Final Year Project Showcase Batch-2018
Year 2022

Department: Electronics Engineering Programme: Electronics Engineering		
1	**Project Idea**	Smart Digital Speedometer and Cruise Control System For Motorbikes
2	**Process**	A smart bike is modelled by incorporating the features of digital speedometer, fuel monitoring system, anti theft system and cruis control. Brief description of these processes is as below; **The speedometer system** is interfaced with the motorcycle through which we displayed our required parameters on a LCD display. The LCD display is successfully displaying the parameters which we wanted to achieve. From the start, the value of speed in km/h and current gear state is being displayed. This is followed by the value of trip in km (how much motorcycle has travelled in a trip) and value of current fuel remaining in liters which was our main goal. Finally, the values of clock, day, date, and year are being displayed in the end. Selection of sensors for **fuel measurement** is a difficult task and as the shape of tank is not symmetric so it created difficulties in measuring the accurate reading of fuel in the tank.The unavailability of sensors in the local market also proves as an obstacle in achieving more accurate results as sensors are needed to export from different countries and this process is both money and time consuming. Making the speed lock and fitting of cruise control system is a complicated task to achieve. The **anti-theft system** that works is such a way that when the sensor detects the correct fingerprint it switches the relay and makes it short circuited which in result turns the ignition on and when the same fingerprint is again placed on the sensor it makes the contact open circuited and turns the ignition off that displays on the lcd as well. Hence, the ignition can be turned on and off by placing the correct fingerprint again and again on the sensor The procedure for enrolling the fingerprint that the user can do in a highly secure way. For enroll and delete there are separate push buttons and when the enroll button is pressed, it asks the key password first which you can enter with the help of 1x4 keypad and when the correct password is entered then it asks the location on which he wants to save his fingerprint and then after pressing ok button it makes the user enroll the fingerprint. The procedure for deleting the fingerprint that the user can do in a highly secure way. For enroll and delete there are separate push buttons and when the delete button is pressed, it asks the key password first which you can enter with the help of 1x4 keypad and when the correct password is entered then it asks the location of the

		fingerprint he wants to delete and then after selecting the location and pressing ok button it makes the user delete the fingerprint. The **Cruise Control System** is implemented on the motorcycle adjacent to the race grip through which the rider can lock the speed of bike at specific speed levels. The system works in such a way when the green button is pressed the dc gear motor performs rotation and a needle type pin locks the speed and when the red button or any of the brakes is pressed it unlocks the speed.
3	**Outcome**	• **Digital speedometer** is designed to digitally monitor the speed of bike. It is developed by hall-effect sensor and RTC clock module is used . • **Fuel measurement** is developed for monitoring fuel in the fuel tank. It is developed by using ultrasonic sensors to measure accurate fuel readings in the tank. • **Anti-theft system** is deveopled for the safety of bike from robbery. It is developed by using fingerprint sensor module. • **Cruise control** module is deveopled to continue cruising at the same speed to provide safe and comfortable journey on longer routes. It is designed and developed by uisng dc motor and relays.
4	**Evidence (Theoretical Basis)**	As we know that we have been living in an era of technology where everything has digitalized so we have decided to implement some ideas on our motorbike that could make the life of common people easy. In our system we have used lcd and interfaced it with arduino to show gear state, clock, speed, rpm and fuel measurement in liters on our lcd screen .Fuel measurement system has developed to minimize the problem of fuel theft at petrol pumps and it has also helped user to know what amount of fuel is left in the tank in running condition. A clock has introduced in our project letting the user know about the current time while riding. It has also helped in reducing accidents as the user does not have to continuously see the time in the mobile phone or wrist watch. A motorcycle gear indicator is an indicator that automatically has indicated which gear you are riding at any given time, thereby avoiding the problem of drawing attention to the motorcycle gear position. The purpose of speedometer has showed the speed of vehicle in km/h, miles/h or in both. We have also developed and implemented an anti-theft system using a fingerprint sensor interfaced with arduino .The purpose of anti-theft system has avoided bike robberies and only a person who has the fingerprint enrolled has been able to unlock the bike ignition system. Our project also includes cruise control system that allow the users to make the vehicle cruise at a constant speed.
5	**Competitive Advantage or Unique Selling Proposition** (Cost Reduction, Process improvement, Attainment of any SDG (Sustainable Development Goal), increase of market share or capturing new market or having superior	

