CALVING ALERT SYSTEM

ASHWIN S (201CS125)

EZHILARASI S (201CS156)

NAVEEN G (201ME157)

VISHAL PATHRI V (201CS330)

ABSTRACT

Researchers have found that almost 50% of all calf deaths within the first 24 hours after birth are a result of calving difficulty. Difficult calving may cause Dystocia, acidosis and hypoxia. Cattle breeders are unaware of the calving time of the cow, they don't know how long calving had been happening. So, it is inevitable to eliminate the calving complications due to lack of monitoring by calving alert systems.

Calving alert tool is a tail-mounted sensor that measures tail movements. The device is placed on the tail of the cow opposite to cow's vulva. Cameras are fixed in the cattle farm where the physical movement of the cow is monitored and analyzed. AI based detection system can detect the physical movement of the cow during labor. On the day of calving, cow will have increased tail movement and drop in temperature near vulva. The calving alert tool will have sensors which can detect the tail movements and the contractions of the vulva. Sensors also checks the temperature of the vulva. When the cow reaches a certain level of intensity, tail movement and temperature, the Calving alert tool alerts the farmer through the SMS, phone call and also through the notifications in the app.

The calving alert tool can be connected with multiple users. In addition there will be a sound alarm alerting the cattle breeders. The camera monitors the physical movement of the cow and processes the data using Artificial Intelligence and Machine learning. By combined analysis of calving alert tool and calving monitoring system survivability of the cow and the calf can be increased.

PROBLEM STATEMENT

Cattle breeders are unaware of calving time of the cow.

Not being able to monitor cattle calving which leads to death of calf and cow.

They are ignorant on how long calving has been happening.

- Dystocia, Still birth, Clinical metritis in heifers.
- Weak calf.

EXISTING SOLUTION

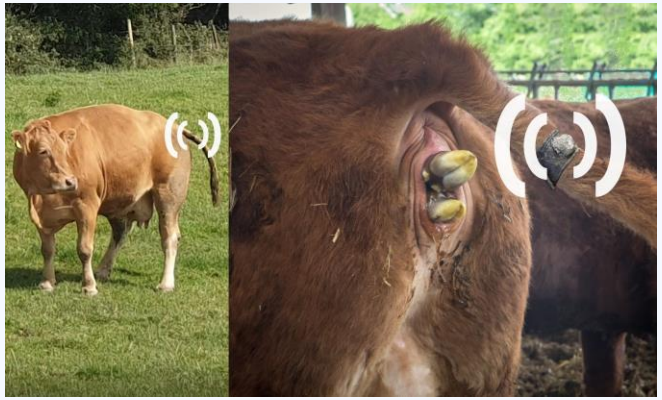
Patura

Moocall

SOLUTION STATEMENT

- Sensor is used to detect the movement and temperature of the vulva.
- Physical movement of the cow is detected by the camera and processed with the help of Artificial Intelligence and Machine Learning.
- Alert message will be sent to the owner after the analysis of the contractions in the vulva and the movement of the cow detected by the camera.

PROPOSED SOLUTION



IoT based calving alert tool

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AI based behavior monitoring system

