A Disappearing A-Pillar

DESIGN DOCUMENT

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A pillar: Pillar is the vertical or near vertical supports of a car's window area, and a car usually have four pillars, named A, B, C, D moving from the front to rear. In this project, we are going to focus on A pillar.

Blind spots

While safer, today's cars present a number of blind spots drivers must be aware of when driving.

A-pillar   B-pillar   C-pillar
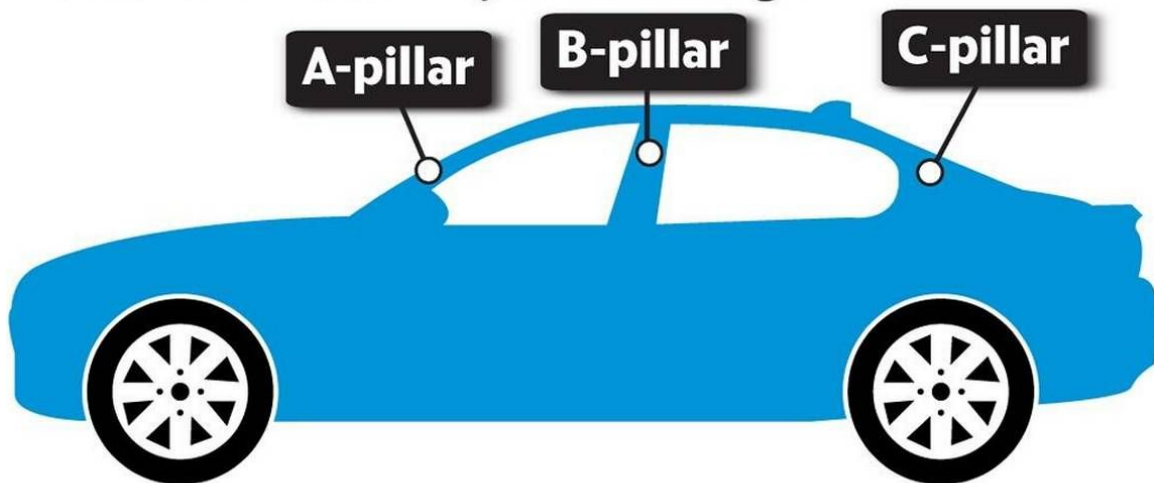
The Bellingham Herald

NOTE: This template is a work in progress. When in doubt, please consult the project plan assignment document and associated grading rubric.

1 Introduction

1.1 ACKNOWLEDGEMENT

The purpose of our project is to find a way to assistant driver's viewability while making turns and going inverse. To be more specific, we are going to increase the viewability by decrease the impact of A pillar. A pillar is the vertical or near vertical supports of a car's window area, and a car usually have four pillars, named A, B, C, D moving from the front to rear. In this project, the most difficult part is how to transfer image onto a tablet and make drivers feel like they could see through A pillar.

1.2 PROBLEM AND PROJECT STATEMENT

In recent years, lots of accidents are cost of bad viewability of driver. More specific, because of the pillars, drivers could not see what is going on near them when make a turn or go inverse in their car. Because of this reason, the goal of our project is to find a way to assistant driver's viewability. In order to achieve this goal, we are going to use a camera to capture what is going on around the car, especially the area that might be covered by A pillar. Then transfer the image into a tablet and set the tablet near the A pillar to display the image, so that driver could see through the A pillar and avoid accidents. The most important part in our project would be transfer the image from camera to the tablet, because this is the main part and we need to write code using Android Studio and upload it to our device. Because working with Android Studio is new to us and doing image processing is also a challenge to us, in our opinion, this would be the most hard part in our project. As for the final outputs, we hope our customer, drivers for example, they could use our tablet to look through A pillar and see the part that is covered by the pillar and avoid accidents.

1.3 OPERATIONAL ENVIRONMENT

Although our product is a software that built in an android tablet, the purpose of this product is to assistant drivers to get wider view. Thus, this tablet need to be attached to the car's A-pillar inside the car, we don't need to consider water-proof in first place. However, we need to ensure the tablet is fixed onto the pillar so it wouldn't rotate or fall down while driving, which would be even more dangerous.