	performance over a competitor. In summary, any striking aspect of the project that compels the industry to invest in FYP or purchase it. Some detailed description is required in terms of how, why when what. You can select one or more from the following dropdown and delete the rest of them). Please keep relevant options, delete the rest of them, and correct the sequence	
a	**Attainment of any SDG** (e.g. How it is achieved and why it is necessary for the region)	Applying engineering knowledge for solving currently faced problems with the help of electronics while gaining technical expertise and experience of making a multipurpose system contributing towards society The following SDGs addressed in our project: **SDG#8 Decent work and economic growth** **SDG#9 Industry, Innovation and Infrastructure** **SDG#12 Responsible consumption and production**
b	**Any Environmental Aspect** (e.g. carbon reduction, energy-efficient, etc.)	NA
c	**Cost Reduction of Existing Product**	• The cost of the product can be minimize by replacing the modules such as RTC, I2c etc. by discrete embedded components and by designing our own microcontroller circuit with required input/output pins and components (modules and ready made microcontroller circuits/modules have some extra components in them that's why they are bit expensive than the circuit design and made by our own). • Secondly if the manufacturing of products will take place on large industrial scale or in bulk quantity than the cost per product will be reduce. • Purchasing components directly from manufacturers or wholesalers will reduce the cost of each component. • If the manufacturer is self sufficient to make each and every part (e.g. PCB designing, PCB Manufacturing, circuits designing and manufacturing, display interface, system body etc.) then the cost per product can be reduced.
d	**Process Improvement which Leads to Superior Product or Cost Reduction, Efficiency Improvement of the Whole Process** (e.g. What is the issue is current process and what improvement you suggests)	At first the accuracy of fuel measurement system can be improved by using different sensors. The anti-theft system can be improved in a way that it allow users to change the password and another recommendation is that one can design the algorithm in a way that if someone, whose fingerprint is not enrolled, tries to unlock the bike so it sends message on owner mobile or can also use an alarm for enhancing safety. At last, the cruise control system can be improved by modifying its designs so that it can become more easy for user to lock the speed and it can also be modified in a manner that one can design a cruise control system that has different speed options access with the help of push buttons associated with different speed level. The GUI can be improved by using a better lcd to make the display more smooth and attractive. These all modifications can be made to make the product more superior and efficient.
e	**Expanding of Market share** (e.g. how it expand and what is the problem with the current market	The problem with current market is that customized solutions are not available. We can increase our market share by offering our product customized according to users' liking. For instance, a

		customer can decide what parameters he/she wants to be displayed on speedometer. Another strategy can be to offer innovative features like our anti-theft security system with password function. Also, to increase our market share, we can ensure to offer high quality products as customers are quality conscious of a product and its price. We can advertise our product on social media and by placing our product on different shops of motorcycle market the market share can be increased.
f	**Capture New Market** (e.g. Niche market or unaddressed segment)	• There are number of local markets that sell bike spare parts including speedo meters and security systems for different bikes. The product can be sell directly to retail shops of those markets then the shop keepers will disply the product in their shops for catching customer attraction. • Industrial market can be capture by selling the product to bikes manufacturing industries. • Direct customer approach can also be done through social media and marketing (custome made speedometers for direct clients). • Topology of manufacturing different variants of product (e.g. version-1 less features, version-2 more features than v-1, Version-3 more features than v-1 and v-2) can be helpful to capture all types of customers. • Niche marketing can be apply on those customers who are passionate to modify their bikes by direct selling of customized systems to them.
g	**Any Other Aspect**	The anti-theft system can be used in any system or projects where security is needed. So it can be a universal security system and can be used in door locks, bank lockers and security safes.
6	**Target Market** (Industries, Groups, Individuals, Families, Students, etc) Please provide some detail about the end-user of the product, process, or service	• Companies that manufacture multi-function speedometers. • Bike manufacturing companies. • Bike riders who travel on a daily basis. • People who modify and customized their motorcycle as per their requirement.
7	**Team Members** (Names along with email address)	Muhammad Shahmeer Khan (msk.shahmeer786@gmail.com) Syed Ashhad Ali (syedalikhan29@gmail.com) Syed Rafay Hasan (sdrafay.hasan@gmail.com) Muhammad Hassan Khan (hassaankhan271@gmail.com)
8	**Supervisor Name** (along with email address)	Dr. Sadia Muniza Faraz (smuniza@neduet.edu.pk)

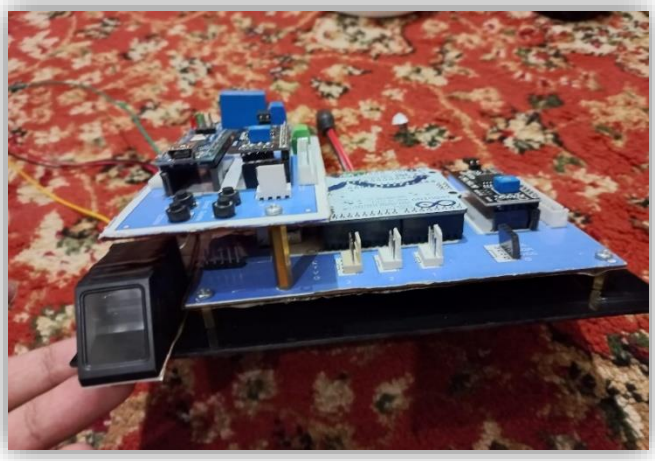
10	**Pictures (If any)**	 Fig-1 imeplementation of antitheft system
		  Fig-2 Implementation of speedometer

Fig-3. Impelemedntation of antitheft system

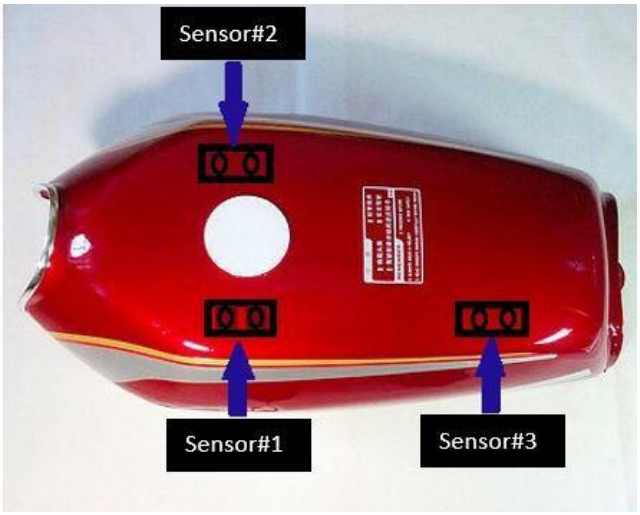


Fig-4 Placement of sensors in tank for fuel monitoring