BUSITEMA UNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

TITLE: COW HEAT DETECTION SYSTEM.

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DECLARATION

I, Waisana Bosco registration number BU/UG/2015/132 do hereby declare that this Project report is original and has not been submitted for any other degree award to any other University before.

Signature ..... Date 30/05/2019

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APPROVAL

I certify that the project entitled "Cow Heat Detection System" has been done under my supervision and is submitted to the board of examiners with my approval.

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ABSTRACT

Cow heat detection system is a system designed special for dairy farmers purposely to ease their work in monitoring and availing the cow for mating and insemination on time. In Uganda, dairy farming is one of the major activities in the southwestern, central, and northeastern parts of the country, with the sector contributing significantly to the economic, nutritional, and employment opportunities of the rural communities in those areas. However, diary and animal production in Uganda is affected factors like dry season, and with mostly heat detection failure causing frustration to farmers hence reduction in milk output. The current methods used for heat detection like visual observation is not efficient and time wasting. This has led to decrease in the country's economy and losses to dairy farmers. With these challenges faced and studied from different forms of literature, consultation and observation, cow heat detection system has been developed through a number of procedures as well testing and evaluation done. The main aim of this system is to ease heat detection and facilitate cow mating and insemination on time. In this system, three major functionalities have been achieved that is to say sensing and monitoring the parameter changes, drawing conclusion basing on the findings, and alerting the farmer by messaging using GSM.

In conclusion, this system will reduce the increasing losses in Agriculture in terms of extended calving intervals, milk loss, increased veterinary cost, increased heifer rearing cost, and slowed genetic progress mainly from the dairy farming sector and possibly animal production.

LIST OF ACRONYMS

ER	Electrical resistance
Mg	Milligrams
GSM	Global system for mobile communication.
RISC	Reduced instruction set computer.
AVR	Advanced Virtual RISC
I/O	Input / Output.
EEPROM	Electrically Erasable Programmable Read-Only Memory.
kB	Kilo byte
SRAM	Static Random-Access Memory
ISP	In-system programming
USART	Universal Synchronous/Asynchronous Receiver/Transmitter
IDE	Integrated Drive Electrons
A/D	Analog to Digital converter.
SPI	Serial Peripheral Interface.
MIPS	million instructions per second.
MHz	Megahertz.
RTD	Resistance Temperature Detector.

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CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND

Uganda being agro-based country, dairy farming is one of the major activities in the southwestern, central, and northeastern parts of the country, with the sector contributing significantly to the economic, nutritional, and employment opportunities of the rural communities in those areas. Uganda's Central and Western Regions account for about 50 percent of national milk production. This production is predictable and available all year round. Factors like dry season, and heat detection failure (diary animals) cause reduction in milk output. This study focus set on the heat detection across the animals[1].

Detection of estrus (heat) is often cited as the most costly component and undoubtedly, the major limiting factor to the success of both cow mating and Artificial insemination programs on many dairy farms. Incorrect detection of estrus leads to loss of income due to extended calving intervals, milk loss, increased veterinary cost, increased heifer rearing cost, and slowed genetic progress. To achieve excellent heat detection, many factors have to be taken into account. First, the cow must express behavior and physiological changes, and secondly, these changes must be detected to determine if and when insemination should occur. It is clear that an excellent rate of heat detection is vitally important. Some herds have exceptional fertility while others struggle with conception rates, calving intervals, pregnancy rates and other parameters, which might be caused by inefficient heat detection. Numerous factors, environmental, managerial, and cow-related, play a role in estrus expression and detection. The time of ovulation and age of the egg at sperm penetration is critical for conception, so the goal of a heat detection program should not merely be to attain a high detection rate but to achieve a high detection rate with a corresponding high conception rate [2].

The occurrence of estrus is due to specific influences of ovarian steroid hormones on behavioral centers in the brain leading to some signs, primary and secondary therefore it is essential to understand the primary and secondary signs of heat in order to achieve accurate and efficient heat detection. Primary sign involves cow standing to be mounted. The average duration of standing heat is 15 to 18 hours, but heat duration may vary from 8 to 30 hours among cows. An estrus cow usually stands to be mounted 20 to 55 times during her estrus period with each mount lasts three

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