22CDT21-DESIGN THINKING

END SEMESTER(20/12/2024)

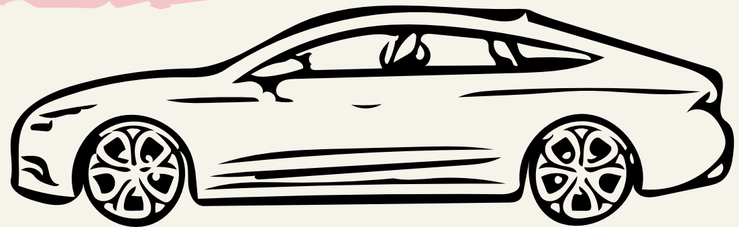
TEAM-7

AUTOMATIC HEADLIGHT DIMMER

DUSK TILL DAWN

TEAM MEMBERS:

1)MIDUNAVARSHINI S - 23CSR132
2)MEGATHILAGAVATHY S- 23CSR128
3)PRAJIT PRANAV K - 23CSR161
4)PRATEEKSHA G K -23CSR165
5)RITHAN A K - 23CSR176
6)RAVI PRASANTH R - 23CSL261



PHASE 1: EXPLORE

T1: SCOPE TOOLS

PRATEEKSHA G K(23CSR165)

	SCOPES	DEFINITIONS
S	**SITUATION AND /OR PROBLEM**	The lack of driver vigilance in manually adjusting their headlights, resulting in accidents, poses a significant safety concern that requires immediate attention.
C	**CONSTRAINTS**	Weather conditions, Limited detection range
O	**OBJECTIVES AND OUTCOMES**	Enhancing road safety, improving driver comfort, and optimizing headlight utilization.
P	**PEOPLE**	Late night drivers
E	**ESTIMATES**	Time: 3 – 4 months Cost: 10k-12k
S	**SCOPE**	Scopes may be on alternatives in sensors,algorithm
	DESIGN CHALLENGE	We seek to develop a cost- efficient automatic headlight dimming system that significantly improves road safety.

MIDUNAVARSHINI S(23CSR132)

T2: STEEP TREND ANALYSIS

SOCIAL & DEMOGRAPHICS

- Reduction in accidents
- Easy for elderly driver
- Highly usable in rural areas

TECHNOLOGY

- Advancement in sensors
- Maintenance and reliability

ECONOMY

- Market demand
- Offer from insurance companies

ENVIRONMENT & NATURE

- Energy efficiency
- Management of electronic components

YOUR DESIGN CHALLENGE ISSUE

POLITICS & LEGAL

- Standards from government
- Liability and safety

T3: STRAGETIC PRIORITIES MATRIX

RITHAN A K(23CSR176)

	URGENT	LESS URGENT
IMPORTANT	Ensuring the system can accurately detect various vehicles on opposite direction	Implementing responsiveness to different driving condition
LESS IMPORTANT	Road lighting improvement by local authorities.	Implementing safety rather than luxurious features

T4: STAKEHOLDER MAPPING MATRIX

MEGATHILAGAVATHY S(23CSR128)

High Interest/Low influence • End users-drivers & owners • consumer safety advocates • driving instructors and schools • pedestrians and bicyclists	**High Interest/High influence** • Automobile manufactures • Road Safety organisations • Automative Engineers and Researchers • Sensor manufactures
Low Interest/Low influence • General Public • Car dealerships • Investors • Transport unions	**Low Interest/High influence** • Insurance companies • Automotive suppliers • Fleet owners • Government Tranportation departments

