

Graph - Non-linear Data Structure

PowerPoint Presentation (34 slides)

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Unit-3 (Part 4) Graph Non-Linear Data Structure pradyuman.jadeja@darshan.ac.in +91
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Graphs What is Graph? Representation of Graph Matrix representation of Graph Linked List representation of Graph Elementary Graph Operations Breadth First Search (BFS) Depth First Search (DFS) Spanning Trees Minimal Spanning Trees Shortest Path

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Adjacency matrix A diagrammatic representation of a graph may have limited usefulness. However such a representation is not feasible when number of nodes and edges in a graph is large. It is easy to store and manipulate matrices and hence the graphs represented by them in the computer. Let $G = (V, E)$ be a simple diagraph in which $V = \{v_1, v_2, \dots, v_n\}$ and the nodes are assumed to be ordered from v_1 to v_n . An $n \times n$ matrix A is called Adjacency matrix of the graph G whose elements are a_{ij} are given by $a_{ij} =$

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Adjacency matrix An element of the adjacency matrix is either 0 or 1. Any matrix whose elements are either 0 or 1 is called bit matrix or Boolean matrix. For a given graph $G = m(V, E)$, an adjacency matrix depends upon the ordering of the elements of V . For different ordering of the elements of V we get different adjacency matrices.

V_1	V_2	V_3	V_4	0	1	0	1	1	0
0	0	1	1	0	1	0	1	0	0

$A =$

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Adjacency matrix The number of elements in the i th row whose value is 1 is equal to the out-degree of node V_i . The number of elements in the j th column whose value is 1 is equal to the in-degree of node V_j . For a NULL graph which consist of only n nodes but no edges, the adjacency matrix has all its elements 0 . i.e. the adjacency matrix is the NULL matrix

V_1	V_2
-------	-------

V 3 V 4 0 1 0 1 1 0 0 0 1 1 0 1 0 1 0 0 V 1 V 1 V 2 V 2 V 3 V 3 V 4 V 4 A =

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Power of Adjacency matrix Entry of 1 in i th row and j th column of A shows existence of an edge (V_i, V_j) , that is a path of length 1 Entry in A 2 shows no of different paths of exactly length 2 from node V_i to V_j Entry in A 3 shows no of different paths of exactly length 3 from node V_i to V_j 0 1 0 1 1 0 0 0 1 1 0 1 0 1 0 0 A = A 2 = A x A = 1 1 0 0 0 1 0 1 1 2 0 1 1 0 0 0 1 1 0 1 1 1 0 0 2 2 0 1 0 1 0 1 A 3 = 1 2 0 1 1 1 0 1 2 3 0 2 1 1 0 0 A 4 =

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Path matrix or reachability matrix Let G = (V,E) be a simple diagraph which contains n nodes that are assumed to be ordered. A n x n matrix P is called path matrix whose elements are given by

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Adjacency List Representation 0 1 3 2 4 0 1 2 3 4 1 2 3 4 0 3 0 3 4 0 1 2 4 0 2 3

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Graph Traversal Two Commonly used Traversal Techniques are Depth First Search (DFS) Breadth First Search (BFS)

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Depth First Search (DFS) It is like preorder traversal of tree Traversal can start from any vertex V_i V_i is visited and then all vertices adjacent to V_i are traversed recursively using DFS 1 2 3 4 5 6 7 8 DFS (G, 1) is given by Step 1: Visit (1) Step 2: DFS (G, 2) DFS (G, 3) DFS (G, 4) DFS (G, 5) DFS (G, 2): Step1: Visit(2) Step 2: DFS (G, 6) DFS (G, 6): Step1: Visit(6) Step 2: DFS (G, 3) DFS (G, 8) DFS of given graph starting from node 1 is given by 1 2 6 3 8 7 4 5 v v v v v v v v

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Depth First Search (DFS) A B C D E F G H A B C D E F R M Q N P O A B D H E C F G v v v v v v v v A B D C F E v v v v v v v

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Breadth First Search (BFS) This methods starts from vertex V 0 V 0 is marked as visited . All vertices adjacent to V 0 are visited next Let vertices adjacent to V 0 are V 1 , V 2 , V 2 , V 4 V 1 , V 2 , V 3 and V 4 are marked visited All unvisited vertices adjacent to V 1 , V 2 , V 3 , V 4 are visited next The method continuous until all vertices are visited The algorithm for BFS has to maintain a list of vertices which have been visited but not explored for adjacent vertices The vertices which have been visited but not explored for adjacent vertices can be stored in queue

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Breadth First Search (BFS) 1 3 4 5 6 7 8 2 A B C D E F G H V 0 V 1 V 3 V 2 V 4 V 5 V 6 v 1 2 3 4 5 6 7 8 | | | v v v v v v v A | B C | D E F G | H v v v v v v v v V 0 | V 1 V 2 | V 4 V 6 V 3 | V 5

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Write DFS & BFS of following Graphs A B C D E F G H A B C D E F R M Q N P O 0 1 4 3 5 2 A B C D E 1 2 4 6 5 3 A B C D E F

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Procedure : DFS (vertex V) This procedure traverse the graph G in DFS manner. V is a starting vertex to be explored. Visited[] is an array which tells you whether particular vertex is visited or not. W is a adjacent node of vertex V. S is a Stack, PUSH and POP are functions to insert and remove from stack respectively.

