
- Circuit design in Proteus and Kicad
- Program using STM32 chip
- Analysis and optimization.

1. INTERACTION WITH EXISTIND PHYSICAL MODEL



2. MECHANICAL DESIGN IN SOLIDWORKS

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Insert Components
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Linear Component Pattern
Smart Fasteners
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Show Hidden Components
Assembly Features
Reference Geometry
New Motion Study
Bill of Materials
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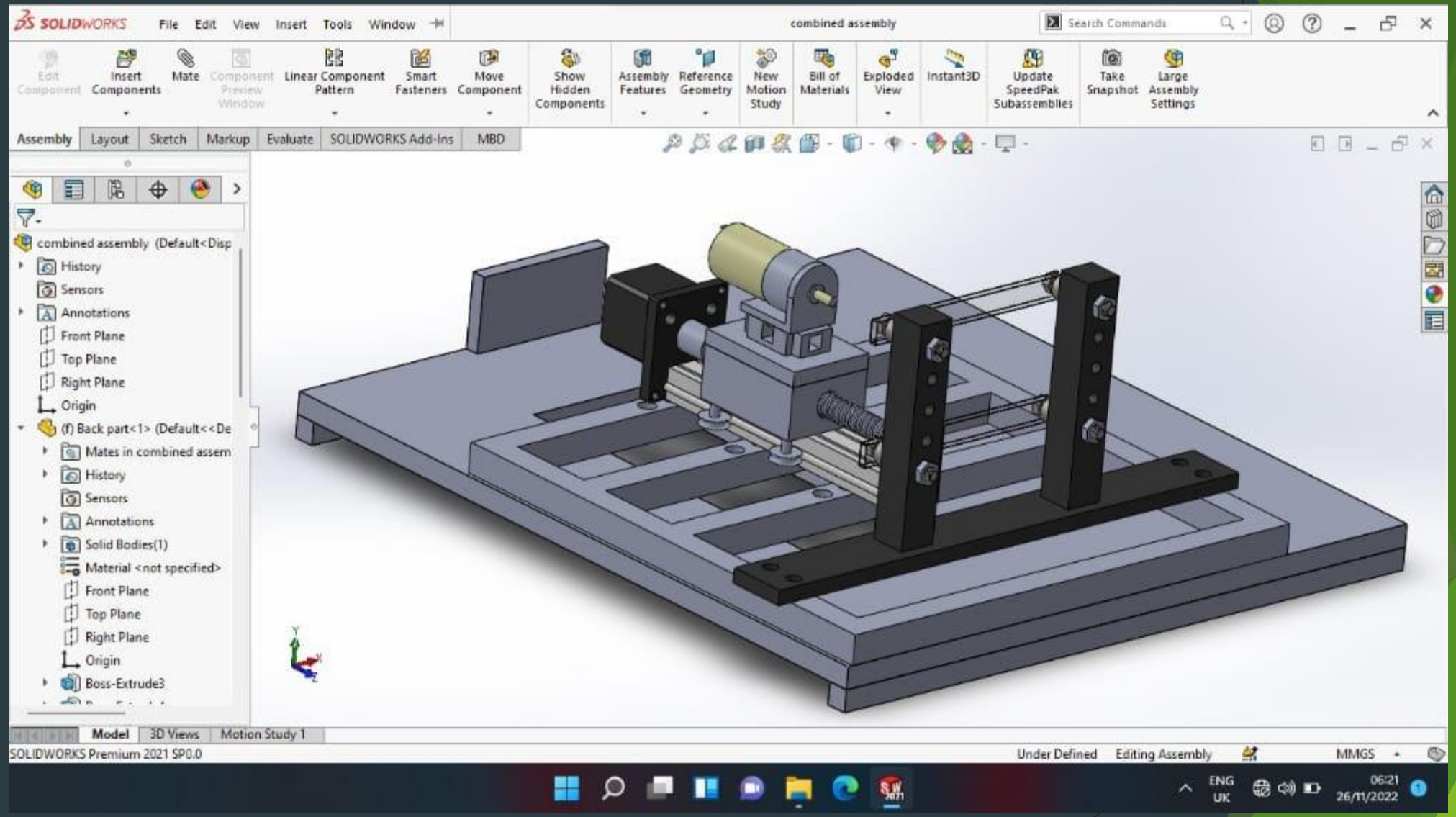
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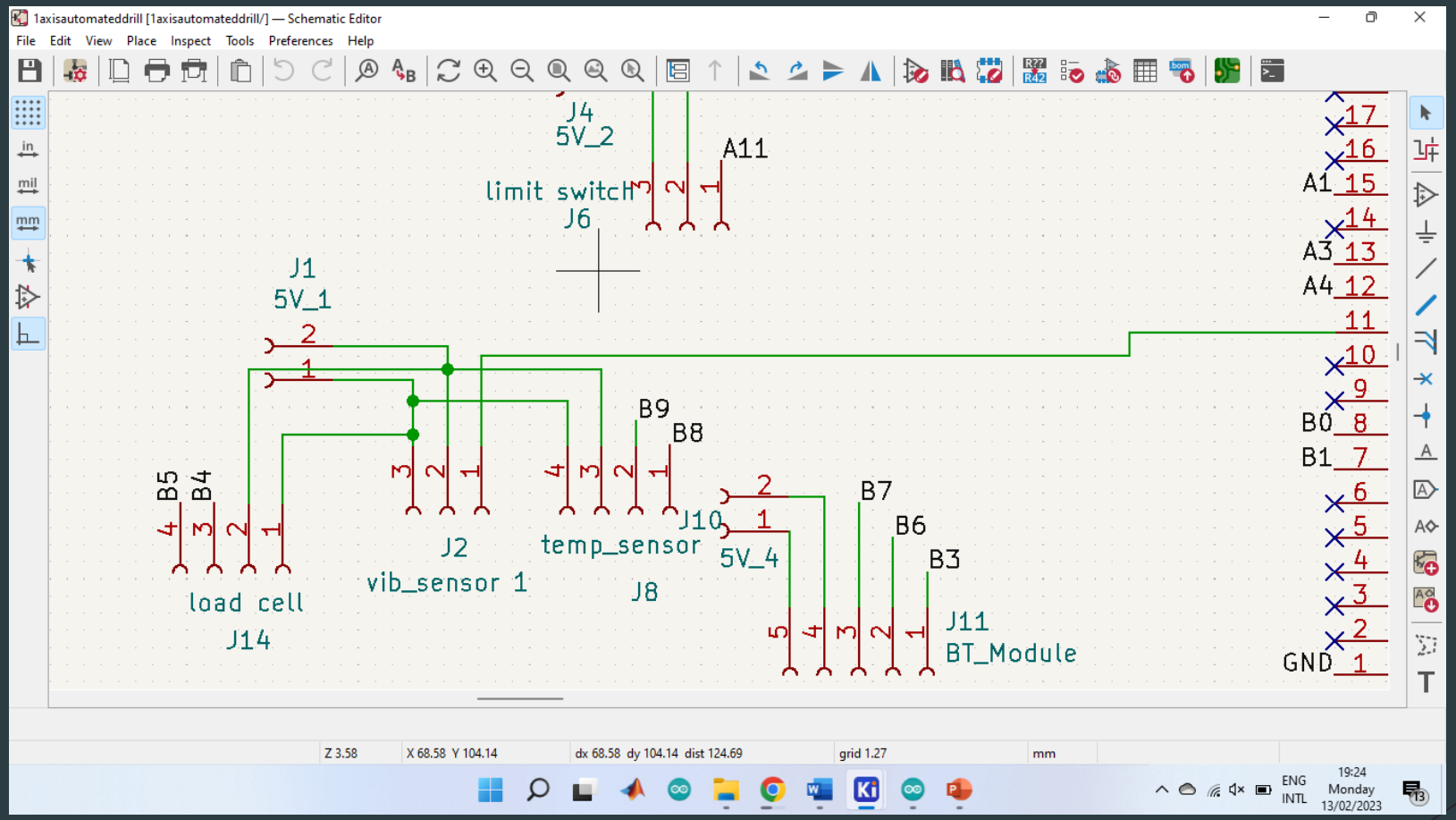
3. CIRCUIT DESIGN IN KICAD