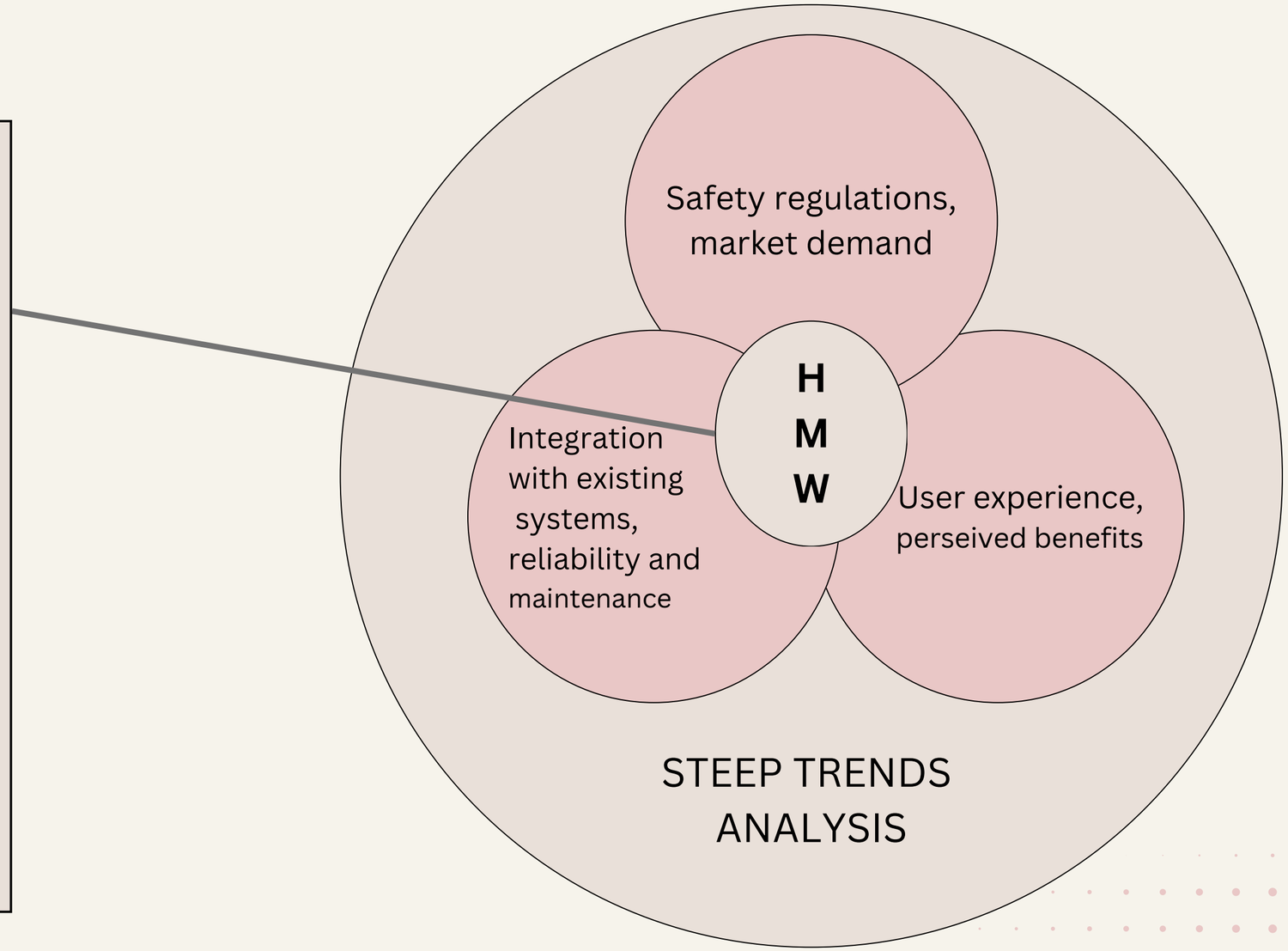
T5: REFRAMING THE OPPORTUNITIES

MEGATHILAGAVATHY S(23CSR128)

1.How might we ensure automatic headlight dimming systems provide optimal visibility without causing glare to other drivers?

2.How might we integrate automatic headlight dimming technology seamlessly into existing vehicle systems?

3.How might we enhance user trust and adoption of automatic headlight dimming technology in vehicles?



PHASE 2: EMPHATHISE

T6: POEMS FRAMEWORK

MIDUNAVARSHINI S(23CSR132)

P People	• Car Manufacturers • Regulatory authorities • Automotive Suppliers • End Users(Car Drivers)
O Objects	• Sensors, • Microcontrollers
E Environment	• Adjusts based on lighting from oncoming vehicle, road and weather condition. • Reducing glare for the drivers • Improves safety.
M Messages & Media	• Alert messages • Audio signals • Tutorial videos or Animated demonstration videos
S Services	• Software update service • Customer support and assistance • User feedback and analytics service.

