Chemical Safety Machine

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Chemical Safety Machine

Objective:

- Idea
- Introduction about project.
- Our project with public Safety
- Problems
- Mechanical Functionality
- Electronic Functionality
- Software Functionality
- Demo

Safe is very important thing
Safety is a pressing social need

Idea

- **The basic idea of our project is public safety in chemical laboratories.**
- **Safety is first.**

Idea (cont…)

http://www.time4science.com/images/labsafety/labsafety2.JPG

- **Chemical experiments may be cause some dangerous.**
- **Some of the possible outcomes of those interactions that cause burns on the skin or possible cause suffocation because of possible gas.**

Idea (cont…)

- In our project we isolate those hazardous chemicals on humans.
- The machine controls the mixing elements and chemical solutions with each other.
- So it is these interactions may be in a more safe and away from danger.
- This is keep you away to dealing directly with the products of these hazardous reactions, because all of things are done on away.

Idea(cont..)

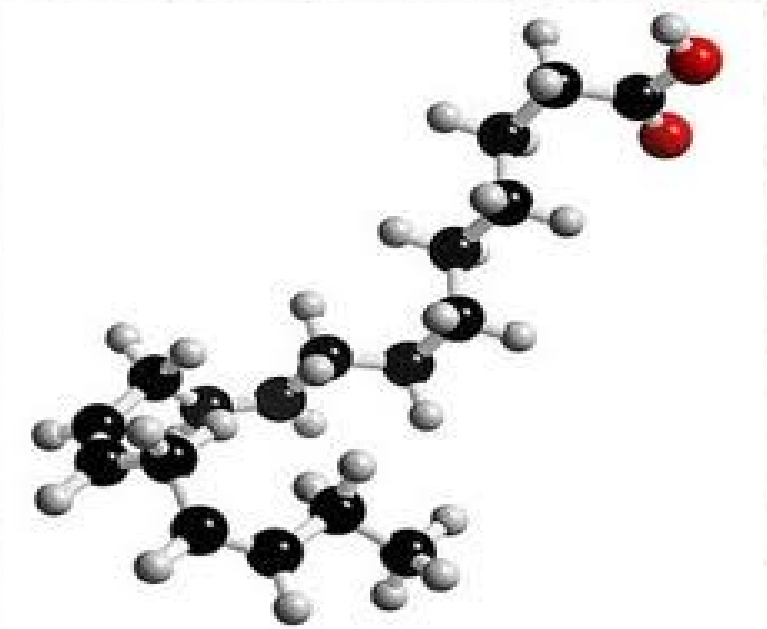
$$Zn_{(s)} + 2HCl_{(aq)} \longrightarrow ZnCl_{2(aq)} + H_{2(g)}$$

$$Mg_{(s)} + CuSO_{4(aq)} \longrightarrow MgSO_{4(aq)} + Cu_{(s)}$$

$$Cu_{(s)} + 2AgNO_{3(aq)} \longrightarrow Cu(NO_3)_{2(aq)} + 2Ag_{(s)}$$

$$2Na_{(s)} + 2H_2O_{(l)} \longrightarrow 2NaOH_{(aq)} + H_{2(g)}$$

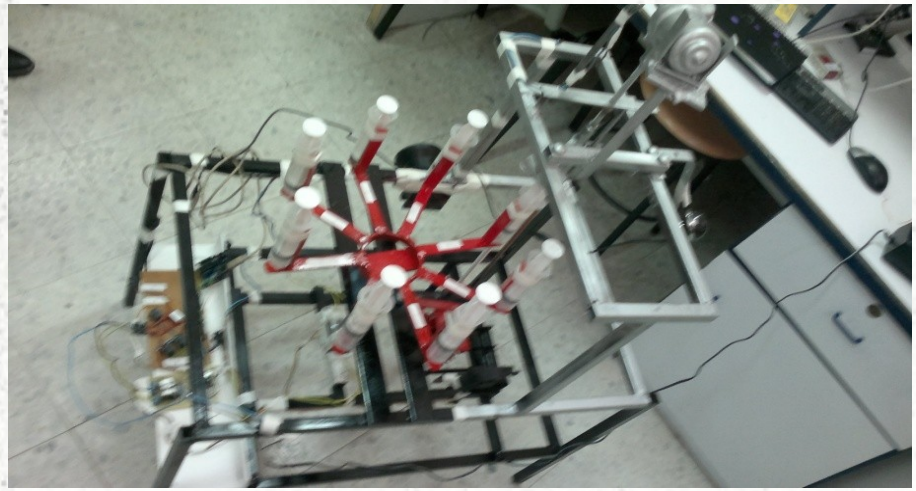
Chemical Safety Machine *(CSM)* apply chemical experiments by getting the chemical equation from chemists. that connect with server about network or Internet.



First Steps

- We build our Machine from the ***scratch***.
- We designed the outer Skeleton in mechanical engineering labs, we spent more than month to build this design
- We had faced some problems in the design, especially mechanical problems but we managed to overcome some of them, but not perfect accuracy.

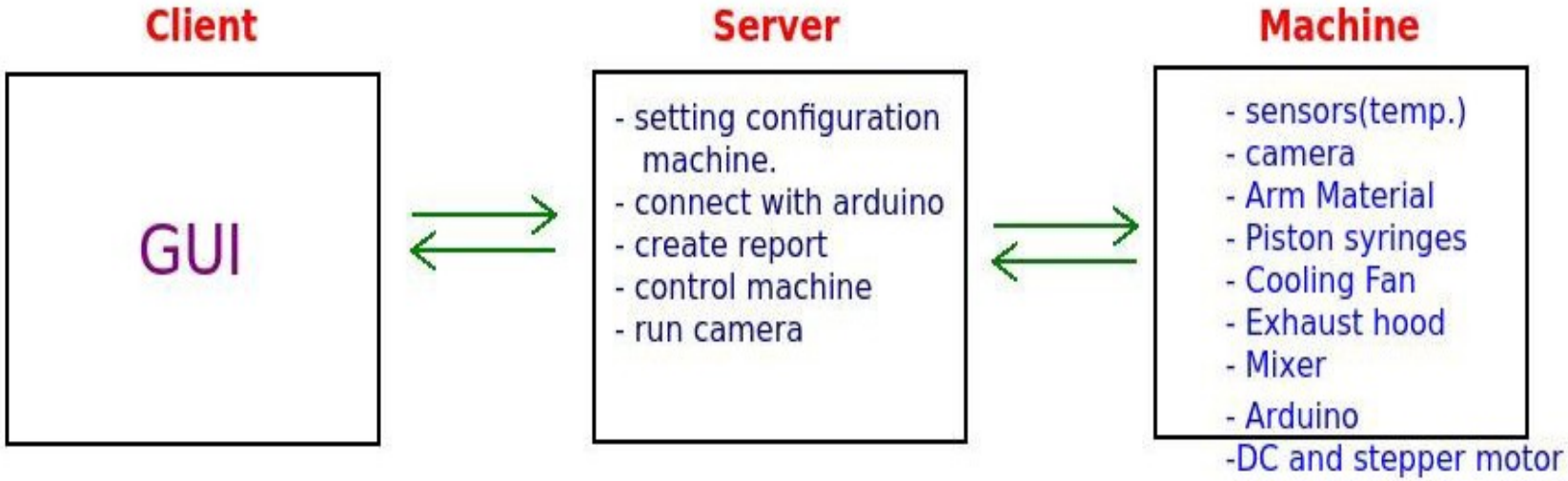
First Steps (cont….)