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Procedure : DFS (vertex V) 1. [Initialize TOP and Visited] visited[] ? 0 TOP ? 0 2. [Push vertex into stack] PUSH (V) 3. [Repeat while stack is not Empty] Repeat Step 3 while stack is not empty v ? POP() if visited[v] is 0 then visited [v] ? 1 for all W adjacent to v if visited [w] is 0 then PUSH (W) end for end if

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Procedure : BFS (vertex V) This procedure traverse the graph G in BFS manner V is a starting vertex to be explored Q is a queue visited[] is an array which tells you whether particular vertex is visited or not W is a adjacent node f vertex V.

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Procedure : BFS (vertex V) 1. [Initialize Queue & Visited] visited[] ? 0 F ? R ? 0 2. [Marks visited of V as 1] visited[v] ? 1 3. [Add vertex v to Q] InsertQueue (V) 4. [Repeat while Q is not Empty] Repeat while Q is not empty v ? RemoveFromQueue () For all vertices W adjacent to v If visited[w] is 0 Then visited[w] ? 1 InsertQueue (w)

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Spanning Tree A Spanning tree of a graph is an undirected tree consisting of only those edges necessary to connect all the nodes in the original graph A spanning tree has the properties that For any pair of nodes there exists only one path between them Insertion of any edge to a spanning tree forms a unique cycle The particular Spanning for a graph depends on the criteria used to generate it If DFS search is use, those edges traversed by the algorithm forms the edges of tree, referred to as Depth First Spanning Tree If BFS Search is used, the spanning tree is formed from those edges traversed during the search, producing Breadth First Spanning tree

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Construct Spanning Tree A B C D E F G H A B C D E F G H DFS Spanning Tree BFS
Spanning Tree A B C D E F G H A B C D E F A B C D E F A B C D E F DFS Spanning Tree
BFS Spanning Tree

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Minimum Cost Spanning Tree The cost of a spanning tree of a weighted undirected graph is the sum of the costs(weights) of the edges in the spanning tree A minimum cost spanning tree is a spanning tree of least cost Two techniques for Constructing minimum cost spanning tree Prim's Algorithm Kruskal's Algorithm

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Prims Algorithm A B C D E 4 2 1 7 5 3 6 6 5 A - B | 4 A - E | 5 A - C | 6 A - D | 6 B - E | 3 B - C | 2 C - E | 5 C - D | 1 D - E | 7 Let X be the set of nodes explored, initially X = { A } A Step 1: Taking minimum Weight edge of all Adjacent edges of X={A} A B 4 X = { A , B } Step 2: Taking minimum weight edge of all Adjacent edges of X = { A , B } A B 4 2 C X = {A ,B,C} Step 3: Taking minimum weight edge of all Adjacent edges of X = { A , B , C } A B 4 2 C D 1 X = {A,B,C,D} A B 4 2 C D 1 X = {A,B,C,D,E} Step 4: Taking minimum weight edge of all Adjacent edges of X = {A ,B ,C ,D } E 3 We obtained minimum spanning tree of cost : 4 + 2 + 1 + 3 = 10

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Kruskal's Algorithm A B C D E 4 2 7 5 3 6 6 5 Step 1: Taking min edge (C,D) 1 C D 1 Step 2: Taking next min edge (B,C) B C D 2 1 Step 3: Taking next min edge (B,E) B C D E 2 3 1 Step 4: Taking next min edge (A,B) B C D E 2 3 1 A 4 so we obtained minimum spanning tree of cost : $4 + 2 + 1 + 3 = 10$

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Construct Minimum Spanning Tree 0 1 3 4 5 2 3 6 5 5 3 6 6 4 1 2 0 1 3 4 5 2 3 3 4 1 2 3 1 6 4
2 7 5 1 4 1 2 3 2 2 3 3 3 1 4 2 5 1 1 2 2 3 7 6 4

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Draw minimum spanning tree using Prim's & Kruskal's algorithm A B C D E F 1 1 5 2 4
5 7 6 2 2 3 4 5 1 8 7 6 3 8 12 15 4 9 10 17 10 10 14 a b c d e f g 4 8 9 10 16 2 8 7 2 9 0 1 2
3 4 10 100 50 20 60 10 30 A B C D E F G H 1 2 3 3 3 2 4 4 2 1 5 6 7 5 A B C D E F 1 3 6 4 2
4 3 1 5 7 2

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Shortest Path Algorithm Let $G = (V, E)$ be a simple diagraph with n vertices The problem is to find out shortest distance from a vertex to all other vertices of a graph Dijkstra Algorithm - it is also called Single Source Shortest Path Algorithm

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Dijkstra Algorithm - Shortest Path A B C D E F 1 1 5 2 4 5 7 6 2 A B C D E F 0 ? ? ? ? 0 0 0
0 0 0 Distance Visited A B C D E F 1 1 5 2 4 5 7 6 2 A B C D E F 0 ? ? ? 0 0 0 Distance
Visited 0 1 st Iteration: Select Vertex A with minimum distance 0 ? 1 1 0 0 ? 5 1 5 ? ? ?