T7:EMPATHY MAP (USER - DRIVER)

PRATEEKSHA G K(23CSR165)

1. What are the difficulties the driver faced while driving during night time?
2. How will the driver feel when he uses a vehicle with automatic headlight dimmer system?

HEAR?

1. Has he ever heard of a vehicle that implements this automatic headlight dimmer?
2. Will the driver's family be at peace that he will return home safe?(using this automatic headlight dimmer)

THINK & FEEL?

SEE?

1. Does he face any other difficulties while driving?
2. Will he consider this as an added advantage to the vehicle?
3. According to him what are all will be the pros and cons of this system?

DO & SAY?

1. Will the driver suggest the other drivers to use a vehicle with automatic headlight dimmer?
2. How long can he drive trusting this system?

PAIN

- Glare and discomfort
- Reduced visibility
- Fatigue and strain
- Increased accident risk

GAIN

- Enhanced Safety
- Improved driving experience
- Reduced driver fatigue

T8: JOURNEY MAP(INTERVIEW QUESTIONS)

MEGATHILAGAVATHY S
(23CSR128)

Is the working of this system highly efficient in Indian traffic ?

Does this system make sense in reducing accidents?

Why we can’t see this technology frequently in Indian roads?

What is the approximate production cost of this system?

How does the matrix system work?

How to bring up this technology in economic cars?

Is this implementation will change the design of the car?

Have you ever heard about any real time accidents related to this?

Have you tried any method or techniques to avoid glare?

Have you ever experienced any problem with manual adjustment of headlighr

What if we provide an affordable headlight that adjusts for oncoming traffic?

T9: POST INTERVIEW DE-BREIF PRESENTATION

PRAJIT PRANAV K
(23CSR161)

- **Goal / Motivations:**

1. Enhance customer satisfaction.
2. Aim to position the showroom as the top choice for premium car buyers in the region.

- **Aspiration**

1. Aspires to become a regional sales director.
2. Leveraging their expertise to boost Audi's presence in emerging markets.

- **Current Experience**

With a decade of experience in the industry, the manager has built strong relationships with customers and understands their needs well.

- **Challenges and Pain points**

1. Adapting to rapid technological advancements
2. Ensuring the sales team can effectively communicate these innovations to clients.
3. Managing customer expectations about the availability and pricing of high-end features.

- **3 most memorable things about the Interviewee**

1. Deep knowledge and enthusiasm for Audi's technological advancements.
2. Strong focus on customer-centric service.
3. Passion for motorsports and the future of electric vehicles.

- **User Insights & Deep needs**

1. Values continuous learning, especially in staying ahead of automotive trends.
2. Need support in training the sales team on new technologies.

T10: SAMPLE NEED STATEMENTS

PRAJIT PRANAV K
(23CSR161)

People want to trust that their vehicle’s lighting is designed to provide both safety and comfort during night driving.

Should feel confident on driving at night, knowing the car has advanced lighting technology.

Explore the Matrix LED system in action before making a decision, to fully appreciate its capabilities.

Understand the benefits of the Matrix LED system to make an informed purchase decision.

Vehicle should stand out with premium features like the Matrix LED system, reflecting the user’s style and taste.

T11: PERSONA CANVAS (USER-1)

RAVIPRASANTH R(23CSL261)

PERSONA CANVAS

Persona Name: Mr V Vivek

Demographic Profile :

The Manager, Audi Showroom, Coimbatore .

Age : 48

Gender: Male

Home : Coimbatore

Education Background :

Diploma in Mechanical Engineering

Goals :

- Enhancing customer satisfaction
- Ensuring goodness of both office bearers and clients.