- **Then the next step is put the rest of the elements on the Skelton such that (DC motor, Stepper Motor, some electronic circuit….etc).**

- **This design is built to isolate the tube in which you interact safely and away from danger is equipped with a cooling fan and a suction fan, and mixer**

First Steps (cont....)



The system represent from software and hardware interact together.

Mechanical And Electronic Functionalities

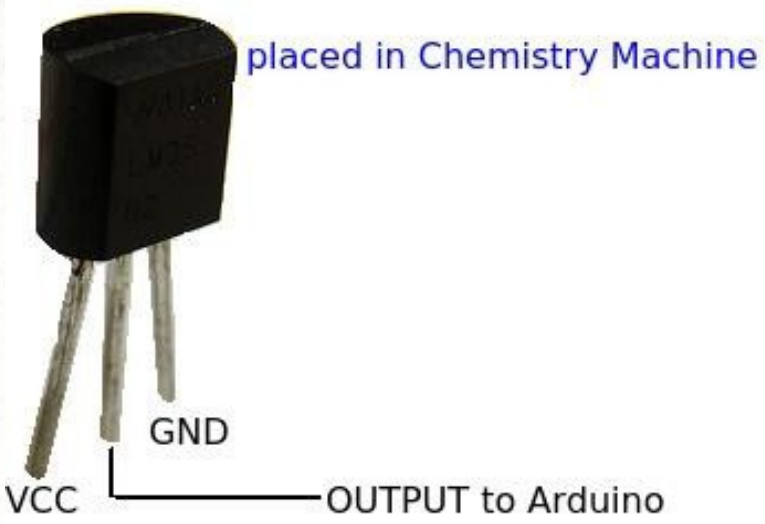
Arduino

- Used to control all parts in the system .
- Receives commands from the application.

- Temperature sensor

-Used to measure the temperature of the experiment.

-When temperature greater than specified range cooler run



Compressor Dc Motor

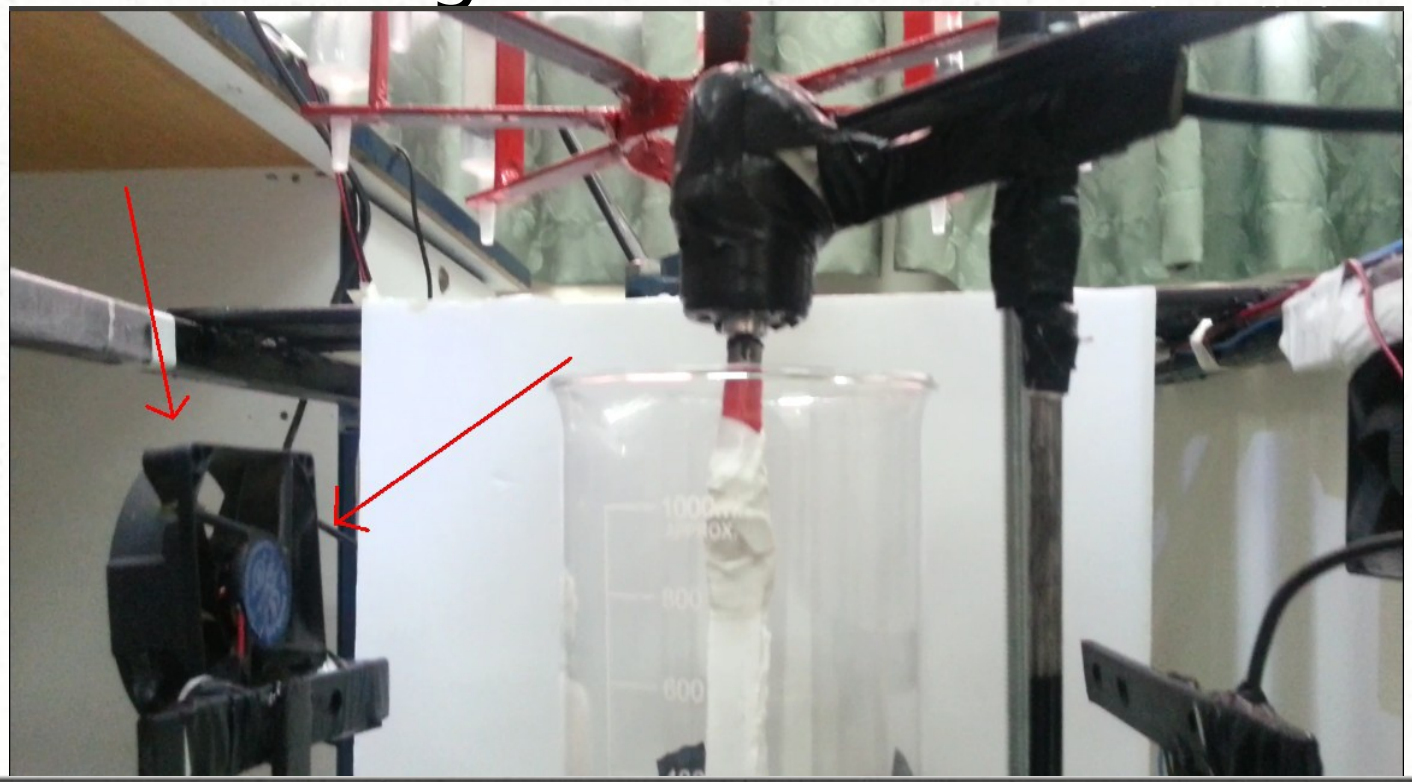
- Used to compress material syringes
- Move in two direction , down to compress the syringe and up to move back to the original position
- Specify the amount of material by moving time of th motor .

Stepper Motor

- Used to move syringe bars to get to reaction materials .
- Divided to 8 parts (interval) ,each interval move bars to the following bar .

