UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

A STUDY OF RAINFALL PATTERN THAT AFFECT FLOODING USING FUZZY LOGIC APPROACH

SHAHIRATUL AMALINA BINTI ABD KARIM
2014805374   K15/05
NURUL HAZIRAH BINTI NORHAIZIN
2014840272   K15/05
NUR FAZLINA BINTI ISMAIL
2014486294   K15/05

Report submitted in partial fulfillment of the requirement
for the degree of
Bachelor of Science (Hons.) Mathematics
Center of Mathematics Studies
Faculty of Computer and Mathematical Sciences

JULY 2016

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

ABSTRACT

Flood is a natural disaster which is a major inauspicious event affecting from the earth's natural processes. In Malaysia, the northeastern states are frequently hit by flooding and one of the affected-areas is Kelantan. Hence, this study assesses in determining the rainfall patterns that affect flooding by using Mamdani fuzzy inference system by applying the model to the Kuala Krai, Kelantan. This study emphasized the volume of rainfall in December 2014 as it was the worst flood event for the past 100 years. Five inputs variables which are the volume of rainfall of five main stations in Kuala Krai were utilize to get an output variable which is the volume of rainfall for whole Kuala Krai. Trapezoidal membership functions were employed for each variables and the relationship between variable will be characterized by using 243 IF-THEN rules with AND connection. Subsequently, the acquired output values were verified with the actual flood event in December 2014. All implementation done by using MATLAB Software. Since the result corresponds to the actual flood incident in December 2014, thus, the efficiency of fuzzy logic model display satisfactory levels in interpreting flood situation based on volume of rainfall in Kelantan.

.

1 INTRODUCTION

1.1 Introduction

Natural fiasco is an undesirable occurrence as a subsequent from normal processes of the Earth which is uncontrollable and unpredictable occurrence. Flood tragedies are among the world's most common and harmful types of disaster (IFRCS, 1998). Flood can be defined as an environmental incident or occurrence where usually a dry piece of land or area is submerged under water. It happens at the point when a river bank is overflowed, the water spreads out over the flood plain and for the most part gets to be dangerous to the general public(Ching et al., 2013).

Flood is a natural phenomenon despite the fact that how difficult an administration or people endeavored to diminish or to prevent it totally.(FRMP, 2012). Normal floods are waited for and embraced as they offer fertile soil, water and technique for transport, however major floods may affects harm to life, employments, and environment(Consortium, 2008). The impacts of flooding comprise destruction to home, shops and businesses (Vinet, 2008). He call attention to that, the issues came as the flood sufferers need to pay the expense of repair and some small shops do not reopen after catastrophe. Other than that, flood may bring about infrastructure destruction, including streets, rail lines, airplane terminals, power supply framework, water supplies and sewage transfer frameworks (WHO, 2002).

There are four types of flood which are slow-onset riverine floods, rapid-onset flash floods, aggregation of water in ineffectively depleted environment, and coastal floods brought on by high tidal waves (Few et al., 2004). In Malaysia, flash flood and monsoon floods are the types of flood which has been monitored in by the Malaysian Drainage and Irrigation Department (DID, 2000a). In view of the hydrological perceptions, the distinction between these two fiascos is the time occupied by the waterway stream to retreat to the standard reading. Flash floods take just a few hours to reappearance to the ordinary water reading, while monsoon flood can keep going for one month (Noorazuan, 2006). In Kelantan, the flood usually occurs by riverine flooding. It

1