3. CODE SECTION

oneaxisdrill_code | Arduino 1.8.19

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oneaxisdrill_code

```
//======================SWITCHES=========================
//vibration PA5
//TEMPERATURE B8,B9
//LOAD CELL SCK B4,SCL B5
//ENCODER B0,B1

const int vibration =PA5 ;
const int limitswitch = PA11;
bool calibrate=false;

const int enA =PB12 ;
const int in1 = PB13;
const int in2 = PB14;

//=================start and stop button=========================
const int Startmachine =PA3 ;
const int  Stopmachine= PA1;

#include "HX711.h"
HX711 scale;
float calibration_factor = 380;
float units;

// Define stepper motor connections:
#define dirPin PA8
#define stepPin PB7

int target=1700;
```

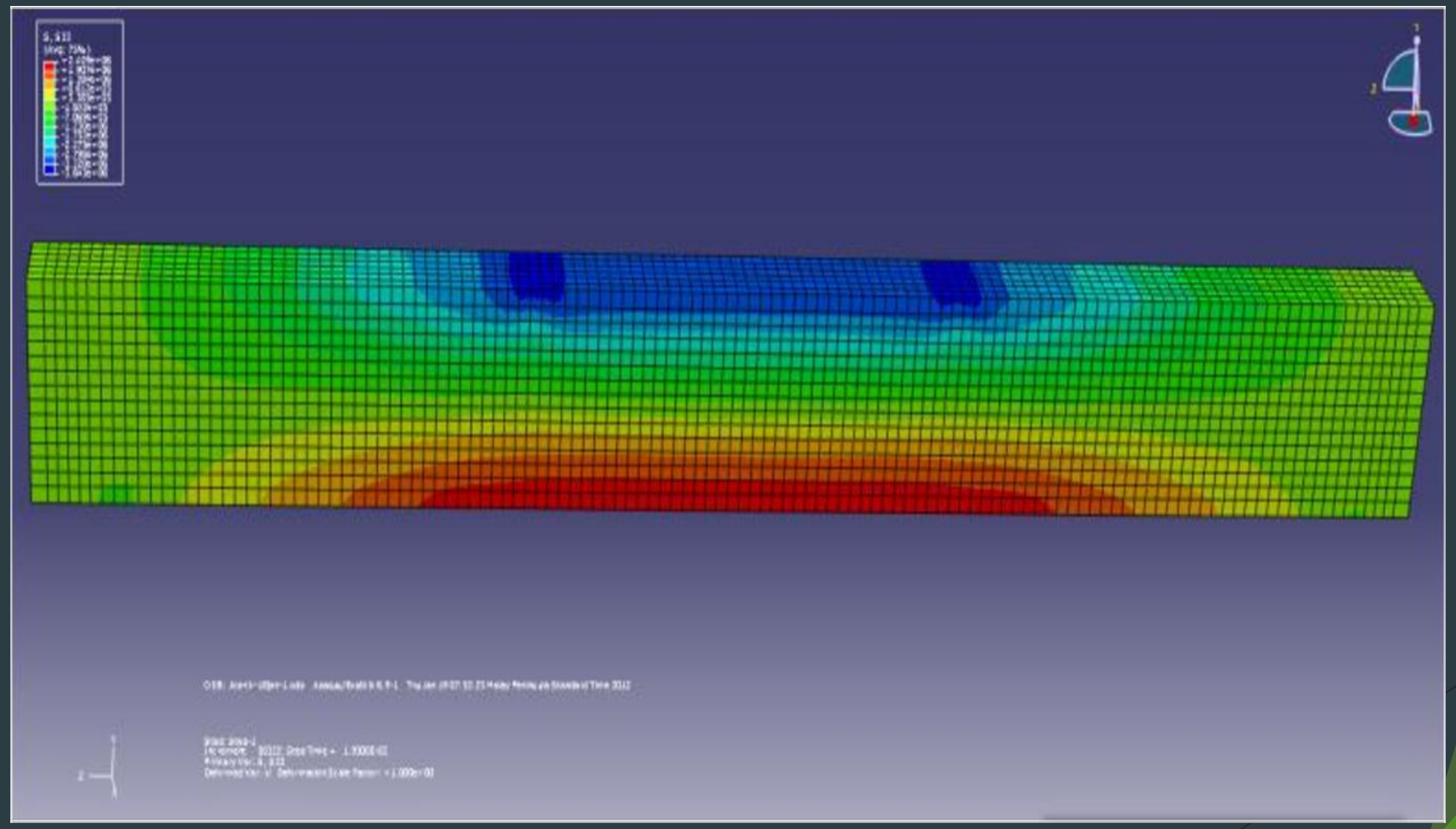
```
void setup() {
  pinMode(Startmachine, INPUT);
  pinMode(Stopmachine, INPUT);
  pinMode(limitswitch, INPUT);
  pinMode(in1, OUTPUT);
  pinMode(in2, OUTPUT);
  pinMode(enA, OUTPUT);

  pinMode(stepPin, OUTPUT);
  pinMode(dirPin, OUTPUT);

  scale.begin(PB4, PB5);//initialize the load cell
  scale.set_scale(calibration_factor);
  scale.tare();
  Serial1.begin(9600);
}

void loop() {
//  if(analogRead(Startmachine)>=3){
////    gethome=false;
////  SpindleControl(1);
//   feedControl(1,1);
//  }else{
//     if(analogRead(Stopmachine)>=3){
//  //     SpindleControl(0);
//         feedControl(0,1);
//      gethome=true;
```

4. FINITE ELEMENT ANALYSIS IN ABAQUS



THINGS WE DIDN'T ACCOMPLISH

- Deeper dive into finite element analysis in Abaqus and Ansys.
- Full circuit design and simulation.

FUTURE PLAN DURING ATTACHMENT PERIOD

1. Modification of Solid works mechanical design.
2. Interaction with Abaqus and Ansys.
3. Circuit research, design and analysis in Proteus and Kicad.
4. Code optimization