Cooling fan

- Used to cool the experiment
- Automatically turned on when temperature high

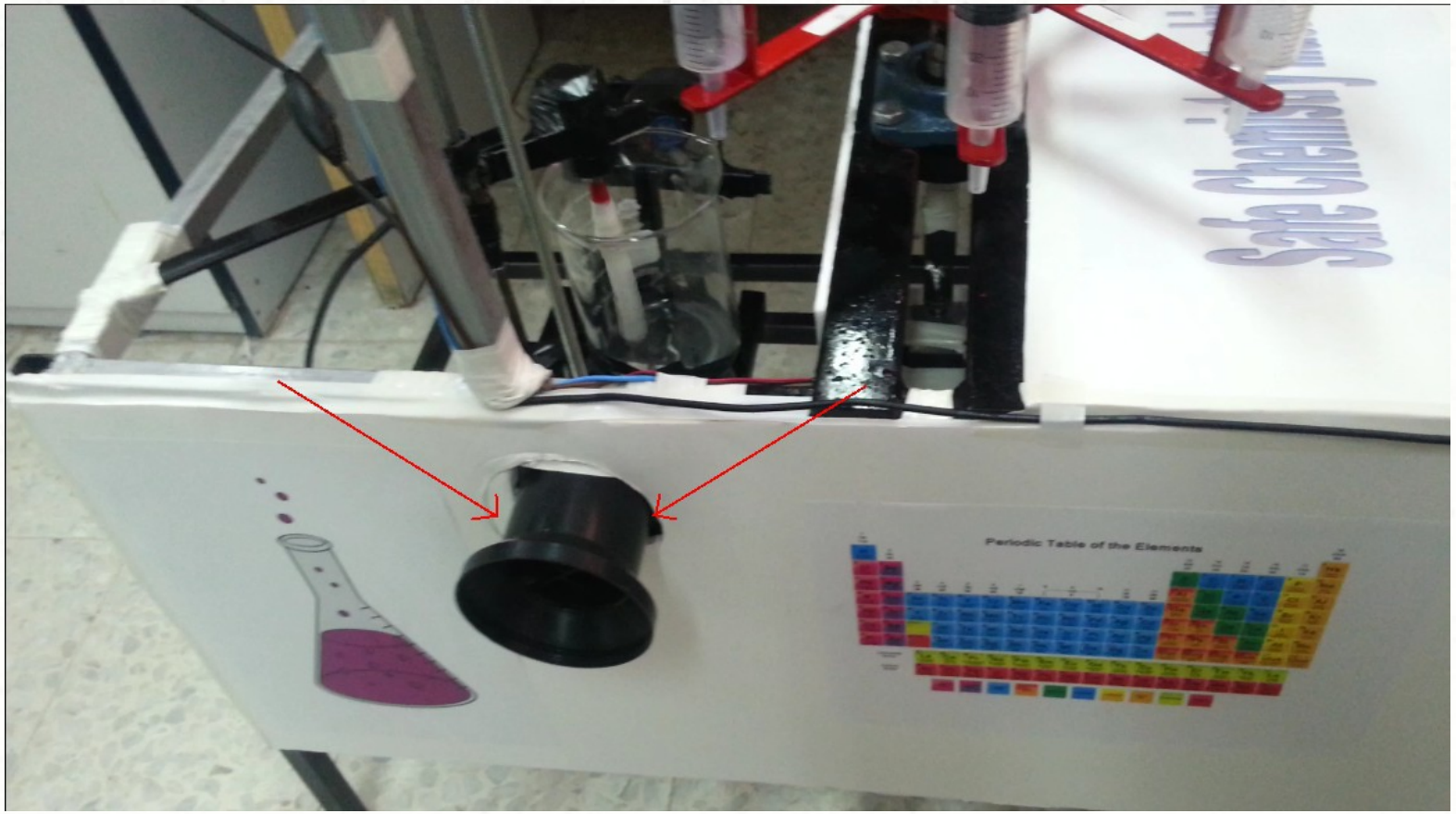


Mixer

- Used to mix the materials in The reaction flask

Hood Air

- Used for Purification of the air in the system



Software

- Arduino Programing: C Language
- Serial Control: Python

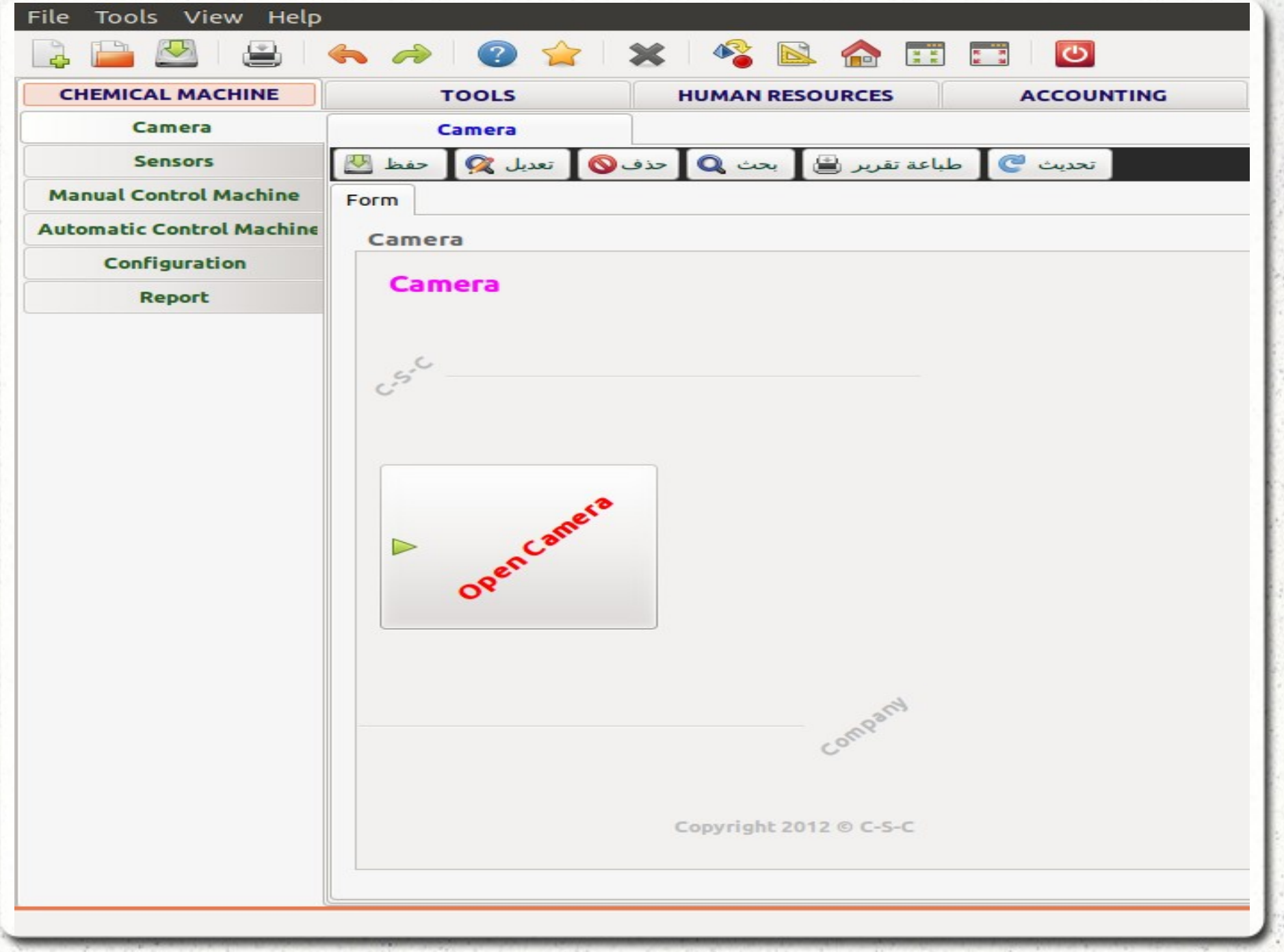
Software Functionality