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Dijkstra Algorithm - Shortest Path A B C D E F 1 1 5 2 4 7 6 2 0 2 nd Iteration: Select Vertex B with minimum distance 1 2 Cost of going to C via B = $\text{dist}[B] + \text{cost}[B][C] = 1 + 1 = 2$ Cost of going to D via B = $\text{dist}[B] + \text{cost}[B][D] = 1 + 2 = 3$ Cost of going to E via B = $\text{dist}[B] + \text{cost}[B][E] = 1 + 4 = 5$ Cost of going to F via B = $\text{dist}[B] + \text{cost}[B][F] = 1 + ? = ?$ A B C D E F 0 1 5 ? ? ? 1 0 0 0 0 0 Distance Visited 3 5 ? A B C D E F 0 1 2 3 5 ? 0 0 0 Distance Visited 1 1 0 5

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Dijkstra Algorithm - Shortest Path 3 rd Iteration: Select Vertex C via B with minimum distance
A B C D E F 0 1 2 3 5 ? 1 1 0 0 0 0 Distance Visited A B C D E F 1 1 5 2 4 7 6 2 0 1 3 2 5 ?
Cost of going to D via C = dist [C] + cost[C][D] = 2 + ? = ? Cost of going to E via C = dist [C]
+ cost[C][E] = 2 + 5 = 7 Cost of going to F via C = dist [C] + cost[C][F] = 2 + ? = ? A B C D E
F 0 1 2 3 5 ? 0 0 0 Distance Visited 1 1 1 5

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Dijkstra Algorithm - Shortest Path 4 th Iteration: Select Vertex D via path A - B with minimum
distance A B C D E F 0 1 2 3 5 ? 1 1 1 0 0 0 Distance Visited A B C D E F 1 1 5 2 4 7 6 2 1 3
2 5 9 Cost of going to E via D = dist [D] + cost[D][E] = 3 + 7 = 10 Cost of going to F via D =
dist [D] + cost[D][F] = 3 + 6 = 9 A B C D E F 0 1 2 3 5 9 1 0 0 Distance Visited 1 1 1 5

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Dijkstra Algorithm - Shortest Path 4 th Iteration: Select Vertex E via path A - B - E with
minimum distance A B C D E F 0 1 2 3 5 9 1 1 1 1 0 0 Distance Visited A B C D E F 1 1 5 2 4
7 6 2 1 3 2 5 7 Cost of going to F via E = dist [E] + cost[E][F] = 5 + 2 = 7 A B C D E F 0 1 2 3
5 7 1 1 0 Distance Visited 1 1 1 Shortest Path from A to F is A ? B ? E ? F = 7

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Shortest Path Find out shortest path from node 0 to all other nodes using Dijkstra Algorithm
0 1 2 3 4 10 100 30 60 50 10 20 0 1 2 3 4 10 100 30 60 50 10 20 0 10 50 60 30

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Find shortest path between given nodes using Dijkstra's algorithm
A B C D E F G H 1 2 3 3 3
2 4 4 2 1 5 6 7 5 0 1 2 3 4 10 100 50 20 60 10 30 S C D E A B F 3 2 2 6 1 3 1 4 2 A B C D E
F G H 1 1 2 5 1 1 4 8 6 6 2 1 4

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MARUTI SUZUKI ARENA



MARUTI SUZUKI ARENA

PRESENTING
VICTORIS
GOT IT ALL





FOR THE DRIVE INSIDE YOU THAT WANTS IT ALL

Maybe it's the way it stands. Unshaken. Self-assured.
Maybe it's the way it moves. As if it owns the road.
The Victoris is for the ones who know when to hold back, and when to go all out.
Who seek out new adventures, new experiences.
Who refuse to settle for anything less than everything.

For the ones who have it all. An SUV that's:

GOT IT ALL



THE CHISELED LOOK THAT SAYS IT ALL

>>

The Victoris speaks in a design language that's impossible to ignore. Its sweeping silhouette and sculpted lines create a stance that's dynamic when in motion and commanding when still. The seamless tail light stretches across the rear, leaving a signature that lingers long after it's gone.





CRAFTED FOR ALL YOUR SENSES

>>

A cabin tailored for those who know what they want. Everything. With a touch of class.

Its expansive design with dual-tone interiors, panoramic sunroof, vibrant 64-colour ambient lighting, right down to the elegant three-level dashboard with precision stitching; creates a space that serenades all your senses.





ALL YOU NEED
FOR COMPLETE
PEACE OF MIND

>>

Safety is more than just a feature. It's a promise. It's the quiet assurance that's inherent to every aspect of the Victoris. Where advanced driver-assist technology works seamlessly with intuitive features to create a drive that feels unshakably secure. So, while the road may throw its share of surprises, you stay confidently in control.