Deep Need Statement :

I need to ensure that our showroom not only sells vehicles but also educates customers about the importance of safety features like automatic headlight dimmers

Motivation / Aspiration :

Focusing on integrating new technologies that improve safety and driving experience

Interview image:

Hobbies :

Watching motorsports, Playing tennis

Challenges / PainPoints :

- Keeping up with rapidly changing technology
- Being consistent in commercial environment

Social & Family Lifestyle :

A close knit family

Behavior & Family Lifestyle :

Supportive family

T11: PERSONA CANVAS (USER-2)

RAVIPRASANTH R(23CSL261)

PERSONA CANVAS

Persona Name : Mr Sethupathy

Demographic Profile : Driver

Age : 52

Gender: Male

Home : Erode

Education Background : HSC

Goals :

- Ensuring the safety and comfort of the students.
- Providing a reliable service that students and parents can trust.

Deep Need Statement :

- Need tools and technologies that enhance safety and make the job easier, especially when it comes to visibility at night.
- Automatic headlight dimmers could help reduce the stress while driving

Motivation / Aspiration :

- Responsibility to transport students safely.

Interview image:

Hobbies :

Going for a walk

Challenges / PainPoints :

- Visibility issues during night due to glare

Social & Family Lifestyle :

Nuclear family

Behavior & Family Lifestyle :

A supportive family that understands the demands of the job.

PHASE 3: EXPERIMENT

T12: SCAMPER WORKSHEET

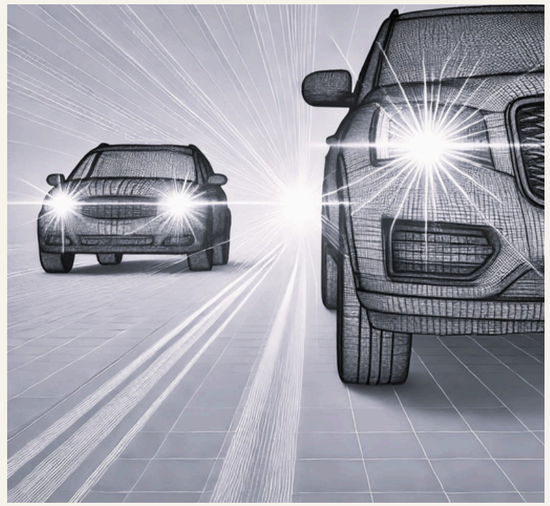
PRATEEKSHA G K(23CSR165)

S SUBSTITUTE	• Install a manual headlight switch for full control over adjusting brightness as needed. • Anti-glare night driving glasses don't replace an automatic headlight dimmer.
C COMBINE	• Integrate with fog lights or LED strips for enhanced visibility in various driving conditions. • Combine with adaptive lighting systems that adjust beam patterns based on steering angle & road conditions.
A ADAPT	• Use a microcontroller and light sensors to create a custom system • Drive a vehicle with automatic headlight dimmer.
M MODIFY	• Modify the light sensor sensitivity for better response to varying light conditions. • Install a switch to temporarily disable the automatic dimming function for manual control.
P PUT TO OTHER USES	• Use it with collision avoidance or adaptive cruise control to enhance nighttime safety. • Set up different automatic profiles for various driving conditions, like city or highway.
E ELIMINATE	• In case you need a complete automatic system,remove the manual override switch for a fully automatic system.
R REVERSE	• Rearrange wiring to integrate additional features, such as fog lights or DRLs. • Relocate the control module to a more accessible area for easier troubleshooting or adjustments.

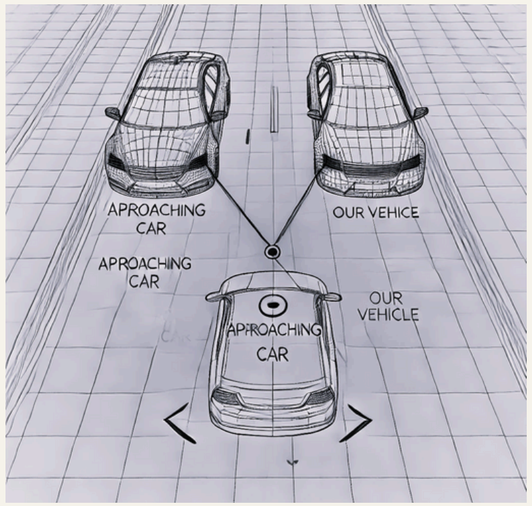
PHASE 4: ENGAGE

T13: STORYBOARD CANVAS

MIDUNAVARSHINIS (23CSR132)



