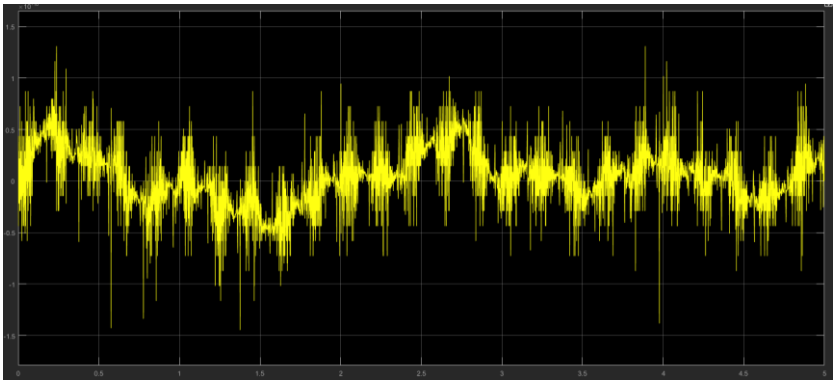
GRAND CHALLENGE INDIA (IDIA)

EXECUTIVE SUMMARY-

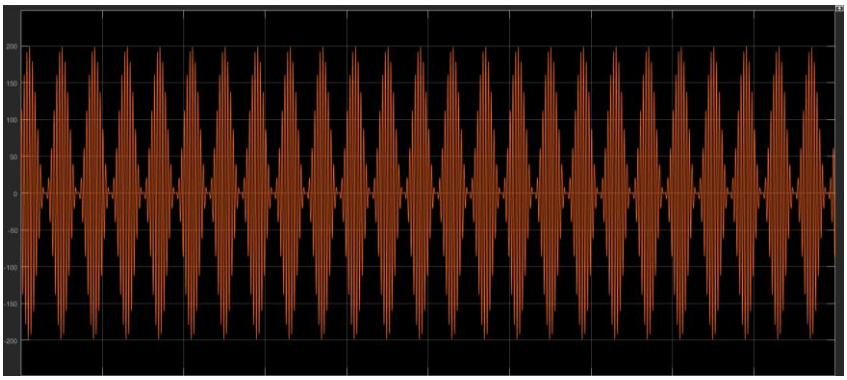
- This product aims to build an advance but cost-effective Infusion Pump in order to have a real time patient data analysis.
- It will provide accessibility to the doctors and the health workers to have direct control over the Infusion Pump in case of any system issue.
- A data base has been created to keep record of patient's response to the medication.
- In addition to this a Battery Energy Storage System(BESS) has been provided to have power back up in case of power cut off.

BESS MATLAB SIMULATION:

VOLTAGE ANALYSIS BETWEEN PHASES:



CURRENT ANALYSIS:



DATA MANAGEMENT:

```
\CREATING PATIENT DATABASE.................
START LOADING .....
Patient id num= 22
NAME=DONA
BLOOD GROUP=B+
HEIGHT= 160
AGE= 21
BLOOD PA= 120
ADULT DOSE IN mg()= 500
GROWN
FRIED RULE
DOSE(in mg) =5.83333
....DATA EXTRACTION WITH ATMEGA2506....
***PROVIDE DETAILS OF INTUTTION PUMP****

MINIMUM RATED PRESSURE= 23
MAXIMUM RATED PRESSURE= 38
CURRENT PRESSURE= 30
 BODY TEMPRATURE USING LM35 TEMPRATURE SENSOR
37
PRESSURE AND TEMPRATURE IN RANGE........
***SYSTEM WORKING GOOD***
ALARM OFF
Get well soon
..... DATA AQUISITION FOR INTUTION......

Process returned 0 (0x0)   execution time : 70.417 s
Press any key to continue.
```

DATA ACQUISITION CODE WITH ARDUINO IDE:

flow_and_temp_check§

```
volatile int flow_frequency;
unsigned int l_hour;
unsigned char flowsensor = 2;
unsigned long currentTime;
unsigned long cloopTime;
int t=0;
void flow ()
{ flow_frequency++;
}
void setup()
{
   pinMode(flowsensor, INPUT);
   digitalWrite(flowsensor, HIGH);
   Serial.begin(9600);
   attachInterrupt(0, flow, RISING);
   sei(); // Enable interrupts
   currentTime = millis();
   cloopTime = currentTime;
}
void loop ()
{currentTime = millis();
 t=t+1;
   if(currentTime >= (cloopTime + 1000))
   {  cloopTime = currentTime;
      l_hour = (flow_frequency * 60 / 7.5)*0.277778;
      flow_frequency = 0;
      Serial.print(l_hour, DEC);
```

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GOAL-

- **TO design an advance INFUSION PUMP for effective and accurate medication.**
- **To provide real time data acquisition of medication process.**
- **Providing interconnected network between patient, doctors and health workers.**

SPECIFIC PROBLEMS-

- Infusion pumps are frequently used to administer medications, pump failures can harm patient body.
- Lack of user awareness.
- Alarm error.