6 AIRBAGS STANDARD



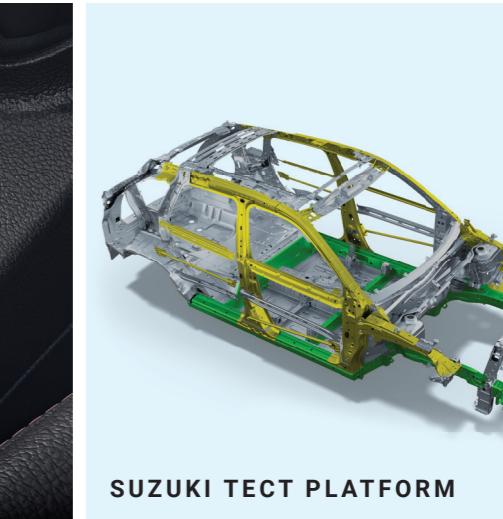
FRONT PARKING ASSIST SENSOR WITH
AUTO 360° CAMERA ACTIVATION



360° VIEW HD CAMERA
WITH 11 VIEWS



ELECTRONIC PARKING BRAKE
WITH BRAKE HOLD



SUZUKI TECT PLATFORM



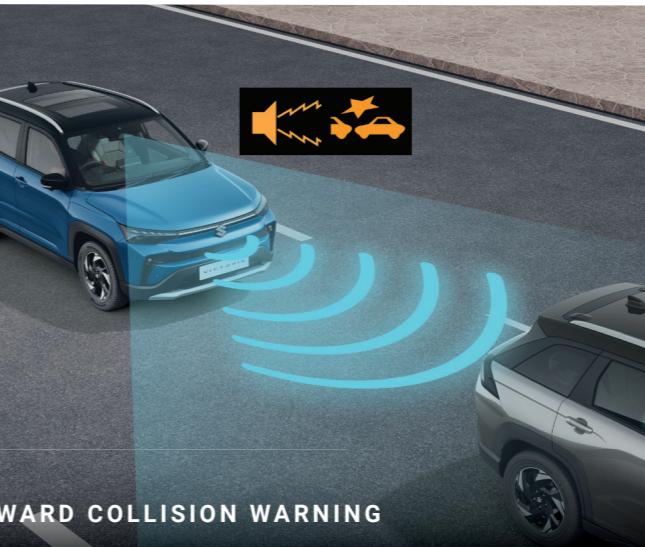
ADVANCED LEVEL 2 ADAS

Real confidence comes from knowing that your car is always thinking two steps ahead.
The Level 2 ADAS on the Victoris preempts, and protects you, as your ever-present guardian.



LEVEL 2 ADAS* FEATURES

- Lane Keep Assist
- Automatic Emergency Braking
- Forward Collision Warning
- Blind Spot Monitor with Lane Change Alert
- Adaptive Cruise Control with Curve Speed Reduction
- High Beam Assist
- Lane Departure Prevention
- Lane Departure Warning
- Rear Cross Traffic Alert
- Vehicle Sway Warning



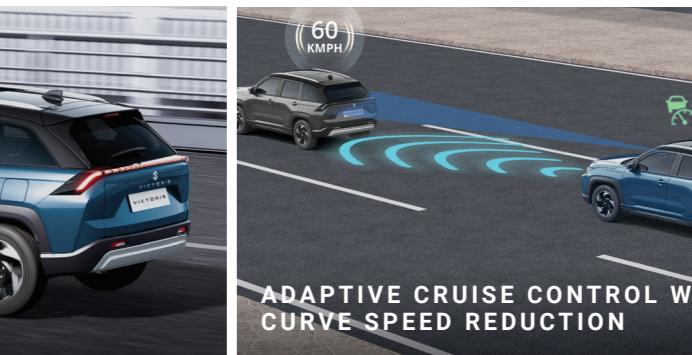
FORWARD COLLISION WARNING



BLIND SPOT MONITOR WITH LANE CHANGE ALERT



AUTOMATIC EMERGENCY BRAKING



ADAPTIVE CRUISE CONTROL WITH CURVE SPEED REDUCTION



LANE KEEP ASSIST

*Advanced Driver Assistance System (ADAS) is not a substitute for human eye and driver vigilance, it is a driver assist system that enhances driving experience and safety. The system performance may vary from road and driving conditions. The driver shall remain responsible for safe, vigilant and attentive driving. Features and specifications may vary model wise.



SMART POWERED TAILGATE WITH GESTURE CONTROL

Hands full? Just a swipe with your foot makes access to the boot effortless.

ALL-IN ON COMFORT



In the Victoris, comfort begins long before the journey does. It starts the moment you settle in. The cool embrace of the ventilated seats. The effortless reach of every control. Every aspect of the Victoris adjusts to your personalised comfort to ensure that the road ahead feels less like travel and more like an experience.



ALL THE TECH. ALL FOR YOU.

Experience intuitive tech at its best with the Smartplay Pro X Touchscreen Infotainment System. With all your preferred connectivity features, an extensive app store, and a host of personalization options, the Victoris creates a space that's a reflection of you.

