

**BUSITEMA
UNIVERSITY**
Pursuing Excellence



FACULTY OF ENGINEERING

**DEPARTMENT OF TEXTILE AND GINNING
ENGINEERING**

**PREDICTION OF YARN COMPOSITION USING PROBABILISTIC TYPE OF
ARTIFICIAL NEURAL NETWORK**

BY:

JABWANA DAVID

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SUPERVISOR: DR. NIBIKORA IDIPHONSE

CO SUPERVISOR: MR. ALLAN KASEDDE

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DEDICATION

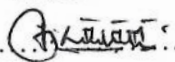
I dedicate this report to my beloved mother Mrs Wanyenze Rose who has played the central role in my academics and welfare.

DECLARATION

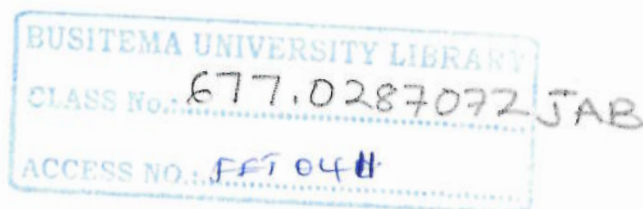
I JABWANA DAVID declare that this research project is my original work and has never been submitted to any higher institute of learning.

JABWANA DAVID

BU/UG/2011/188

Signature... 

Date: ... 30th JUNE - 2015



APPROVAL

I hereby submit in this research proposal with permission from the following supervisors;

Dr. NIBIKORAILDEPHONSE

Signature.....

Date:

Mr. ALLAN KASEDDE

Signature.....

Date:

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CHAPTER ONE

1.0 BACKGROUND

A yarn is a strand of fibers used for knitting or weaving (Merriam-Webster, 2012). Yarns are produced by a series of processes which include blow room, carding, draw frame, comber for combed yarns, speed frame for ring spun yarns, ring frame and rotor spinning machine. Yarn composition is term used to describe the percentage of each type of fibers in a yarn. It is also commonly referred to as blend ratio (Carl A. Lawrence-2003)

There are several reasons as to why blending of yarns is done in a spinning mill. Some of them include;

Blending is done to impart lacking properties in other yarns, examples of such properties are moisture regain, drapability, aesthetics, and heat retention (journal of the Textile Association-jan.Feb.2007)

Some yarns are not easily processed if not blended thus calling for blending, thus blending is done for some yarns for ease of processing. Yarns composition has several effects on the properties of yarns produced from the spinning mill as shown below;

Composition affects strength and thus when doing the blending the correct blend ratios have to be carried out to ensure that the required strength is obtained.

Composition also affects the ease with which the rovings' are spun into the yarns (Textile learner 2004)

Composition also has effects on the chemical and physical properties of yarns. As shown from above the effects of yarn composition, measures have to be taken to predict yarn composition and make corrections where necessary to prevent any negative effect from arising. Composition tests can be done at roving stage or at the yarn stage in the spinning mill depending convenience. The composition tests in Nyanza textiles limited are carried out in the chemical laboratory by carrying out a carbonizing test because most of the blends done are cellulose and polymer yarn blends. As the chemical method of

REFERENCES

- 1) <https://the.fibresociety.Org//...../2005>
- 2) <https://www.scrib.com//sept 19, 2013>
- 3) Y Chetouani-process safety and environment protection, 2014-elsevier
- 4) RChattonpadhyang, A guha-Textile progress, 2004 Taylor and francis
- 5) www.research.gate.net/yarn prediction by R Furferic-2010
- 6) www.fzu/sestak/yyx//liberec 2011.pdf
- 7) <https://law.resource.org>
- 8) Espace.library.curtain.educ.com by A Saptoro-2010”
- 9) [textilelearner.blogspot.com/...../ an overview of draw frame autoleveller May 2014](http://textilelearner.blogspot.com/...../)
- 10) [https://smartech.gatech.edu/...../ by NPCZQ Chao-1993](https://smartech.gatech.edu/...../)
- 11) Scilert.net/fulltext/?doi=jas.2007