

# [Cyborg Hedwig]



A-Level Coursework by Vagif Aliyev  
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# **Definition, investigation and analysis**

## **Definition - nature of the program to be investigated**

### **About the Organization**

[Alan should have this]

### **About end user**

The machine will only be available to certain customers since it is handmade and can not be mass produced. Therefore, anybody with the intention of having the machinery must contact the Company if they are interested in purchasing the product.

No requirements are needed to use this device since all parts will be assembled before hand. Connecting the device to a plug is the only possible Requirement.

The ideal end user would be someone who is interested in robotics or people who would like to use the video & audio recording of the device in conference to contain a first person view of the conference.

### **Areas of Development**

The two major areas of development are:

- Audio Object Localization
- Processing Audio & Video

The core of the application is the Audio Object Localization module. This will determine the location of the source of the sound and only then relevant data can be fetched. The location will be determined by comparing the data received from two sound sensors using a library called [insert here].

The Processing of Audio and Video .....

Both of these areas of development are crucial due to the application and must be given a lot of thought.

### **About the Data**

The sound data in its raw format will be fetched from the sound sensors. This method will provide micro controller with values from sound sensors which will need to be processed in order to find the location of the source.

Other data, concerning Audio and Video will be derived from the attached camera

# Investigation and Analysis

This section covers the pre-production communication with the client, Peter Thomas, in order to establish the project, determine its feasibility and arrive at a requirement specification that both parties agree upon.

## System Analysis and Communication

To understand the project clearly, my client and I exchanged emails and met at various occasions. An out-take of conversation is documented below. Emails by my client are in green and emails from me are in yellow.

Dear John,

I received your email from Alan Milosevic, who is one of my mentors, regarding the course project. I hope you can provide a project for me to produce for you. I am willing to take up a challenging project, especially one involving motors and sensors.

Best Regards,

Vagif Aliyev

Hi Vagif

I've had a chat to Alan about you and apparently you're intending to apply to university to study engineering. For the past four or five years or so we've worked with Alan's students on a varied collection of projects which have ranged from iOS applications to automated train systems to writing in the air. Without exception every project has been a real success, so much so that this year again we're happy to suggest a range of projects that we and/or our clients would like to see.

You mention that you'd like something involving motors and sensors. Many, many years ago some friends and I built a really interesting project that involved a stuffed owl, a bunch of discrete electronics and software. The owl has long since disappeared but I've often wondered about building it again. So, if you're up for it, this is it in a nutshell.

Take one large owl (stuffed or a toy)

Put some means of sensing sound in each ear.

Place motors in its neck

Put some electronics in its head

Write the appropriate software so that the head of the owl will rotate so as to equalise the pressure of any sound - i.e. move the head so as to point in the direction of the sound.

This was a great party piece - people found it hilarious as the owl moved to follow a conversation.

I'd love to see it work again.

It should be a very satisfying project - there will be a lot of trial and error working with the sensors and motors but with the introduction of the arduino board and the raspberry pi (and other controller boards that you should take a look at) you should be able to get something interesting up and running fairly rapidly I would hope.

If that isn't enough for you, I can think of plenty of extensions :-)

Hello Mr.Thomas,

It sounds really interesting and i would love to design such a machine. I have already played with motors and came to the conclusion that a Stepper motor would be more suited for the owl. I will contact you again after i have looked into sound sensors.

Regards

## **Summary of the pre-production Communication**

My client wishes me to build a robot owl which responds to sound by turning its head to the source.

The application is a device which can be put in a conference room to record a first person perspective of the conversation which will be saved on a memory stick both video and audio.

## **Requirement Specification**

### User Requirements

- The user should be able to obtain the data through a secondary storage device e.g flash disk

### Hardware Requirements

- A micro controller, Arduino in this case
- 2 Sound Sensors
- A Stepper motor
- Wires
- Power supply

### Software

- The micro controller will have everything already compiled and run on it e.g storage of libraries and code.

## **Client's confirmation to the Requirement Specification**

By signing this document, both parties agree that the requirement specification is satisfactory and pleases the client's vision to the application design and that the final product will be close to that described.

Developer's Signature: .....

Client's Signature: .....

Date: .....