- Security.
- Network Camera for experiments monitoring.
- Configuration for Setting Machine and Message.
- Automatic Machine Control.
- Manual Machine Control.
- Sensors.
- Report.

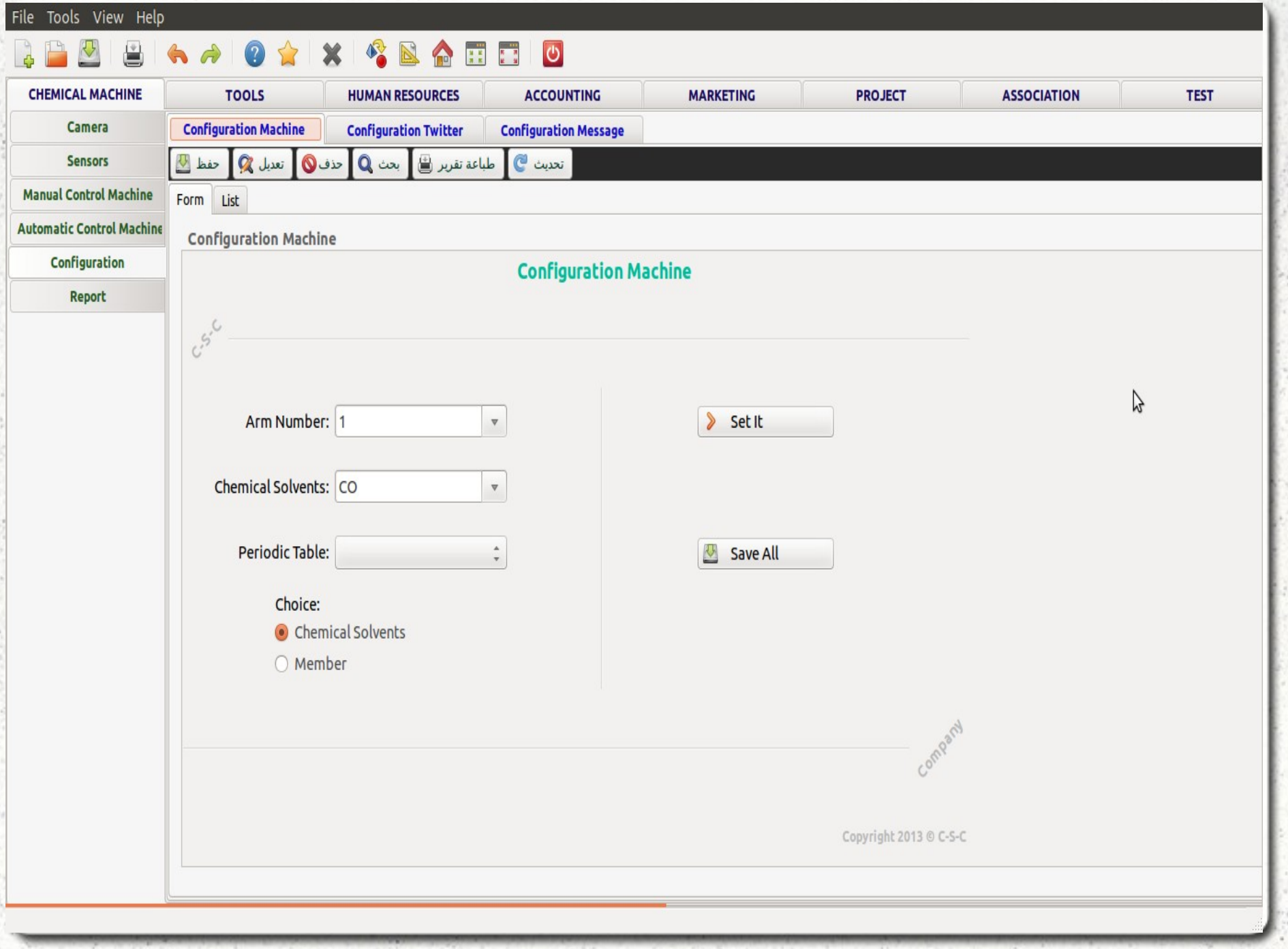
Security Software

- Server and Client Data **Encryption**
- Login About Secure Network.
- **User name and password** to login.
- User levels