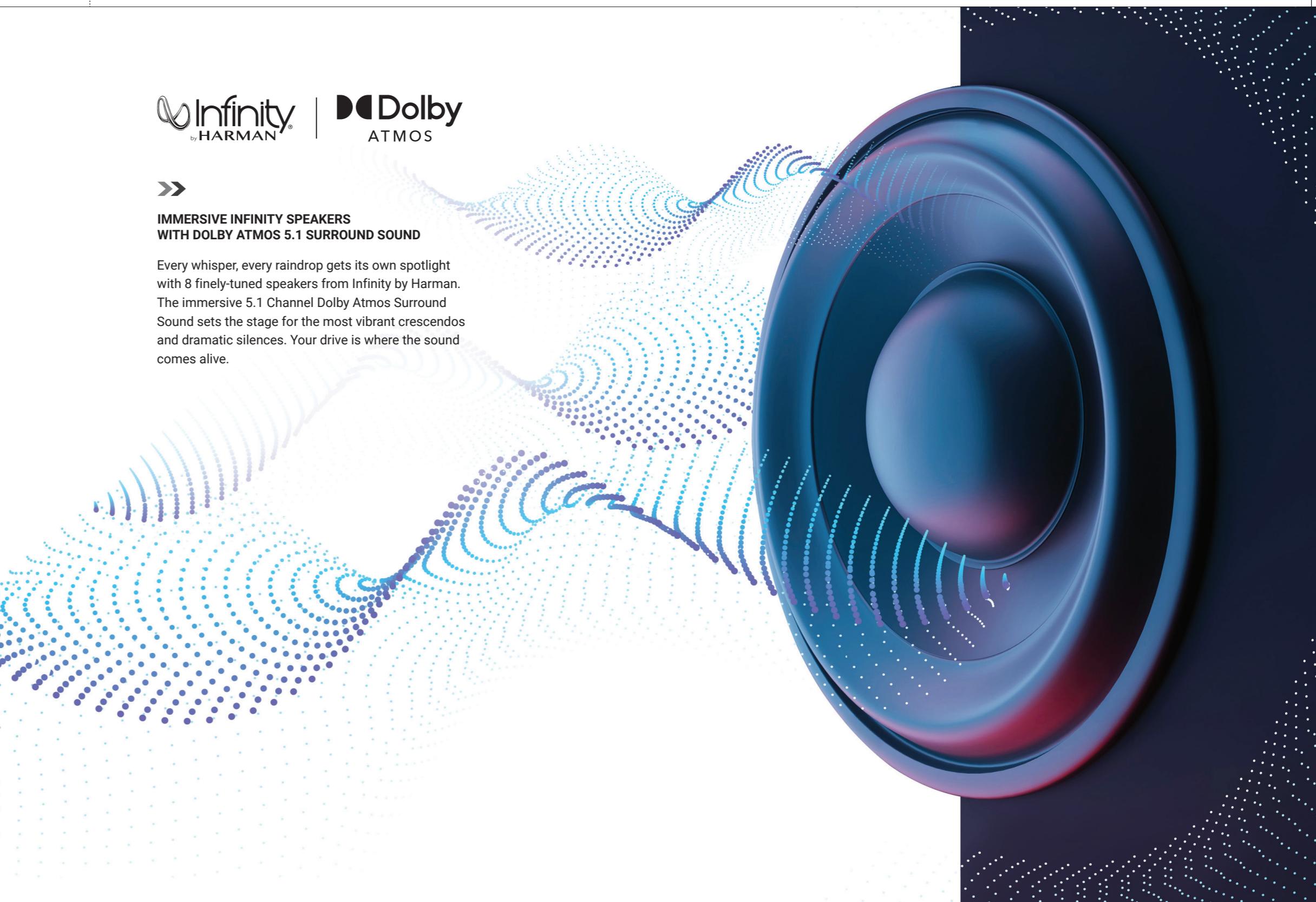


infinity
by HARMAN | Dolby
ATMOS



IMMERSIVE INFINITY SPEAKERS WITH DOLBY ATMOS 5.1 SURROUND SOUND

Every whisper, every raindrop gets its own spotlight with 8 finely-tuned speakers from Infinity by Harman. The immersive 5.1 Channel Dolby Atmos Surround Sound sets the stage for the most vibrant crescendos and dramatic silences. Your drive is where the sound comes alive.





