

# Android-Based Driving Course Information System

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## Abstrak

Era sekarang merupakan perkembangan dimana teknologi sangat dibutuhkan dalam masyarakat dan sudah menyebar di seluruh dunia. Teknologi juga memiliki peran yang penting pada suatu perusahaan. Salah satu perusahaan yaitu kursus mengemudi juga dapat bersaing dengan teknologi karena perusahaan ini menawarkan jasa kepada pelanggannya. Perusahaan Kursus Mengemudi masih banyak yang belum mempunyai strategi khusus dalam menangani pelanggan dengan teknologi, proses bisnis dilakukan secara konvensional. Metode dari penelitian ini dimulai dengan pengumpulan data melalui wawancara langsung dengan narasumber, observasi dan analisis artikel atau jurnal terkait. Tujuan pembuatan penelitian ini adalah merancang dan membangun sistem informasi kursus mengemudi berbasis android yang diharapkan memberikan manfaat untuk sisi pemilik dan pelanggan. Hasil dari penelitian ini adalah Sistem Informasi Kursus Mengemudi berbasis Android dengan fitur-fitur seperti fitur pendaftaran, fitur penjadwalan, fitur laporan dan fitur lokasi yang memudahkan proses bisnis dalam usaha tempat kursus mengemudi.

**Kata kunci:** Sistem Informasi, Android, Mobile, Pendaftaran, Penjadwalan, Rute.

## Abstract

In the current era, technology development is required in society and has been used worldwide. Technology also has an important role in a company. Driving Courses Company is one of the companies that can compete in technology as it offers services to its customers. Many Driving Course companies do the business process conventionally and have no particular strategy for dealing with customers. The research method was conducted by collecting the data through direct interviews with informants, observing and analyzing related articles or journals. This study aimed to design and develop an Android-based driving course information system. It is expected to ease the business process and provide benefits for the company and customer. The result of the study is an Android-based Driving Course Information System which consists of some features, such as registration, scheduling, report, and location features. Those facilities are used to facilitate and ease the driving course business processes.

**Keywords:** Information Systems, Android, Mobile, Scheduling, Routes.

## 1. Introduction

Technology development in the current era is significantly needed in society, and it has spread worldwide. Technology is growing every day and has become part of human life. The existence of technology facilitates daily work in education, economy, government, tourism, health and society. Therefore, all human needs are fulfilled quickly.

Technology also has a significant role in a company. Small, medium and large companies will compete with each other, not in the local market but the global market. The company will always maximize its efforts to ensure customers use its products and services. A company, both large and small, will not run without the support of the public, both internal public (employees, shareholders, company owners) and external public (customers, banks, and government). Hence, the company must be able to implement good interpersonal communication within the business scope. The company does not only aim to make profits but maintaining customers' interests and satisfaction are also required.

One company that focuses on the customers' needs is driving courses because it offers services. A driving course is a place that offers services to teach customers who want to learn to drive a car and to get a car driving license (SIM A). Many Driving Course companies still do not utilize technology and have specific strategies to deal with customers; in other words, the

business processes, such as registration, scheduling, and company reports, are still done manually. Consequently, the business processes do not run effectively because the customers lack of updated information regarding the course. It will affect customer' satisfaction. Moreover, the manual registration business process can spend more customers' time as the processes are done offline. For instance, when the customer cannot come to select or change the schedule, this will postpone the business process.

Some driving courses have been using a website-based Driving Course Information System. This Android-Based Driving Course Information System research was done on a mobile platform with the Android operating system. The public has widely used the android-based operating system because of its easiness and open-source operating system.

Several previous studies regarding driving course information systems using a website platform were used to reference this study. Felby Yugus conducted a study about the driving course information system at the Berlian driving course institution that includes registration and scheduling features. This study used the case study method, The result of the research that can be used as a reference for implementing registration and scheduling features [2]. The next study was conducted by Anggun Putri Pajar by using the observation method and directly observing the registration in a driving course with a registration feature, The result of the research that can be used for implementing registration feature [4]. Satriya Wibawa et al. also conducted a study regarding the GIS-Based Expiration Reminder System Application with the Android Platform. This study is used as a reference for displaying locations on a map based on latitude and longitude [7]. Moreover, Riski Putra Agrarian et al. have done a study regarding an Android-based GIS mobile application for tourism information. The result of this study is used as a reference, especially the features of the addressed location [14]. Research conducted by Anisa Rahmi et al. discussed Findoctor application. It is an application for searching doctors by displaying locations on a map based on latitude and longitude which is used to reference in this study [15]. The features that compare the current research with the previous ones are the registration, the scheduling, the route tracking, and the report feature. Research on information systems for android-based driving courses was compared with research on Information Systems for Driving Courses at the Diamond Driving Course Institute by Felby Yugus, research on Registration Design for Web-Based Driving Course Information by Anggun Putri Pajar, and research on Information Systems and Data Processing for Web-Based Car Courses with SMS Gateway by Rendy et al. The novelty of this current study is the Live Tracking feature. It is a feature used to display the location of customers and instructors during the practice, and it can be seen by the guardian lively. Therefore, it becomes the application specialty that cannot be found in the previous researches.