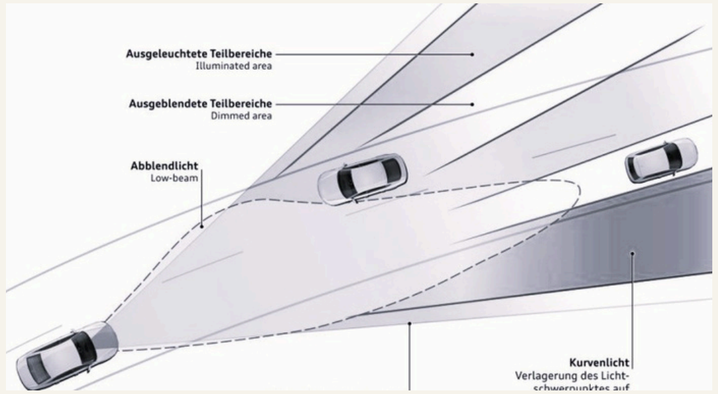
Car with high beam



Car with high beam approaching each other

Blinding lights

Leads to accident



Installing automatic headlight dimmer

Driver feels safe and secure

T14: CONCEPT SYNTHESIS (11 Tool Box)

RITHAN A K(23CSR176)

DESIGN CHALLENGE: How might we design an automatic headlight dimmer for night driving?

SOLUTION APPROACH: Ensuring safety by preventing glare from the high beam of headlights.

Persona:

Night time drivers

Reason:

The blind spot created after passing by a high beam vehicle may lead to accidents.

Deep Needs: Need a device which ensures safety and comfortable driving experience.

Value Propositions to Target Users:

By automatically adjusting the headlights ,it allows the drivers to stay focused while driving.

Gains:

- Peaceful driving
- Need not dim the headlights manually

User Need(Problem) solvers:

A car with automatic headlight dimmer to detect opposite vehicles and dim its own headlights.

Pains:

- Blind spot will be created.
- Eyes get strained.

Gain Creator:

- Sensor
- Manufacturers

Pain Relievers:

- Reduced Eye strain.
- Enhanced road safety.

Value Propositions to Organizations or Agency:

- Lowers accident-related costs and insurance premiums.
- Adds a competitive edge by offering advanced safety features.

T15: IDENTIFING QUICK WIN

PRAJIT PRANAV K(23CSR161)

What is this quick win about?	Reduces glare for oncoming drivers, minimizing the risk of accidents.
What are the success indicators? How would it be measured?	The success indicator will be reduction in the number of accidents.
Who are the resources/staff trainings needed?	Headlights ,IR sensor-End Users must be aware of this technology.
Who will lead this quick win implementation?	The project will be led by Engineers who design and develop the dimmer system.
What are the key steps needed to implement the quick win? What is the timeline till completion?	Awareness among the end users that this type of technology exists will be very useful.
When will the status or progress update?	The status will be updated during the progress and completion of progress.
When will this be completed?	The project can be completed within 3-4 months.
How will the success be communicated?	Success will be communicated through the decrease in accident rate and increase in the number of economic cars with automatic headlight dimmer.

T16: ACTION PLANNING TO ADVANCE THE DESIGN CHALLENGE PROJECT

RAVIPRASANTH R(23CSL261)

Idea What idea for implementation?	**Objectives** Why is this Idea Important?	**Responsibility** Who will lead this?	**Implementation** How will this be implemented?	**Resources** What capablities and resources are needed?	**Completion** When will this be completed?
To avoid accident caused during Night travel.	To reduce travel accidents during night	Team Contributions	Using sensors	Connecting Wires And IR Sensors	3 Weeks
To purchase the components	Overview of overall structure of the project	Team Contributions	Using power supply	Voltage regulator and Transformer	1 Month
Fixing the components and check detection	To check detection	Team Contributions	Arduino Board , Arduino IDE	Required Devices and Code Implementations	1 Month

THANK YOU