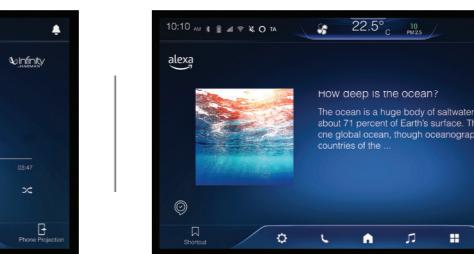
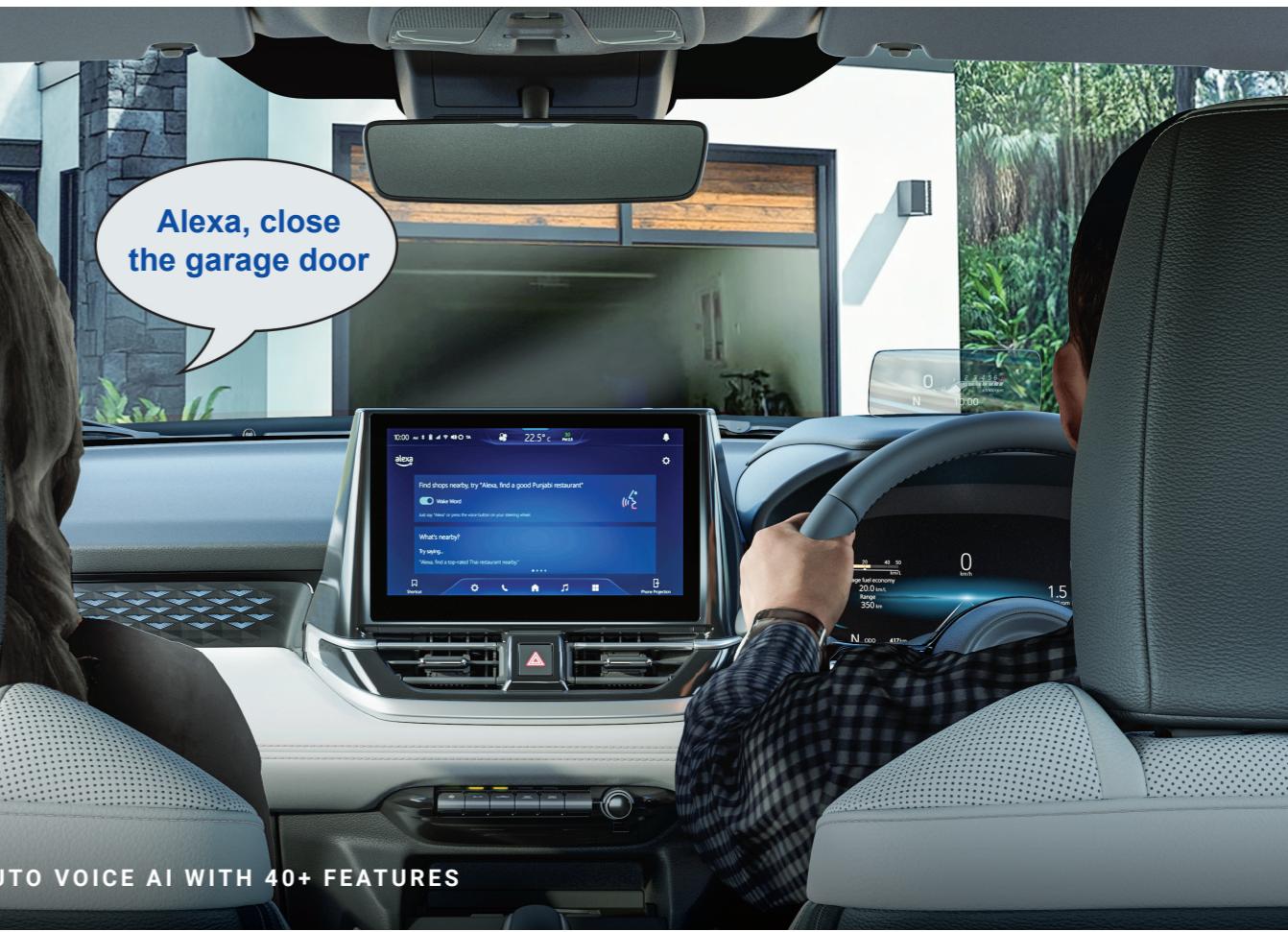
NEXT GEN SUZUKI CONNECT WITH E-CALL

With over 60 smart features, get real-time insights, emergency alerts and vehicle status, on your smartwatch or mobile. The next-gen Suzuki Connect helps you stay connected, informed, and in control, wherever you go.



ALEXA AUTO ON-BOARD

Now take Alexa along for the drive with Alexa Auto Voice AI and over 40 smart features. Stream music, ask questions, and even control smart appliances at home. Experience hands-free convenience, designed for the road.





PERFORMANCE THAT GOES ALL OUT.

From quick sprints to steady climbs, the Victoris adapts seamlessly to every road and every mood. Agile when the moment calls for it, effortless when the journey demands it. Every drive is tuned to respond to you, delivering exhilaration and calm in equal measure.