**2. Research Method**

Research methods used consists of six steps in identifying problems to implementing the system, the following is an image that shows the six steps of the research method.

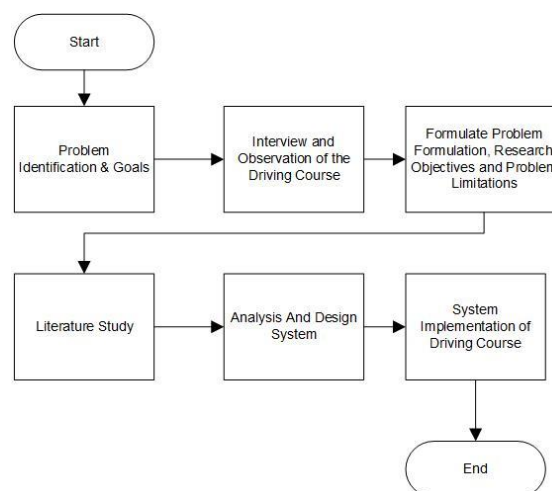


Figure 1 Research Method

Figure 1 shows the six steps in making the application, from the first step, namely identifying the problems that exist around the driving course and determining the purpose of the problems obtained, then conducting interviews and observations at one of the driving course companies which will move to the next stage, which is to collect the problems identified, determine goals and determine problem limitations, after determining this then proceed to the fourth step, namely looking for data sources from journals or research that has been done previously, which will work on the system design of the application and carry out the implementation of the driving course application.

### **3. Literature Study**

#### **3.1 Android**

Android is an operating system made for mobile devices. Android was developed by a company in Silicon Valley named Android Inc. Google took over the operating system in 2005 and made Android an open-source operating system. It makes anyone can use this operating system for free, including in the source code that is in compiling the Android operating system. [11]

This current application is developed for the Android operating system. Android is the best-selling operating system because the market share in Indonesia is around 74.2%. The minimum Android used to run the developed application is Gingerbread (API10), so that this application reaches 99.9% of Android users [1].

The current Android operating system is developed with 3 (three) types of application, namely native application development (Java), web application development (PHP) and hybrid application development (Java + PHP) [5].

#### **3.2 Kotlin**

Kotlin is a statically typed programming language that runs on top of the Java Virtual Machine (JVM) and can also be compiled to JavaScript source code or LLVM compiler infrastructure. The developers are from the JetBrains team of programmers. While its syntax is not compatible with Java, Kotlin is designed to operate with Java Code [6]. Kotlin is also an interoperable language and can develop multi-platform applications such as desktop, mobile and web. Besides developing applications on top of the Java Virtual Machine (JVM), the advantage of using this Kotlin programming discussion is because Kotlin can overcome NullPointerException, which can solve crash problems in most applications. The code writing in Kotlin is also concise and easy to read because it is built on top of the JVM and is easy to learn [13].

#### **3.3 MYSQL**

MySQL is a database that has one or more tables. It is an open-source database server whose existence is quite well known. This database server offers various advantages because it is widely used by practitioners to build a project. The existence of an API (Application Programming Interface) facility by MySQL makes several computer applications written using various programming languages can access the server from the MySQL database. MySQL data type is in the form of a field containing the data value, which the value has its own type [3].

#### **3.4 Google Maps**

Google Maps is an application that offers services provided by Google to display graphical information to users for free. Graphic information provided by google maps includes; Satellite map is displayed in the form of photos from earth satellites; Integrated search results display information from the location; Draggable maps where users can shift maps; Terrain maps display information in the form of physical maps; Earth maps display a map of the earth; My Location displays information about the user's location. [8].

Google Maps offers an API for building web or mobile-based applications. Android as mobile-based allows developers to integrate Google Maps with applications and provide users with functions such as displaying a location on a map and showing different routes on a map [12].

Google Maps API is a service provided by Google for users to utilize Google Maps in application development. The Google Map API can be used to create distribution mapping data.

The Google Maps API has several features, namely manipulating maps and adding content through various services, and allow users to build enterprise applications on their website [10].

