

# Rotating Camera Based on Speaker Voice

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## ABSTRACT

We have introduced a whole new idea of video conferencing which has become increasingly widespread in the workplace. Previously, recording an important meeting under usual circumstances a person is hired to record the entire process of meeting, where an issue of cost, convenience and security arises. A camera can also be installed at the edge of the conference room to capture all the employees and their conversation on the screen. Both the processes force people to face in the direction of recording, which makes communication very awkward. We have designed a system, to be placed of the centre of the table and use microphones to locate the speaker and turn the camera to face them so that the emphasis is on the person currently speaking.

*Keywords:* Microphone, Voice Recognition Unit, Camera Rotation

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## I. INTRODUCTION

In conventional video conferencing systems, a person records the entire process and thus all the recording is done by rotating the camera manually. This type of arrangement may not work effectively in a conference room where a number of persons are talking at a given time. Secondly, in the web conferencing many cameras are mounted at fixed points which cause forcing the members of a conference to awkwardly facing towards the cameras over the entire meeting. Additionally, those persons sitting at the far end of the table are poorly captured on screen and thus it is not clear who is speaking. We provide a voice tracing rotating camera that will automatically track the speaker position and points in that direction, allowing employees to carry on the normal meeting. Since in meeting, members should be focused on the person speaking, our design would be valuable to companies that are using the web conferencing. The concept will be able to use microphones and rotate the camera according to the speaker.

In video conference system different technologies are developed in order to track the location of the current speaker. Currently, in video conferencing system camera located at corner of conference room in such way that camera captures the entire member's and the conversations available in conference room. This camera limited in one direction and also forcing the employees to face towards the camera in the entire meeting.

A simple electronic device which is capable of recording video session of a meeting or a conference eliminates the human effort, cost, and security issues. According to the present invention, an automatic voice rotation camera system and method of operations are provided that eliminate or reduce disadvantages and problem that are arises with previously developed video conferencing systems. According to the present invention, an automatic camera rotation system is provided. The system requires a person for handling the camera to receive control information for controlling a view of the camera. A microphone array includes a number of microphones. The microphone array is used to receive a voice of a speaker and to provide an audio signal representing a voice. A camera controller couples to camera and is operable to receive the speaker position data and to determine an appropriate camera movement. Also necessary control actions are needed to camera so that it automatically tracks the position of the speaker.

### Objective

To make a simple electronic device this is capable of recording video session of a meeting or a conference using automatically rotating camera. To control actions and automatically track the position of the speaker using the microphone array and rotating camera.

**II. PREVIOUS WORK**

- 1) Oliver Thiergart proposed a geometry-based spatial sound acquisition technique that involves the computation of one or more virtual physical microphones placed at the Virtual Microphone (VM) positions. By changing the position of the VM, different prospect of the sound field can be achieved that are not necessarily restricted to the measurement positions.
- 2) Yotam Peled works on the method of noise reduction and dereverberation using spherical microphone arrays. The method contains a fixed beam former, which achieves dereverberation by means of a spatial filter followed by a multi-channel Linearly Constrained Minimum Variance filter that results in further noise reduction.
- 3) Setu Garg proposed the system that tracks a position of the speaker within 10 degrees of their location in less than 3 seconds, which is well within the range of the camera.

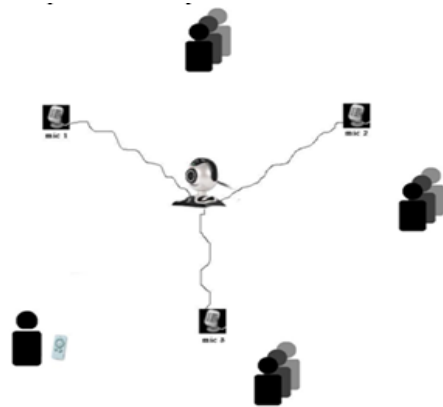


Fig.2: Microphone Array Structure

There are different types of microphones like carbon, dynamic, crystal, capacitive. Carbon microphones was invented and used mainly in telephone applications. But they are very noisy as the carbon granules rumble when the microphone is move and this type is being replaced by more advanced types.

Dynamic microphones are widely used and their quality of reproduction is superb. They are used in the recording industry for music and speech where high exactness is required. Basically they are exactly the same as a speaker, the only difference being the size. But it has limitation of very low output. Because of the low resistance (impedance) of a dynamic microphone, it requires a transformer so it can be connected to an amplifier (called a pre-amp). This transformer is usually used into the microphone's case, but if is absent, it is necessary to connect the microphone to a preamplifier with low input resistance.

**III.METHODOLOGY**

The block diagram for Rotating Camera Based on Speaker Voice is shown below

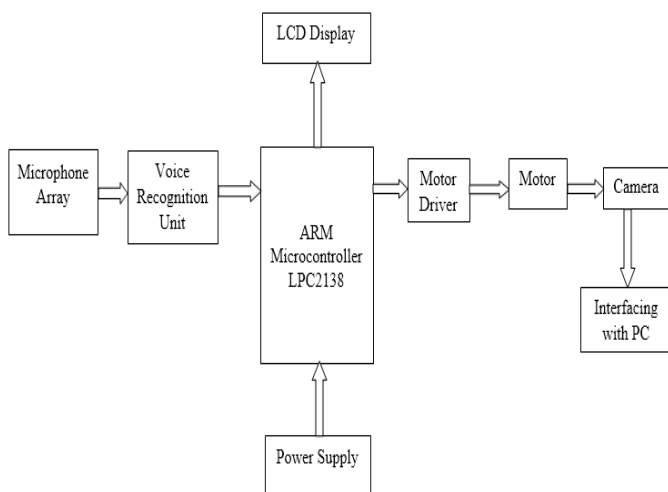


Fig.1: Block diagram for rotating camera based on speaker voice

**Microphone Array**

A microphone array is number of microphones operating in tandem. Microphones accept sound from all directions in the form of electrical signals that contain the information about the sounds coming from all directions. Joint processing of these sounds allows selecting the sound signal coming from the given direction. Microphone array selects the sound from only one microphone by processing multichannel signals.