Because this is based on the tablet, we need to consider charging the tablet's battery while users are using the product. So it would require a car power adapter that can keep charging the tablet.

1.4 Intended Users and uses

Our target user base for this project are motorists whose vehicles have wide A-pillars, due to the fact that vehicles with wider A-pillars will obstruct more of the driver's' field of vision. This blind spot will be further exacerbated and reduced depending on the size of the A-pillar. For our project however, it is assumed that the users mainly drive Sports Utility Vehicles(SUVs) since these cars generally have wider A-pillars.

Our product is targeting on all the drivers that have trouble with the view that blocked by the A-pillar. These driver could attach the tablet onto their car's A-pillar and they could also be able to adjust the size of the pillar through the app so that it would actually make the pillar looks "Transparent".

1.5 Assumptions and Limitations

Assumptions: Our product will be an APP on a tablet; Users can fix our product before there car's A pillar; The product can be used for all kinds of cars in the world; The image got by camera will be cut into rhomboid, it will be amplified but it would be as distinct as before, and the other cutted parts will be black.

Limitations: The end product shall be no larger than A pillar; The cost to produce the end product shall be as cheap as possible, the cost is most of the tablet ; The system is from Android, so IOS can not use it; The test has not performed.

1.6 Expected End Product and Deliverables

The aim of our project is to get the image which is blocked by A pillar. So we need to develop an application to acquire the image, and the most part of things are about code in application need to design. The tool we use is Android Studio.The image should be alterable because different car has different size of A pillar. Our obtained image should suit the size of A pillar of client's car.

The product will be a tablet and an APP in that tablet. So the item delivered to client is just the tablet. The tablet does not need batteries but it need charger when it is out of power.

Delivery dates shall be immediately after you get the tablet and download the application.

2. Specifications and Analysis

2.1 Proposed Design

Since our mission is to reduce the impact of pillar for the drivers as much as possible, we need to make an app that is easy to use,easy to operate and fully functional. The app can be used in any android system devices.

To do this, we first need to design a user interface. On the main interface, users can easily and quickly find the camera interface. This interface is able to show the real time sight of the outside pillar, and enhance the drives' judgment to the outside. So the camera interface should have a real-time image transmission function.

In addition, the app will provide some other auxiliary functions, such as user can customized the angle and width of the image according to their own vehicles. this function is convenient to use. it will ask two input data form users, angle and width. And it will automatically produce the shaped screen corresponding to the number entered by users.

Since we do not expect every customers will be able to measure their vehicles. So we will collect some most common brand vehicles, provide 30 or more measurement information for users to choose directly. We are going to implement this in "Pillar category".

Finally, we will complete a subdirectory called "Privacy setting" so that user can save his or her vehicle pillar information inside of the app database. then it can be used more quickly every time they need it. Of course, in order to make it more convenient and efficient for customized to use our products, we will write users' guidelines after we finish most functions of our app. We will also attach the contact information of our team members so that the customers can contact us in time and give us more feedback in time. This will allow us to update our production depends on the requirements of customers.

2.2 Design Analysis

In the past six weeks, our team has primary designed our project and complement parts of them. Start from learning the creating process of android application, read and collect some articles and videos which related on Android Studio online. It took us two weeks to design the user interface. In general, our UI design is brief and straightforward. We designed a camera button on the user interface that allows users to access the camera interface most quickly. Menu and setting tag are added in the upper left and right corner. The catalog contains "Screen size". "Customized", "Pillar category" and "General product description"'. I will explain the details and usage of these subdirectories following.

For subdirectory, of course, we are not able to finish all of them. But we basically completed our preliminary design according to the plan, for example, we added a main camera page, it provides a parallelogram camera. In general android devices, we are normally see the screen covered by the entire images. In our camera interface, user can only see the image which only covered by pillar in real time. And by complement the "Customized", we let users have the opportunity to customize the shape and width of the image as they want. At present, we have failed to pass the user typing data from other App Activity type class to Textureview type class. we will focus on this problem and figure it out in next few weeks. this could be significant for completing our other subdirectories like "pillar category" and "user privacy settings".