### 3.5 Car Driving Courses

Article 26 paragraph 5 of Law Number 20 of 2003 explains that a course is a continuing education that emphasis skills, competencies, mastery, development, and professional personality development. Driving courses companies provide car driving courses that give car driving skills guidance and are accompanied by an instructor. A car driving course is a course where an instructor conducts private tutoring until the training time that has been agreed upon by the driving course. [2]

### 3.6 GPS

GPS (Global Positioning System) is a satellite-based navigation system in earth orbit. Smartphones have a GPS receiver that can decode the GPS signal. Assisted-GPS is a new technology for smartphones that improves the startup or time-to-firstfix (TTFF) performance of satellite-based GPS positioning systems. This technology enables smartphones to make device location faster and with better accuracy. GPS is a coordinate system that is used to determine the coordinates position of objects on the earth. GPS can also be used to obtain real spatial data automatically [9].

### 3.7 Geographic Information System

System Geographic Information System (GIS) is a system used to enter, store, manage, analyze and reactivate data for various purposes related to mapping and planning [16].

### 3.8 General Overview

The system overview describes the system and application workflow. The overview of the Android-based Driving Course Information System can be seen in Figure 2.

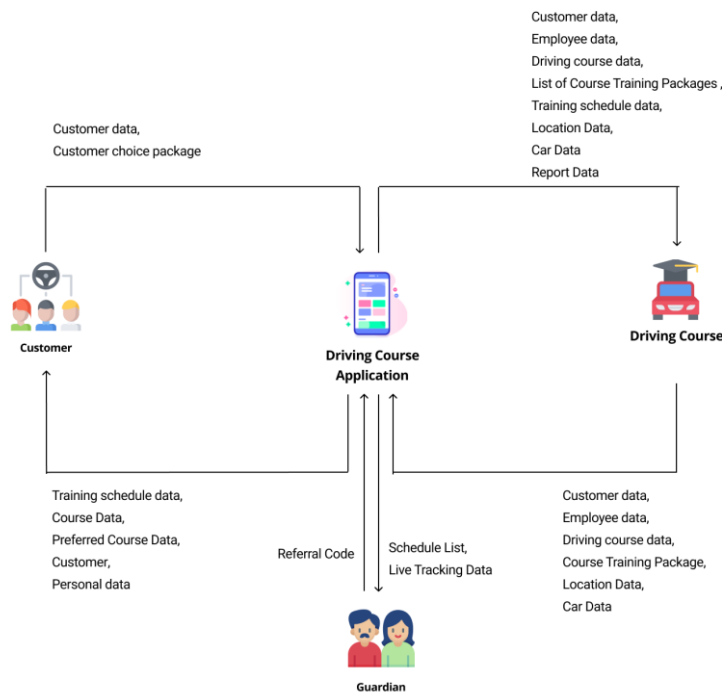


Figure 2 General Overview

Figure 2 is an overview of the Android-based Driving Course Information System. The driving course information system has 3 actors, such as the driving course employee, the customer, and the guardian. The driving course employee can send or receive the data about customers, employees, driving course places, course lists, location data and car data. The

second actor, the customers, can send customer personal data and course selection to the application. They will receive training schedule, course exercises, selected courses, and personal data in the application. The third actor is the Guardian. The guardian receive the data about the customer's schedule and live tracking data or current location.

### 3.8 Data Flow Diagram Level 0

Data Flow Diagram level 0 will show an overview of the process of the Driving Course information system. DFD level 0 of the Driving Course Information System will be explained in the Figure 3.