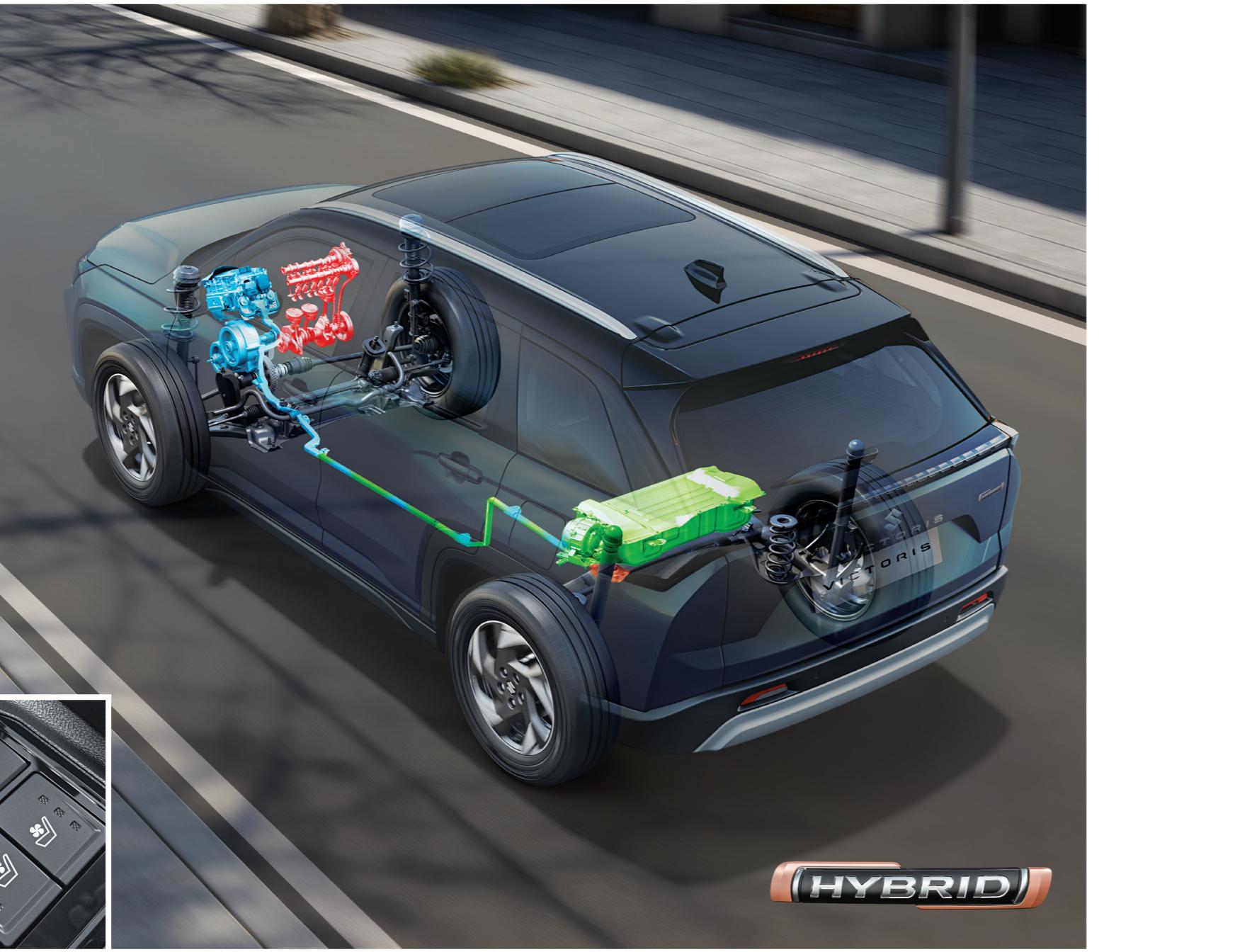
AVAILABLE IN:



FUTURISTIC STRONG HYBRID



For the ones who prefer power without compromise, the Strong Hybrid is the perfect ally. Paired with a battery pack, its refined and silent drive delivers a performance that's smooth, confident, and efficient. With the Victoris, expect nothing less than everything.



ALL-TERRAIN ALLGRIP SELECT



For the ones who own every road they tread, the Victoris with Suzuki ALLGRIP Select is the ultimate companion. From city streets to untamed trails, it adapts seamlessly to challenging terrains, delivering a drive that is as controlled as it is adventurous. Powerful, commanding, and uncompromising, at every turn.



ALL-NEW UNDERBODY S-CNG

>>

A clear boot space with a clean conscience. The Victoris with factory-fitted underbody S-CNG ensures that every journey remains uncompromised. Its clean engine exceeds the fuel efficiency you expect. Its clever design frees-up every inch of your boot space. Its in-built safety features preserve your peace of mind. It's a win-win-win for the Victoris.



THE EXHILARATING SMART HYBRID

>>

The always reliable K15C engine with progressive mild hybrid technology spoils you for choice. Feel every gear shift with a 5-Speed Manual Transmission as it delivers the perfect balance of power and precision for the purist. 6-Speed Automatic Transmission with paddle shifters let you effortlessly switch between control and convenience. When every shift is smooth, and every acceleration confident, you feel like you own the world - all of it.



ADVANCED PETROL K15C ENGINE
WITH PROGRESSIVE MILD HYBRID



6-SPEED AUTOMATIC TRANSMISSION
WITH PADDLE SHIFTERS



5-SPEED MANUAL TRANSMISSION



BLACK & IVORY INTERIOR WITH SILVER ACCENTS



ALL-BLACK INTERIOR WITH CHAMPAGNE GOLD ACCENTS

GOT IT ALL - IN EVERY COLOUR

The all-new Victoris comes in a variety of stunning hues that are sure to vibe with you.

