GSM BASED FLOOD WARNING SYSTEM USING FPGA

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ABSTRACT

Flood is one of the frequent natural disasters occur each year. It can occur due to heavy rain, dam outbreak or overflow water in the river. In other words, rivers can be one of the biggest causes of flood. By monitoring the condition of water level in river or drain, flood can be anticipated early and warnings can be delivered to public in order to prevent loss of property and life. GSM based Flood Monitoring and Warning System (FMWS) is proposed here to convey the condition of river or give warning to people at affected area. Any data received from water level and water flow rate meter is processed and delivered to main system before SMS notifications are sent to public. Currently most of GSM based applications are developed using microcontroller such as PIC or 8051 microcontroller. With the flexibility in designing the hardware, FPGA is chosen to be the heart of the system. An interface unit, UART, between GSM modem and FMWS controller is modeled using Quartus II software and implemented on the Altera DE2 Board.

Keywords- flood ,GSM, water level,water flow rate sensor, SMS autorespond

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CHAPTER 1

INTRODUCTION

1.1 PROJECT BACKGROUND

Flood disaster can be predicted and countermeasure can be taken if monitoring and warning system are implemented at any rivers or drain that cause the flood. A flood monitoring system in real-time in [1] using 300 KHz H-ADCP (Horizontal Acoustic Doppler Current Profiler) is implemented at China. The system measures two horizontal dimension of speed across 200m Yangtze river in China, and calculates the level of water using index-velocity method. The data is received by hydrological information centre in Huangling Temple and it is transmitted from the regional river Yangtze. It uses LAN, satellite and VHF for transmitting and receiving data. Study of the flood warning system in [2] also applied to the Ping river, Chaing Mai province, Thailand, where the floods hit every so often. The system provides five channels data logger: two automatic raingage, two TDR and an air temperature. These data are transmitted to the main server Upper North Water Hydrological And Administration Center (UNHWAC) using Digital Radio signal Packages (DRP) with the interval time set by SCADA system (supervisory control and data acquisition) [10].

Besides based on geographical and hydrological data, wireless sensors and video surveillance system [4-5] are also used to forecast flooding. Complex algorithms to incorporate the effects of noise and winds are also provided in [6] and the system