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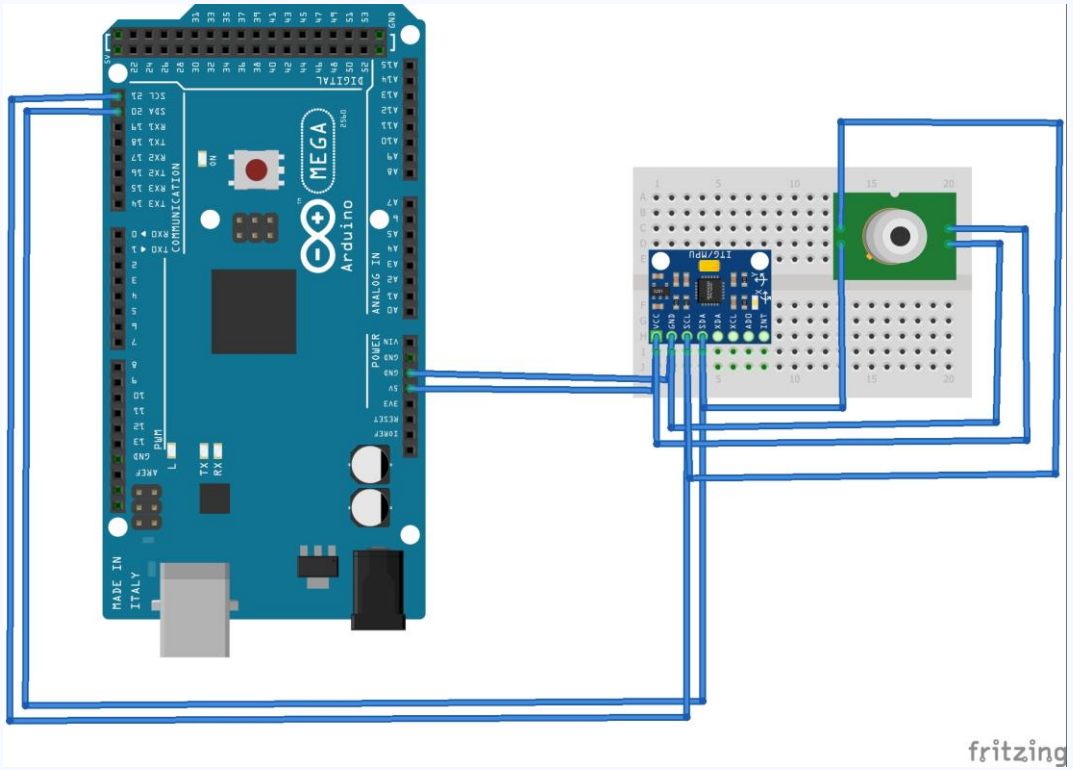
Alert message to the cattle breeder

