Smart Car + AI

Course Outline :

Outline of the course and learning outcome		
General	To stimulate and help students to think critically & to collaborate as a team. Students will identify the problems caused by road accidents in today's stressful world and how to solve it.	Students will be guided and encouraged to identify these causes, brainstorm possible solutions from both technical and non-technical perspectives.
Technical Solutions	Learn how AI can be used to solve and learn the processes required, learn how to implement and exhibit the technology. Students will also be exposed to real life applications of AI in Cars	Learn AI technology as a concept, implement and test it as well as evaluating if the solution is sufficient . Students should also suggest what other AI functions can be introduces to enhance it
		The course will provide limited projects for students to develop and will also suggest extension classes for interested students to explore their solutions.
Non Technical	Students will be introduce to non-technical options like raising awareness & educating public	What kind of tools are available to raise their awareness.
		Education - How to do this and the rewards. Here the students will use a gamified platform to learn this.

1. ***Unit 1***- *Stimulate Critical thinking through discussions, Collaborate by dividing the students into groups.*
    1. *Topic:What are the most common causes of road accidents?*
        - *For younger students - will show videos of different road accidents to stimulate their ideas*
    2. *Possible solutions- Technical & Non-Technical*

General: Obviously for technical solution we can only cover what we have prepared only & depends on the length of the class …. But we can promote it

- *If their ideas are good we will chose 1-2 of their project to do or*
- *To set up another class to implement their solutions.*

	Possible solutions to reduce road accidents		
	Driver	Dangerous driving & don't follow rules	
Units	**Causes of Accidents**	**Possible Technical Solutions**	**Hardware & Software**
2	Sleepiness	Detection & Wake up call	AI with sensors/camera, buzzer module, voice command
	Sudden swerve lane dangerously without signalling	Swerve back and wake up call	AI, Line follower and
3	Turning without signalling	Voice warning and auto signalling ?	Detection based on how much wheels turn and voice command, turn on signal?
	Don't follow traffic lights	Slow down automatically	CV and slow down, voice command
4	Drive too fast & above speed limit set	Scan speed limit and auto set to follow	ML, CV, set speed to be max speed limit or lower
	Follow too close the front car and sudden brake	Detect distance and warning if too close	Detection, CV, Voice command,
	Non Technical	Marketing & Awareness	Education & Awareness & rewards

3. *To solve these problems what must the car be able to do in each?*
    1. *What main functions in each?*
        1. *Hint- can see the car in front, traffic light, speed limit,*
        2. *Can see person to be sleepy?*
        3. *To send wake up call? What kind of wake up call? Sound only? Voice?*
        4. *To slow down, to detect if sudden movement*
        5. *Students learn about each of the components in the car*
    4. *What can AI help in solving these ?*
2. ***Unit 2-*** *Sleepiness*
    1. *What are the parts in Smart Car and components to enable this*
        1. *Key Parts in this project*
        2. *How can AI help?*
            1. *CV*
        3. *Other functions: Wake up call feature? What do we need to have*
            1. *Can a combine feature make it more effective? Or will one or the other sufficient?*
    2. *What are required?*
        1. *Step by step process - we call algorithm*
        2. *Write codes*
        3. *Micro processor or Computer*

    3. *Implementing the ideas based on our discussion on technology*
        1. *Discuss and lead them to understand the process (algorithm)*
        2. *Choosing the "computer board" to process/execute this solution*
        3. *Writing codes to control (showing them the codes and logic by templating the codes)*

    4. *Implementing and exhibiting the result*
        1. *Students see (connecting, testing)*
        2. *Letting them try.*
        3. *Is it successfully 100% of the times, or sometimes? Is it effective and useful*

3. ***Unit 3*** *Project 2*
    1. *What are the parts that the Smart Car need for this*
    2. *Training the car to perform*
    3. *How to solve in marginally different? Discussion?*
        1. *Hint - Live feeds for manual over ride*
        2. *Hint - Notification if marginal product*
        3. *Possible manual over ride ?*
        4. *Is this solution effective 100%*

4. ***Unit 4 -*** *Project 3*
    1. *What parts are needed in this Robotic Arm*
    2. *Train manually to control the arm remotely*
    3. *Train to retrieve objects that are small and difficult like egg, shells, ropes*

5. *Unit 5 - Project 4*
6. *Unit 6- Project 5*
7. *Unit 7 - Project 6*
8. *Unit 8 - Project 7*
9. *Unit 9 - Project 8*

10. ***Unit 10-*** *Summary*
    1. *Are these solutions effective*
    2. *Let them try out 3 solutions again.*
    3. *What else can be done and how can you help in future when you grow up ?*

Smart Car hardware

Hardware (Main Car)	Quantity
Raspberry 4 8gb	1
Raspberry casing	1
Scandisk sd card 64gb	1
Raspberry power supply	1
Car chassis	1
Motor Driver	1
Buck boost module	1
Camera	3
Usb Microphone	1
Rpi cam 8mp 1080	1
Battery Cell	2
Race Track	1
Supporting car (Arduino)	3
Arduino	3
Landscape	
Traffic lights	2
Road sign with speed limit	3
Bystanders	3