In addition, we finished the working of "Contact us" and "About product" by editing the corresponding layout. This will give user a clear description about our product and team members. We have the plan to add an extra category in menu which will guide the user to use our product effective through some text content or video recording by us.

Another thing we need to explain clearly here is the method we used to achieve the shaped image view in camera interface. By looking for the sources online. we found there are two methods to do it. One is create a shaped image by some complicated image processing work and image rotation. We tried it at beginning and give up. The reason is this method asked a lot on the knowledge of the camera building and image processing. Even we can achieve the shaped image finally, but it's still hard to make it customized easily. So at the end, we used the second method which will initial a full screen image and cover it by a shaped layout. This method is much simpler and easy to customize its shape.

3 Testing and Implementation

3.1 INTERFACE SPECIFICATIONS

Our project is to disappear the A pillar. In order to reduce the cost, we use the tablet to show our test result.

 At first, we use the Android studio to develop our app, which can show the image after the A pillar directly to make A pillar disappear. Then we upload our app to the tablet to see the results.

In order to make sure that this app is working well, we need to test the app's camera, the video window on this camera. For the first test, we need to run the APP on our tablet, the app can shown the catalog and the camera icon on the home page. Make sure that all catalogs works well. We need to test our camera

first, the image on the video window transed by the camera will have an angle so that it can parallel to the A pillar on the car.

In addition, we need to do the practical test on the suv car. So that we can know that this app can accurate trans the image from the back of the A pillar to make it disappear. We probably will need to change the angle and the size of the widow after this test to make the A pillar disappearing as possible as we can.

3.2 HARDWARE AND SOFTWARE

Hardware: ASUS tablet with a camera

Software: Android studio, Crazy pillar(our project)

First of all, we use the Android studio to develop our app. And then we run it to test the function of our app.

We measured an angle and the width of the A pillar on a suv car.We set an angle and make the video window at the same width as the A pillar. So that this tablet can be paralleled with the A pillar.

Then we upload this app to the ASUS tablet. And use the ASUS tablet with the camera to show our test results of the app.

ASUS tablet is a long rectangular size tablet.In oder to make the A pillar disappearing as possible as we can, we choose this kind of tablet. When we set this tablet on car, it can be coincided with the A pillar to disappear the blind point on the car.

Android studio is a kind of software to help people develop their own app. We learned the function and the method about how to use this software on youtube.

Crazy pillar is the software we create to disappear the A pillar on the car. It can transfer the image from the back camera and create the image on the tablet as the same size as A pillar on the car.

3.3 PROCESS

In order to see whether our project could accomplish our goal or not, we need to find a way to test it out. First of all, it is to test the interface, more specific, we need to know whether this interface is able to show the real time sight of the outside pillar or not, and can it enhance the drives' judgment to the outside? In order to test it out, our plan is to take pictures from driver side through A pillar, then take pictures through our tablet and compare these two pictures, if the picture taken with tablet shows what is missed or blocked by A pillar, then it is a

pass. In the next test, we need to see whether users can customize the angle and width of the image according to their own vehicles. In this test, we will first fix our tablet on the model car and then by switching each member as different driver to adjust the tablet(because each team member has different height and view angle), if they could still see what is behind the A pillar, then our project pass this test.

3.4 Results

So far, we are still on the design processing part and we are going to upload this testing part after we finish our design. In later test part, we are going to record each test result. And we are going to have discussion with team member to improve the coming problems.

4 Closing Material

4.1 Conclusion

So far, our team has primary designed our project and complete parts of them. The major part that we have completed is the user interface. On the main interface, users can easily and quickly find the camera interface. This interface is able to show the real time sight of the outside pillar, and enhance the drives' judgment to the outside. So the camera interface should have a real-time image transmission function. And we also finished a subdirectory called "Privacy setting" so that user can save his or her vehicle pillar information inside of the app database. then it can be used more quickly every time they need it.

As for the next mission, we hope our app could provide some other auxiliary functions, such as user can customized the angle and width of the image according to their own vehicles. After we complete this goal, we are going to move on the testing part and check if our project could work perfectly.