CIRCUIT DIAGRAM



FLOW CHART

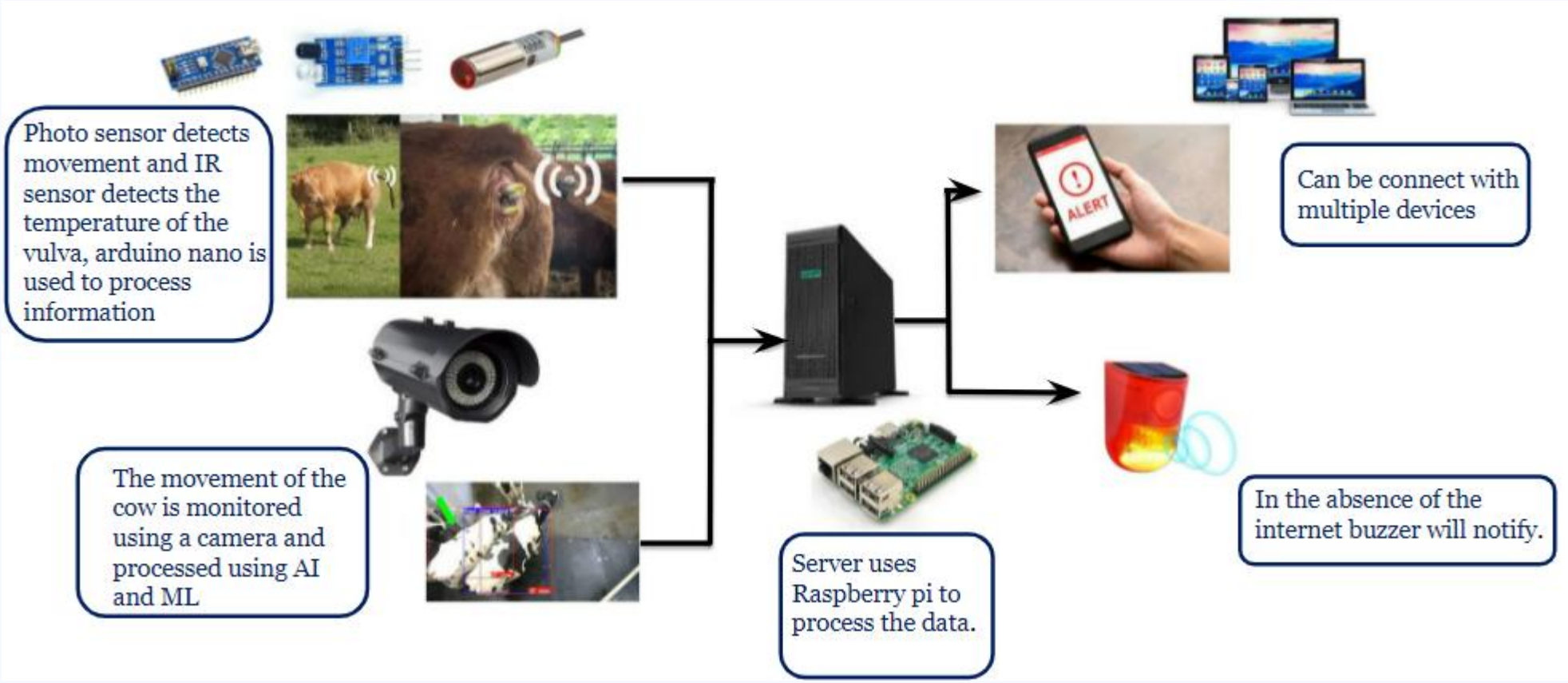
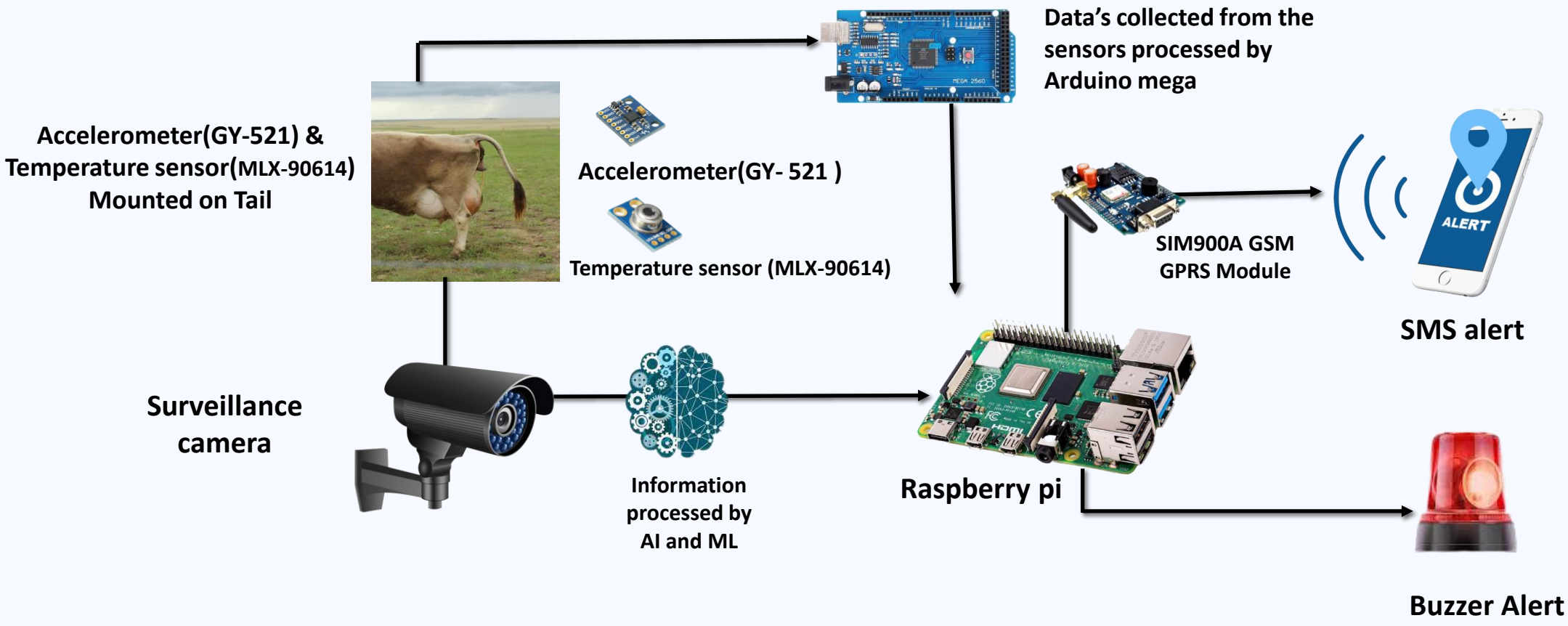


Photo sensor detects movement and IR sensor detects the temperature of the vulva, arduino nano is used to process information
The movement of the cow is monitored using a camera and processed using AI and ML
Server uses Raspberry pi to process the data.
ALERT
Can be connect with multiple devices
In the absence of the internet buzzer will notify.