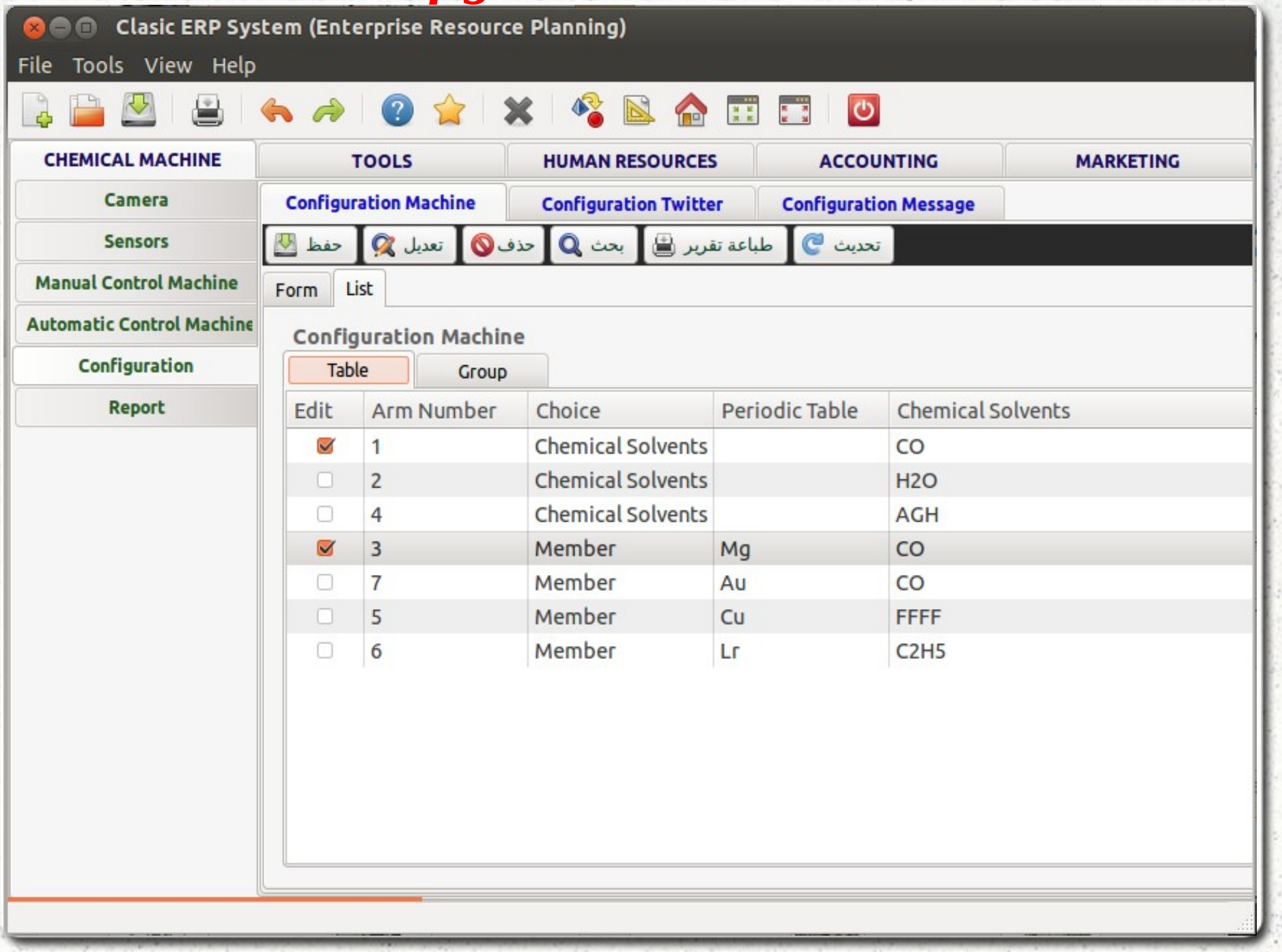
Networking Camera



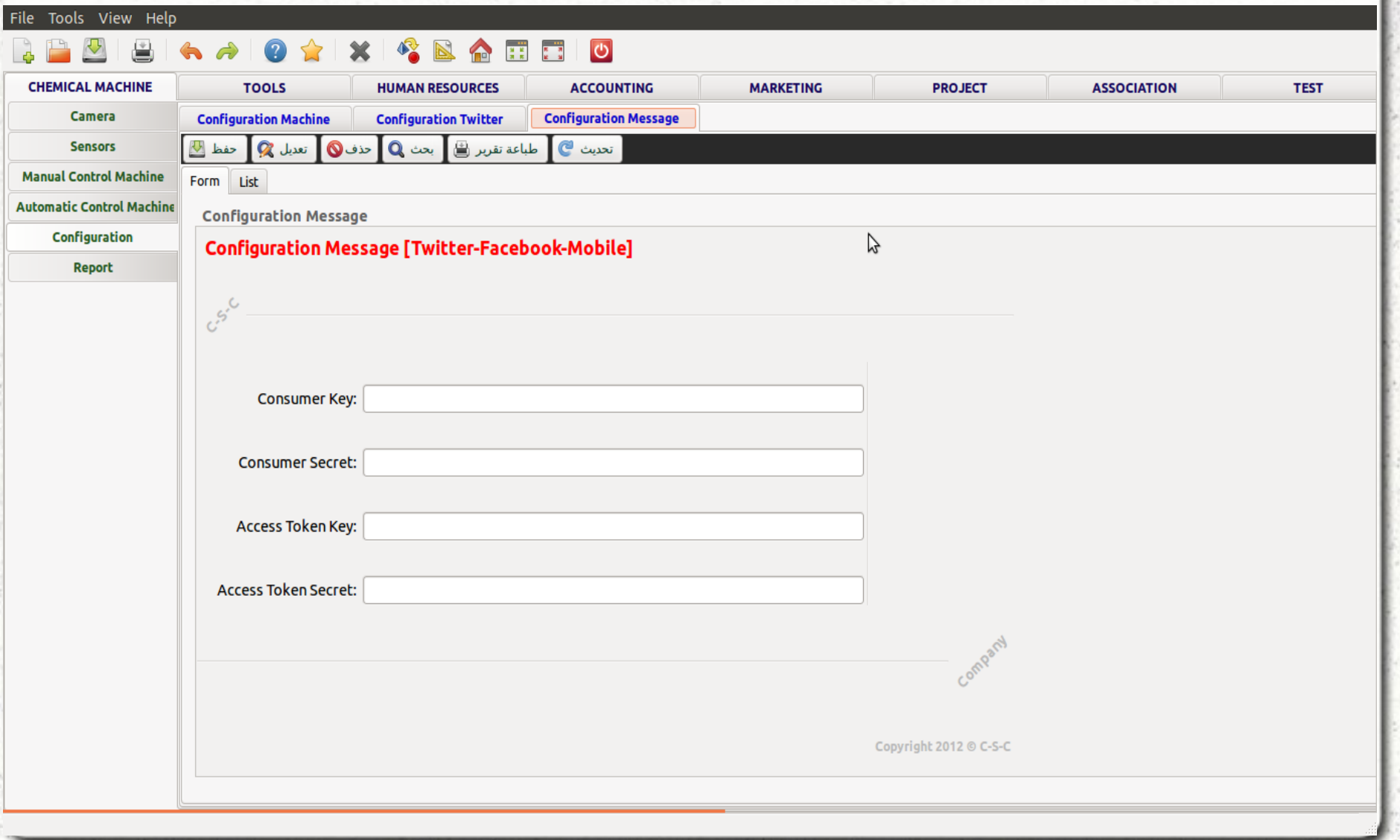
Configuration Machine



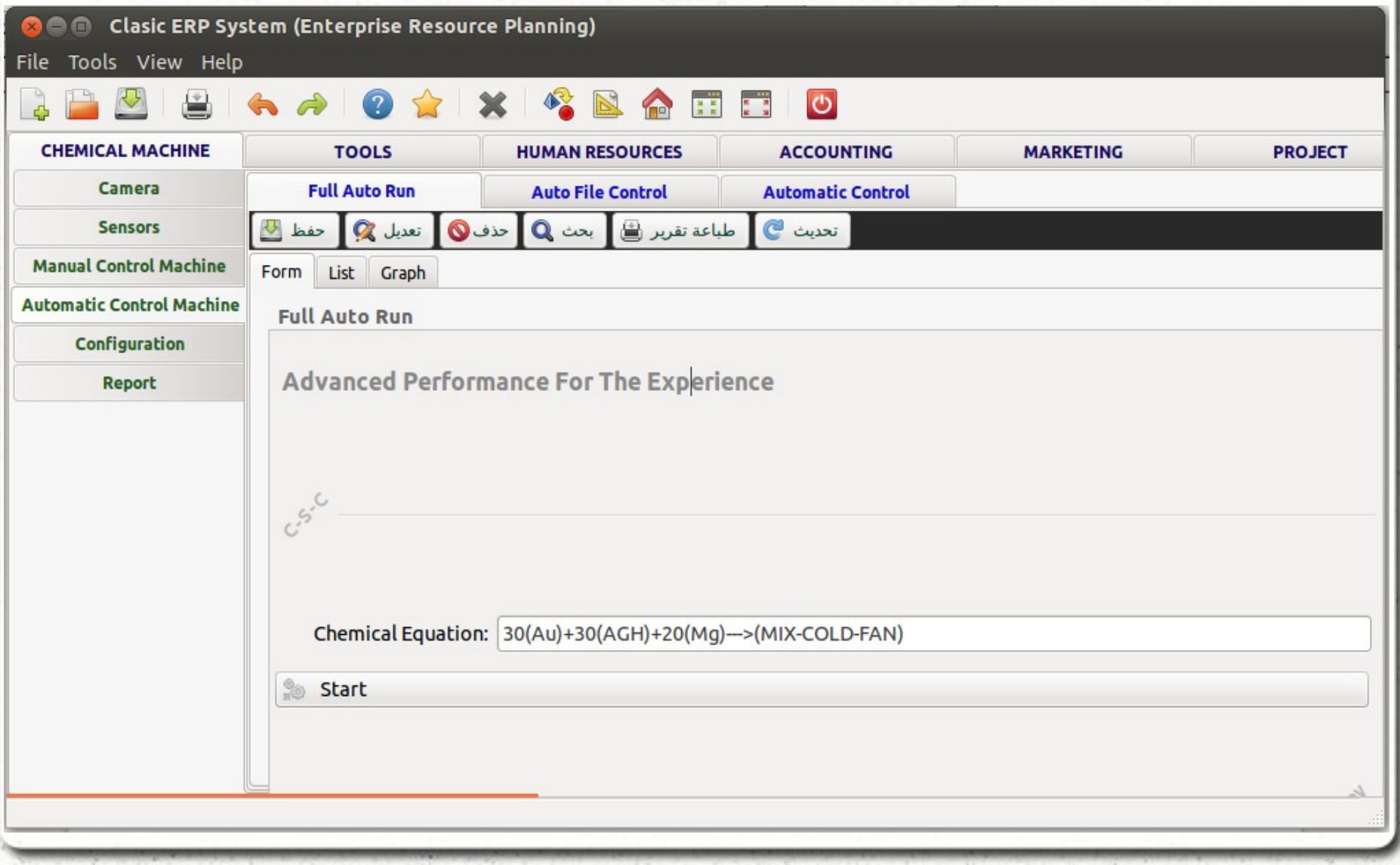
Configuration Machine



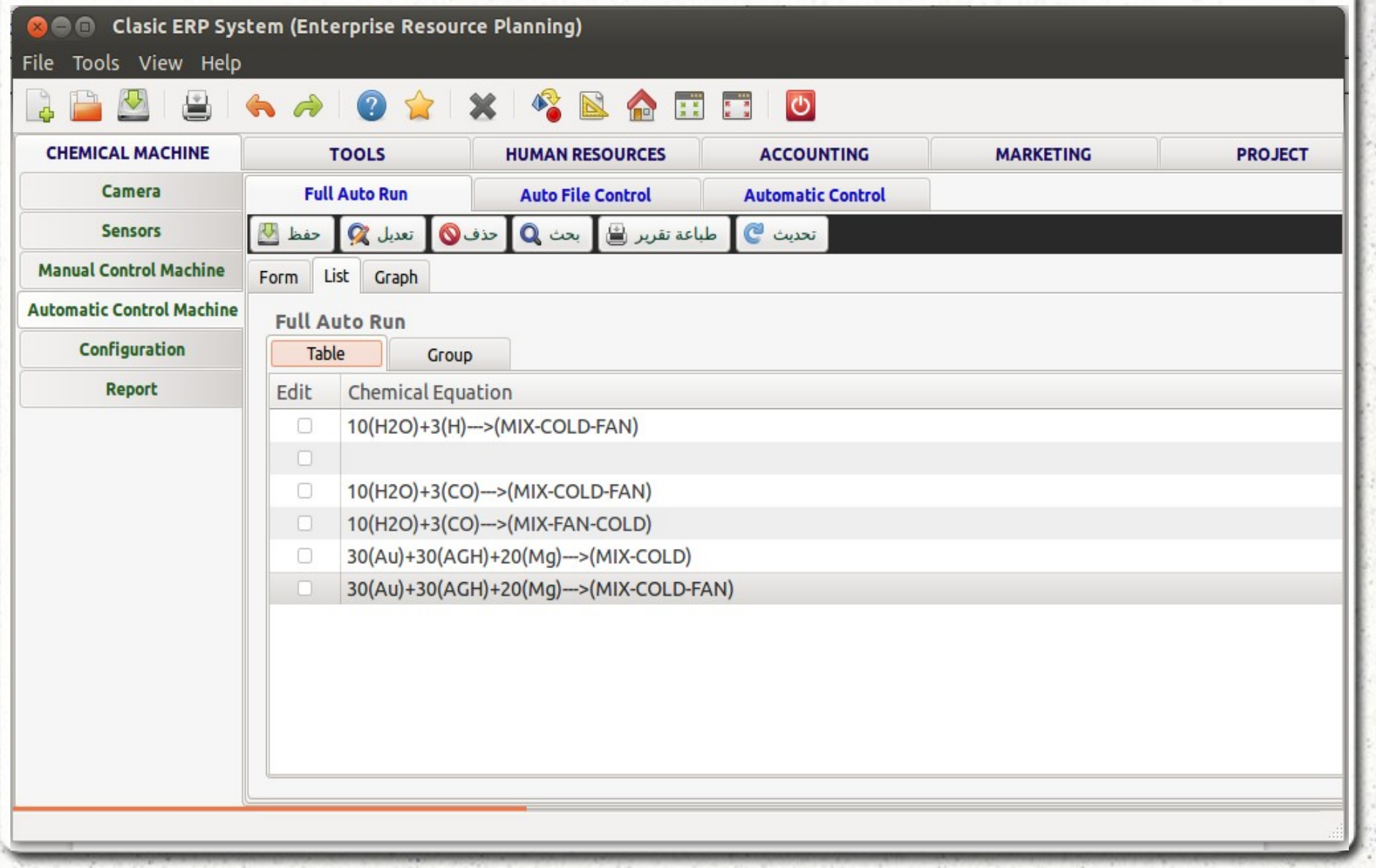
Configuration Message