APPROACH

OBJECTIVE	IMPORTANCE
SEARCH BOX	• For easy navigation-easy to use
BLUETOOTH CONNECTION	• Doctor and nurses will be able connect their mobile with the system to control it

	through possible distance.
AUTOMATIC DOSE CALCULATOR	• It will calculate dose of medicine automatically depending on the various parameters.
DATABASE MANAGEMENT	• Database is created to handle and store dosage history of the patient.
BATTERY	• For power backup in case of power failure.
ALARM SYSTEM	• Alarm will beep in case of system issue.
INFUSION RATE ONTROLER	• It will analyze the fluid flow rate through infusion pump.
PISTON SYRING SLOTE	• To control the fluid.
GSM NETWORK	• Used in order to provide notification to concerned authorities about any issue in the system.
LOW COST	• It will be easily affordable.

COLLABORATION-

Team member:

1. DONA DAS(SEA COLLEGE,BANGALORE)
   -Providing data with amount of drug intake of the patient based on various body parameters.
2. SAURAV ROY (VIT UNIVERSITY,VELLORE)
   -Simulating and designing the infusion pump .Handling the electrical and electronics part .

BUDGET

PRODUCT NAME	PRICE OF PRODUCT	LINK
MICROCONTROLLER(ARDUINO UNO)	500	**https://www.amazon.in/Generic-ATmega328P-Compatible-ATMEGA16U2-Arduino/dp/B015C7SC5U/ref=sr_1_3?ie=UTF8&qid=1515405685&sr=8-3&keywords=arduino+uno**
PNEUMATIC VALVES	1631	https://www.amazon.in/Generic-Position-Operated-Pneumatic-4H210-08/dp/B074295132/ref=sr_1_1?s=industrial&ie=UTF8&qid=1515406000&sr=1-1&keywords=pneumatic+valve
ELECTRONICS (RELAYS, MOSFET, HEAT SINKS, RESISTOR,P-N JUNCTION DIODE,LEDs)		
SENSORS(HC05 MODULE)	315	https://www.amazon.in/Wireless-Bluetooth-Serial-Transceiver-Arduino/dp/B00JP05S6C/ref=sr_1_2?s=industrial&ie=UTF8&qid=1515406165&sr=1-2&keywords=hc05+bluetooth+module
BATTERY(LITHUIM ION)	165	https://www.amazon.in/TP4056-lithium-Battery-Charging-Charger/dp/B00JQ2VG1A/ref=sr_1_1?s=industrial&ie=UTF8&qid=1515406223&sr=1-1&keywords=lithium+ion+battery
GSM MODULE(GSM900)	370	https://www.amazon.in/KitsGuru-M590-900-MHz-1800/dp/B01G8JK222/ref=sr_1_2?s=industrial&ie=UTF8&qid=1515406391&sr=1-2&keywords=gsm+900+module
BUZZER	180	https://www.amazon.in/Robo-India-PBUZZ5-Pizo-Buzzer/dp/B00W7ATBYC/ref=sr_1_1?s=industrial&ie=UTF8&qid=1515406499&sr=1-1&keywords=buzzer
FLOW RATE SENSOR(YF-S201)	360	https://www.amazon.in/REES52-YF-S201-Sensor-Yf-S201-Flowmeter/dp/B01L1B7FL8/ref=sr_1_1?s=industrial&ie=UTF8&qid=1515406570&sr=1-1&keywords=yfs201
TEMPERATURE SENSOR(Lm35)	140	https://www.amazon.in/LM-35-Temperature-Sensor-Robokart/dp/B00ZNCBQ9O/ref=sr_1_1?s=industrial&ie=UTF8&qid=1515406686&sr=1-1&keywords=lm35
TOTAL PRICE	**3,661**	

SOFTWARE USED

- Codeblocks
- Arduino IDE
- MATLAB