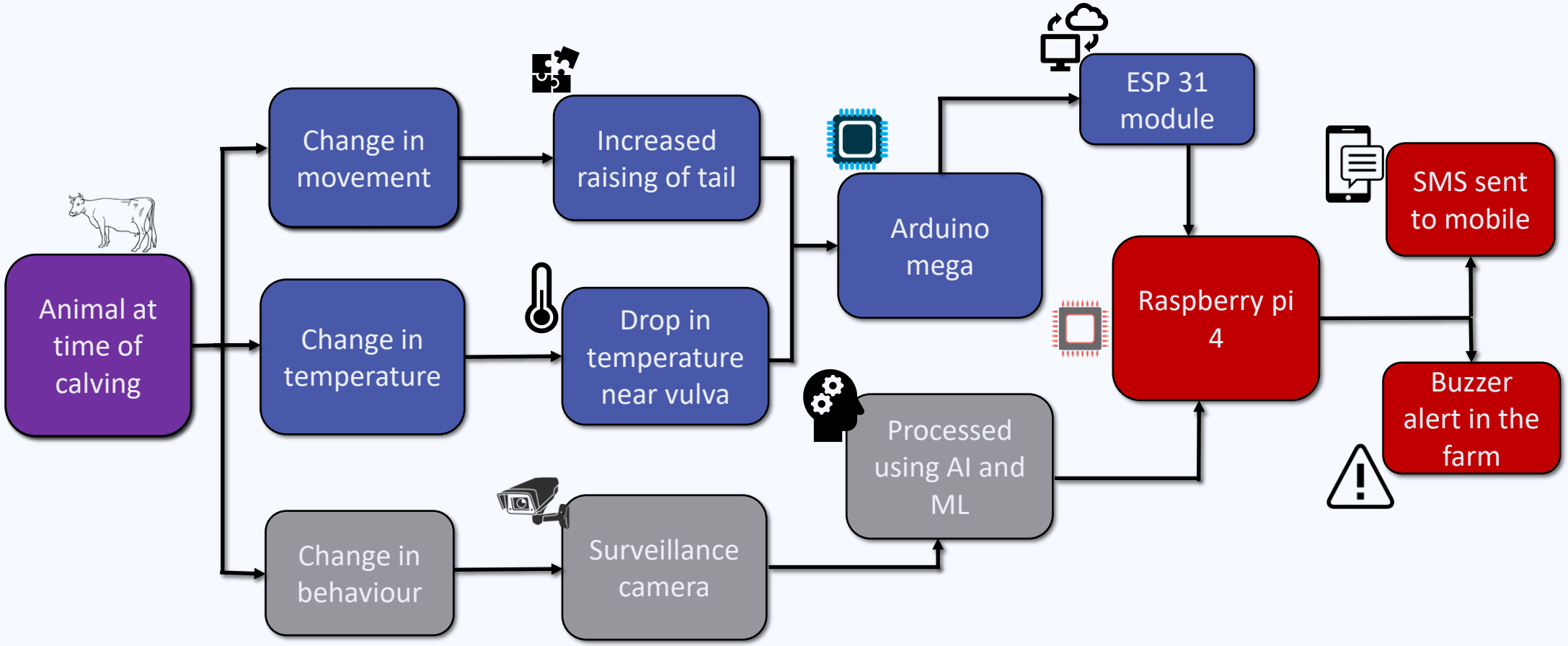
EFFECTIVE UTILIZATION OF THE MODERN TOOL

- Prior calving detection.
- Improved reproductive efficiency and health of cattle.
- Decrease in cases of dystocia and still birth.
- Avoids complications during calving.
- Increases calf and cow's survivability.

TECHNOLOGY STACK



USE CASE


Animal at time of calving
Change in movement
Change in temperature
Change in behaviour
Increased raising of tail
Drop in temperature near vulva
Surveillance camera
Arduino mega
Processed using AI and ML
ESP 31 module
Raspberry pi 4
SMS sent to mobile
Buzzer alert in the farm

ANALYSIS OF RESULT

By implementing this idea,

- The risk during calving can be eliminated.
- Calves can be protected from becoming prey for omnivorous animals.
- Monitoring time can be reduced and cattle breeders can relax themselves.

REVENUE MODEL

UTILITIES	PRICE(Rs.) With Surveillance	PRICE(Rs.) Without Surveillance
Arduino Uno	1699	1699
Accelerometer GY-521	299	299
Temperature Sensor MLX90614	1699	1699
Buzzer	49	49
Raspberry Pi 4	4199	4199
Surveillance Camera System	11,566	-
Total	19,511	7945

References

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