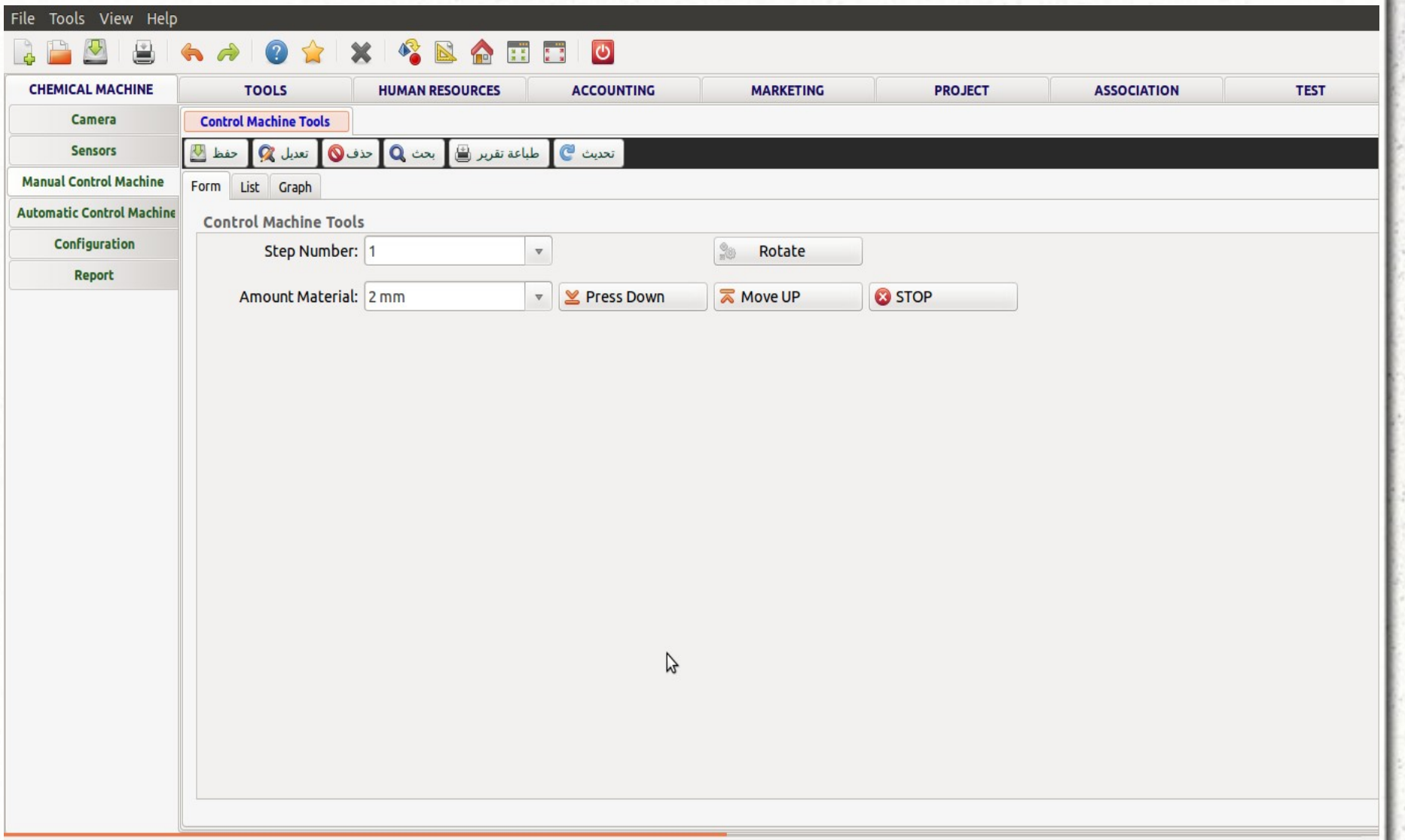
Automatic Machine Control

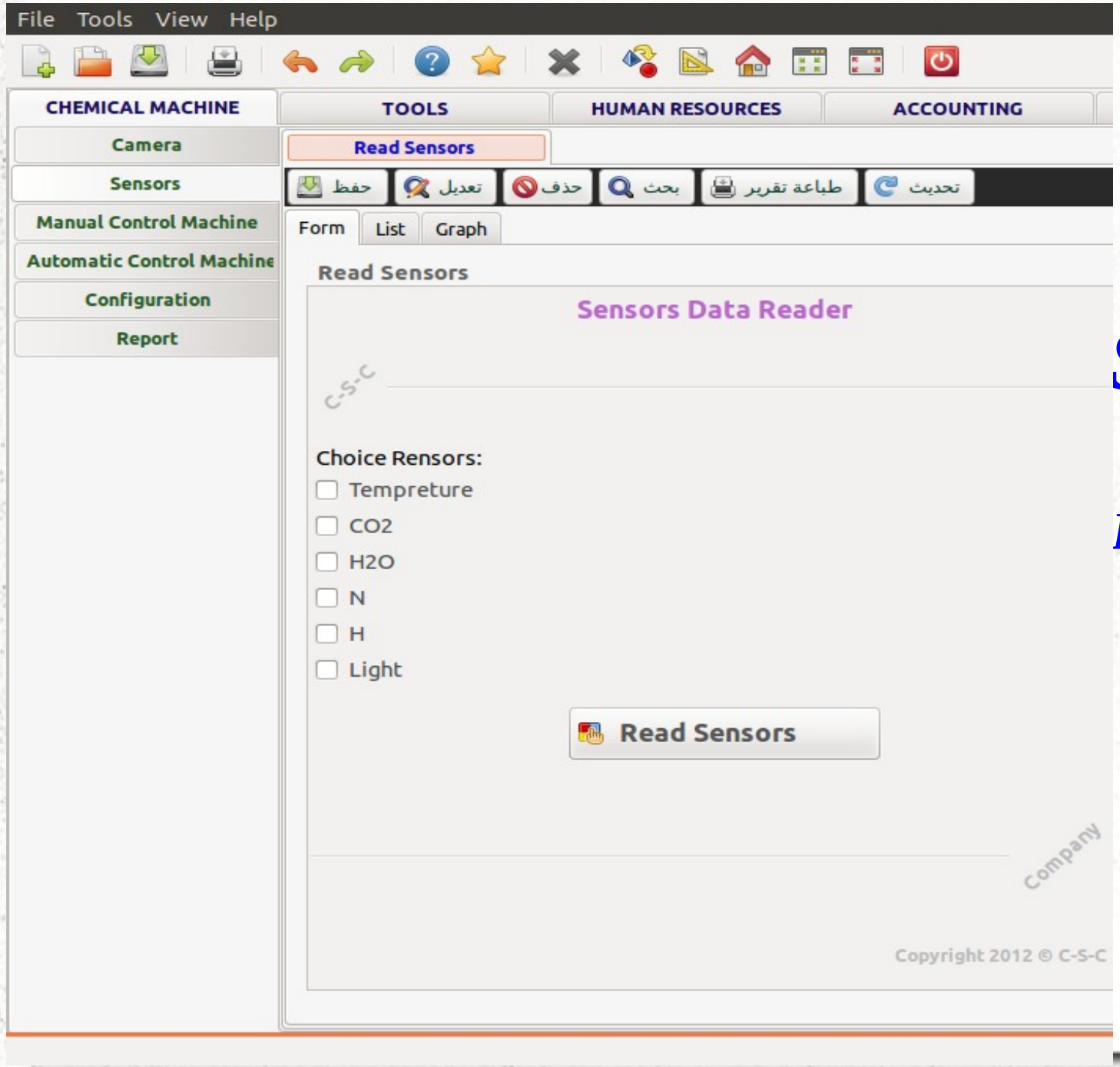


History for Equation



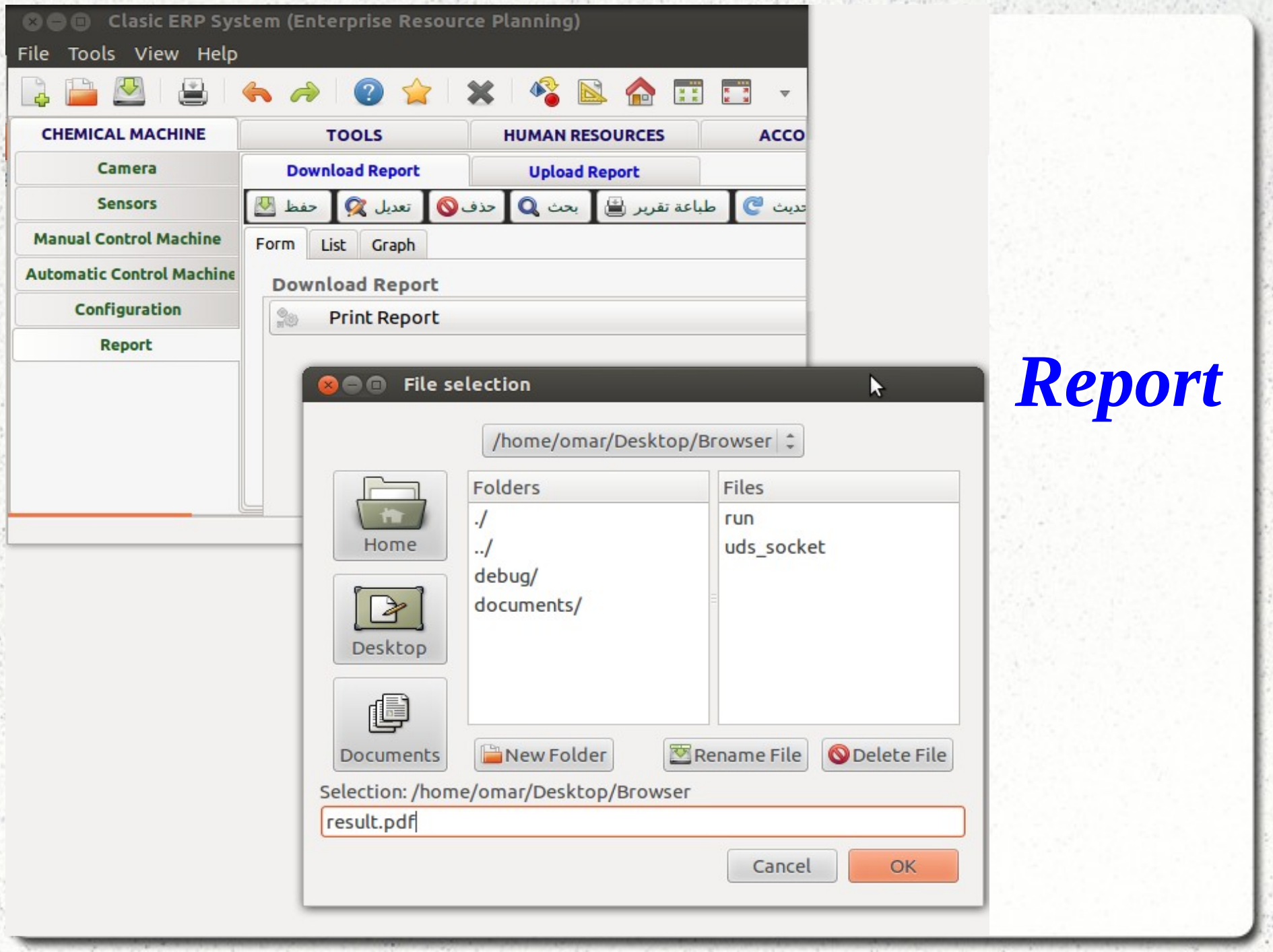
Manual Control Machine





Sensors

Future Work


Clasic ERP System (Enterprise Resource Planning)
File Tools View Help
CHEMICAL MACHINE
TOOLS
HUMAN RESOURCES
ACCO
Camera
Sensors
Manual Control Machine
Automatic Control Machine
Configuration
Report
Download Report
Upload Report
حفظ
تعديل
حذف
بحث
طباعة تقرير
تحديث
Form
List
Graph
Download Report
Print Report
File selection
/home/omar/Desktop/Browser
Home
Desktop
Documents
Folders
./
../
debug/
documents/
Files
run
uds_socket
New Folder
Rename File
Delete File
Selection: /home/omar/Desktop/Browser
result.pdf
Cancel
OK

Report

Demo

Thank You