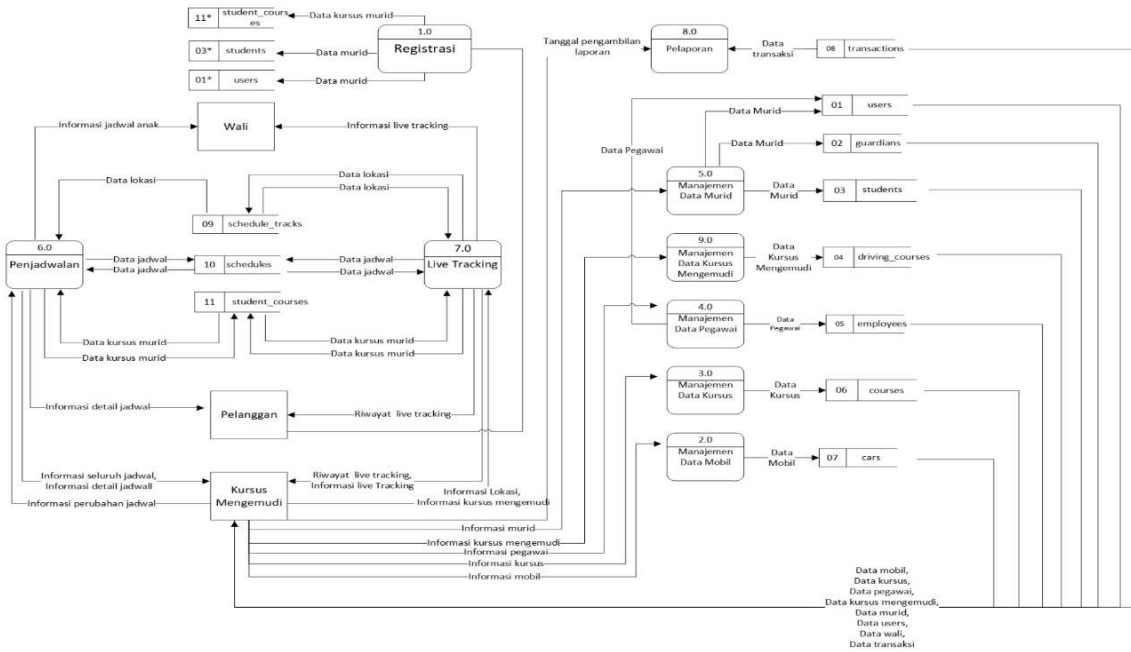


Figure 3 Data Flow Diagram Level 0

Figure 3 is a 0 level DFD of the Driving Course Information System application, Customers, Guardians and Driving Courses which are the entities contained in Figure 3. There are nine data processes shown in the Figure 3. First process is register, the customer can register for the driving course and the data is stored in the customers, students and users table. Second process is car data management, the Driving Course can manage car data stored in the cars table. Third process is course data management, the Driving Course can manage course data stored in the courses table. The fourth process is the Driving Course can manage employee data stored in the employees table. Fifth process is student data management, the Driving Course can manage student data stored in the students table. In the sixth process, the Driving Courses, Customers and Guardians can view the course schedules that have been prepared from the data in the *schedule\_tracks*, *schedule* and *student\_courses* tables. Seventh, the Driving Course, Guardians and Customers can perform or observe the Live Tracking process with data taken in the *schedule\_tracks*, *schedule* and *student\_courses* tables. The eighth process is report, the driving course can manage transaction and finance reports obtained from the data taken in the transaction table. The final process is when Driving Course entities can manage data on Driving Courses with data retrieved from the *driving\_courses* table.

### 3.9 Place and time of research

This research took place at the Bukit Campus of Udayana University, Faculty of Engineering, Information Technology Study Program located on Jalan Campus Bukit UNUD Jimbaran, Badung Regency, Bali. The location was chosen because it has all the supporting aspects so that the research can run well.

### 3.10 Research Technology Specifications

The Research Technology Specifications used in this study are using an Asus laptop A456U series with hardware specifications of an Intel Core i5 processor, 8 Gigabyte RAM, Nvidia GeForce 930mx Graphic Card and 1 Terabyte hard disk storage capacity and using the Windows 10 64bit Operating System, Android Studio Software, PhpStrom, Xampp, Sqlyog. This research uses the android platform.

## 4. Result and Discussion

### 4.1 The Application Display

The display of the driving course information system is based on the driving course owner's side. The home page is the initial display when the users access the application after they have successfully logged in. The home page of the Driving Course application can be seen in Figure 4.



Figure 4 Homepage View

Figure 4 is the homepage or initial view when the users have successfully logged in. On this page there are several features that can be easily accessed by the driving course employees, such as employees, students, courses, reports and live tracking.

### 4.2 Customers Application Display

The display of the driving course information system is based on the customer's side. The home page is the initial display when the user accesses the application after successfully logged in. The home page of the Driving Course application can be seen in Figure 5.



Figure 5 Customer Homepage

Figure 5 is the home page or initial view when the user has successfully logged in. On this page, the customers can easily access some features, namely the course, my course and schedule, this page can only be accessed by customers, besides that the customers can see today's schedule on the main page which is useful in reminding customers.

#### 4.3 Guardian Application Display

The display of the driving course information system is based on the Guardian's side. The home page is the initial display when the user accesses the application after the user has successfully logged in. The home page of the Driving Course application on the guardian's side can be seen in Figure 6.

