1. Chapter I

Introduction

1.1 Introduction

A Road is an infrastructure that is used for traffic above ground level to accommodate transportation. Not all roads have good surface and smooth. Damaged road surface conditions are the main cause of major accidents. According to data from Minister For Public Works and Human Settlements Bina Marga Bandung in 2013, it's recorded that 370 Km of roads in 360 points of Bandung had a pothole and crushed surfaces that endanger road user.

Common method to monitored road surface according to Minister For Public Works and Human Settlements Bina Marga Bandung, to identify the condition detection road surface by using car be equipped with Naasra. The use of Naasra uses a tools that is implemented in the car so that if the car runs then Naasra will immediately receive vibration data from the car. Detection of damaged roads using several industrial tools used as road scanners, where industrial equipment has a high price. Implementation of the concept of accelerometer to detect road damage to the smartphone has been done, but the research using BMW 323 with Ground Penetrating Radar System (GPR) [12, 14].

Figure 1. Damaged Road

Another method, knowing damaged road using manual detecting system or called human checking has high accuracy rate. For sure, surveys in some places that require people who are experts in this field and use special tools [12]. The problem is should have to wait and reporting survey to the main branch will take a long time to be done and how much human resource, time and effort will need to make road improvement projects done.

As the problem mentioned above, the use of applications with smart devices will be able to know the damaged road by pass through the road. If the road is indicated to be damaged, then there are irregular shocks. So that in this study will implement and make a system on a smartphone device that uses an accelerometer sensor where the function of this sensor is used to detect whether there is damage to the road or not on the route traveled. By using the accelerometer and GPS, the application analyzes the value of each path and calculates it with a threshold. Every position and different placement, an accelerometer have different values.

This minor thesis will be focused on methods of using devices that are simple and can be used real time. The device is Android because it is used by many people, the setup is easy, and has many sensors that can be used. In this minor thesis, the focus is the presentation of test results that prove that the accelerometer can be used as a detector for damaged roads. The result of the application usage will displays a map and a red mark that indicates a obstacles in the road. The value will be stored to the storage device and can be accessed again with the application. The application also shows the location of the damage to the map, so that it knows which parts of the road are classified as a obstacles.

1.2 Problem Statement and Scope

Based on the above overview, problem statement of this research are :

1. Does the accelerometer can be used to detect obstacle on the one lane road?
2. How to create threshold for knowing obstacle?

Then the scope or the research limitation for this work are :

1. Obtain data set using a Scooter.
2. The device must be placed at scooter dashboard using bracket.
3. Average speed of the scooter is 20Km/h.
4. Vibration value from pothole and speed bump more than the threshold will be considered as obstacle.

1.3 Objective

The purpose of this minor thesis is to identify the level of accuracy from each threshold, create an application analyze and display road damage on google maps by using an accelerometer and GPS sensor on an Android

smartphone. The application also stores the value of each data such as retrieval time, accelerometer sensor value, and the value of GPS (Latitude and Longitude) into the smartphone internal memory.

1.4 Writing Organization

This minor thesis is organized as follows on section II discusses about related work and a previous study that used in this case, and in the third section will explain the system adaption analysis. After that will discuss the evaluation of this system such as testing, an analysis in section IV and last of a section in this paper is the conclusion of this study.