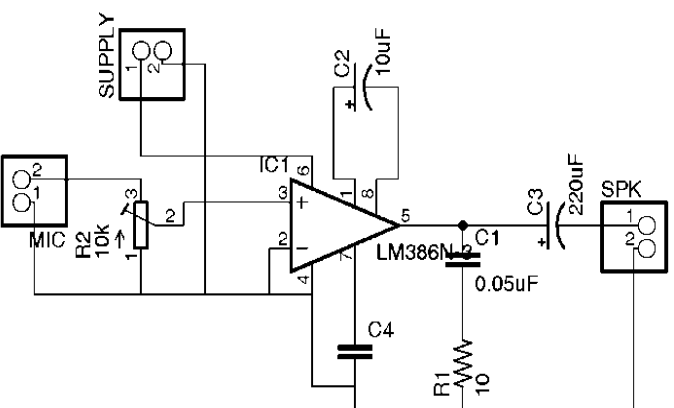


Fig.3: Circuit diagram for voice recognition unit

### Characteristics of speech recognition applications

To decide whether a proposed task is suitable for speech recognition deployment, several requirements are essential. This includes the following:

- The proposed recognition system must provide a real (and hopefully measurable) benefit to the user in the form of increased productivity, easy of use, better human-machine interface, or a more natural mode of communication. Many proposed applications have tried, generally unsuccessfully, to exploit the novelty of voice recognition to attract attention or to get increased sales. Without the true (and lasting) benefit to the user, such application do not succeed over time.
- The proposed recognition system must be “user friendly”; that is, it must make the user feel comfortable with the voice dialogue, it must provide friendly and helpful voice prompts, and it must provide an effective means of communications (i.e., fall-back mode) when the recognizer fails to understand properly the spoken commands. The concept of a user friendly system is essential to the maintenance of a voice dialogue between the user and the machine.
- The proposed recognition system must be accurate; i.e., it must achieve, at least, a specified level of performance on the task associated with the recognition decision.
- The proposed recognition system must respond in real time. It is essential that the user feel that the response to the query comes essentially immediately so that a voice dialogue can be maintained between the user and the system.

### Motor

A motor has positional control via its nature of rotation by fractional increments. A motor is an electromechanical device which converts electrical signals into discrete mechanical movements. The speed of the motor shafts rotation is directly related to the frequency of the voice. Digital signal is used to drive the motor and every time it receives a digital pulse and motor rotates in specific number of degrees. The motor unit is controlled by the microcontroller in accordance with voice sensor.

#### Types of Motor

##### DC Motor

Fast, continuous rotation motors-Used for anything that needs to spin at a high RPM e.g. car wheels, fans etc.

##### Servo Motor

Fast, high torque, accurate rotation within a limited angle-Generally a high performance alternative to stepper motors, but more complicated setup with pulse width modulation tuning. Suited for robotic arms/legs or rudder control etc.

##### Stepper Motor

Slow, precise rotation, easy setup and control-Advantage over servo motor in positional control. Where servos require a feedback mechanism and additional support circuitry to drive positioning, a stepper motor has positional control depends on its nature of rotation by fractional

increments. Suited for 3-D printers and similar devices where position is fundamental.

### Camera

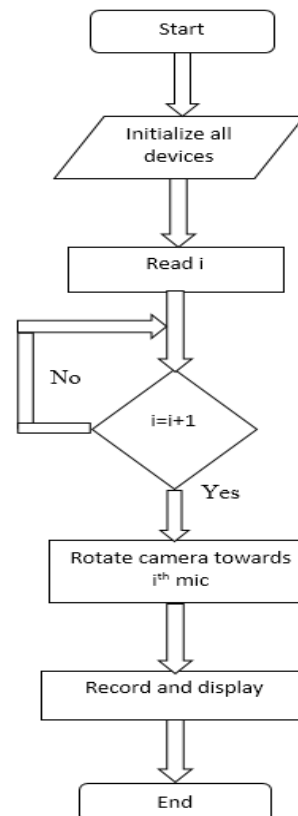
A camera is an instrument for recording images. The images may be individual still photographs or sequences of images which are videos or movies. The word camera comes from camera obscura, which means "dark chamber" and is the Latin name of the original device. The functioning of the camera is very similar to the functioning of the human eye.

A pre-built webcam is used with computers and often have wide angle lenses, making them ideal. The camera sits a top of the motor's rotor and is connected to the computer through USB cable. Webcam capture the video and sends this video on server to see the conference activities by the absent employees in conference room.



Fig.4: Camera

### Flow chart



#### IV.CONCLUSION

The system records meeting without cameraman and at a lower cost. It provides a solution to best capture information exchanges between two people during the meeting and can be used in conference room. Automation eliminates the human efforts, cost and security issue. It also automatically tracks the position of the speaker.

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