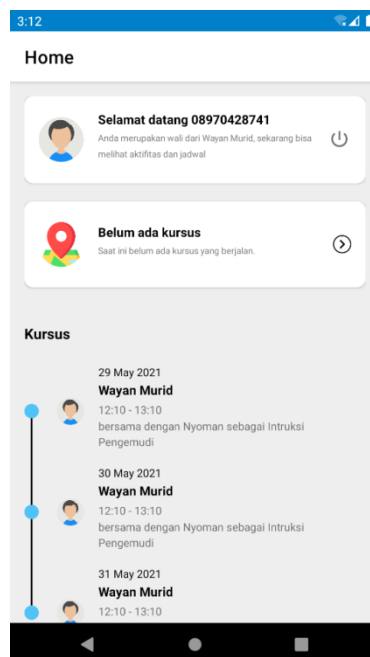


Figure 6 Guardian Homepage



Figure 6 is the home page or initial view when the user has successfully logged in. The home pages can be accessed easily as it provides live tracking observation feature, this page can only be accessed by the guardian of the customer, besides that the guardian can also view today's schedule on the main page which is useful to remind customers.

**4.4 Coordinate Point Line Accuracy Test**

The tests carried out in this study are looking for the accuracy of the coordinate point line by looking for the most accurate point with the least amount of data, by testing the amount of data uploaded every (x meters), to determine the accuracy of the coordinate points can be seen in Figure 7.

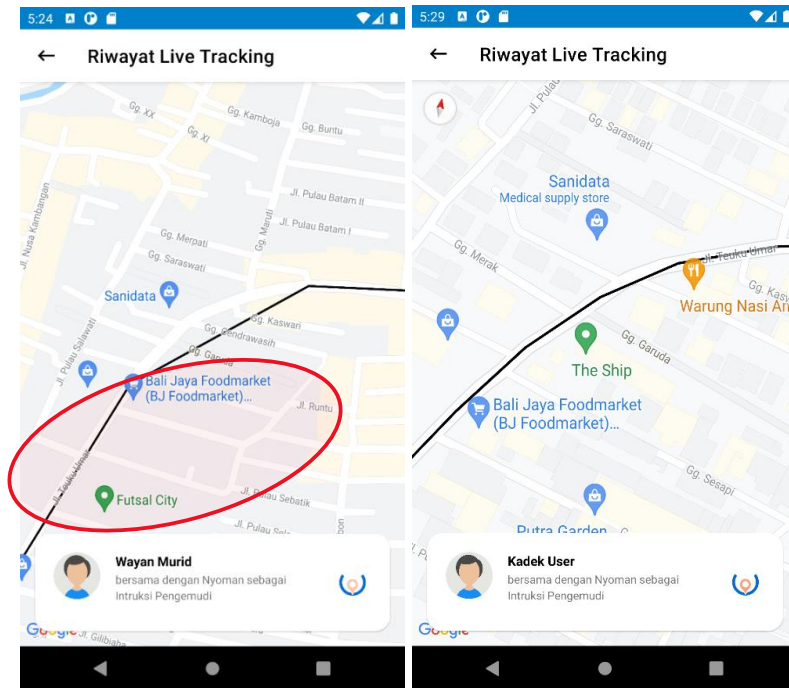


Figure 7 Coordinate point line accuracy

In Figure 7 there are two images on the left and the right, the image on the left shows an inaccuracy in the coordinate point line because it passes through the road from the google map itself, this test is carried out on uploading data every 250 meters, while the right image shows the line is appropriate by walking on google map with testing data upload every 50 meters.

The test results of the search for uploading coordinates into the database are tested into four parts, namely testing 50 meters, 100 meters, 250 meters and 500 meters which can be seen in table 1.

Table 1 The results of testing the accuracy of the coordinate point line

No	Testing name	Amount Data in Database	Size	Accurate / Inaccurate
1	Testing 50 meters	315	22.81 Kb	Accurate
2	Testing 100 meters	173	12.65 Kb	Inaccurate
3	Testing 250 meters	64	4.77 Kb	Inaccurate
4	Testing 500 meters	35	2.74 Kb	Inaccurate



The test results of the search for uploading coordinates into the database are tested into four parts, namely testing 50 meters, 100 meters, 250 meters and 500 meters which can be seen in Table 4.15. Table 4.15 shows the test results obtained, including the name of the test, the amount of data in database, the size and accuracy of the coordinate points line. Based on the table, the most accurate line of coordinates is the "50-meter test" or less than 50 meters, but there are shortcomings, namely the amount of data is the number of coordinate point data uploaded to the database and the size is larger than other tests.

## 5. Conclusion

Conclusively, this study designed and developed an Android-based Driving Course Information System which the aim is to simplify conventional business processes in driving courses company. This application is expected to accelerate the business process as it provides practical benefit with mobile platform technology. Furthermore, this application is also expected to provide benefits for the owners and customers by the presence of features such as registration, scheduling, reporting, and location features.

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