DUALTONE



ETERNAL BLUE / BLUISH BLACK ROOF



SIZZLING RED / BLUISH BLACK ROOF



SPLENDID SILVER / BLUISH BLACK ROOF

MONOTONE



ETERNAL BLUE



SIZZLING RED



MYSTIC GREEN



BLUISH BLACK



MAGMA GREY

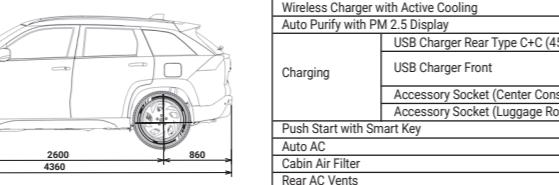
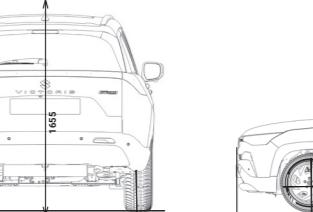
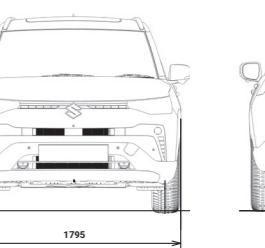


SPLENDID SILVER



ARCTIC WHITE

FEATURE SPECIFICATIONS		PETROL	PETROL/CNG	STRONG HYBRID
Length (mm)		4360		
Width (mm)		1795		
Height (mm)		1655		
Wheelbase (mm)		2600		
Turning Radius (m)		5.4		
Fuel Efficiency	21.18 km/l (MT), 21.06 km/l (AT), 19.07 km/l (ALLGRIP AT)	27.02 km/kg (Strong Hybrid Petrol e-CVT)	28.65 km/l	
Fuel Tank Capacity (L)	45	Petrol: 45 CNG: 55 (water eqvt)	45	
Seating Capacity (nos)		5		
Kerb Weight (kg)	1145-1195* (MT) 1185-1225* (AT) 1285-1305* (ALLGRIP AT)	1230-1245	1250-1295	
Gross Vehicle Weight (kg)	1655(MT), 1685 (AT), 1765 (ALLGRIP AT)	1695	1755	
ENGINE				
Engine Type	K15C Smart Hybrid	K15C	M15D	
Displacement (cc)	1462		1490	
Fuel Type	Petrol	Petrol/CNG	Petrol (Strong Hybrid)	
Max Power	75.8 kW (103.06 Ps) @ 6000 rpm @ 6000 rpm - Petrol Mode 64.6 kW (87.8 Ps) @ 5500 rpm CNG Mode	74 kW (100.6 Ps) 64.6 kW (87.8 Ps) @ 5500 rpm	68kW (92.45 Ps) @ 5500 rpm	
Max Torque	139 Nm @ 4300 rpm - Petrol Mode 121.5 Nm @ 4200 rpm - CNG Mode	137.1 Nm @ 4300 rpm - Petrol Mode 122 Nm @ 3800-4800 rpm		
HYBRID SYSTEM				
Battery Type	Lithium-ion	-	Lithium-ion	
Battery Voltage	-	-	177.6 V	
Motor Generator Type	-	-	AC Synchronous Motor	
Max Power	-	-	59 kW (80 Ps) @ 3995-5500	
Max Torque	-	-	141 Nm @ 0-3995	
Driving Mode	Hill Hold Assist	-	ECO + Normal + Power	
ISG	12V - 6A (Li-Ion)	-	-	
TRANSMISSION				
Type	5MT/6AT	5MT	e-CVT	
DRIVE				
Type	2WD/AWD (ALLGRIP SELECT)	2WD	2WD	
SUSPENSION				
Front	MacPherson Strut			
Rear	Torsion Beam			
BRAKES				
Front	Disc			
Rear	Disc			
WHEEL TYRE				
Tyre Size		215/60 R17		
POWERTRAIN				
1.5L K15C Petrol	5-speed Manual Transmission (5MT)	✓	✓	✓
ISG	6-speed Automatic Transmission (6AT)	-	✓	✓
1.5L K15C Petrol	AllGrip Select (6AT)	-	✓	✓
1.5L M15D	CNG (5MT)	✓	✓	Zxi only
	Strong Hybrid (eCVT)	-	✓	✓



Drawings shown are general specifications of the vehicle.

FEATURE SPECIFICATIONS		Lxi	Vxi	Zxi / Zxi (O)	Zxi+ / Zxi+ (O)
EXTERIOR					
Front Headlamps	Projector Headlamps Halogen	Halogen	Halogen	LED	LED
Rear Tail Lamps	LED Daytime Running Lamps - Dual Function Auto Headlamps with Follow-Me Home Function LED Front Fog Lamps with Extended Lighting Dynamic Connected LED Tail Lamps LED Rear Combination Lamp (with LED Indicator)	- - - -	- - - -	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓
Wheel Spec	Alloy Wheels Steel Wheels with Full Wheel Covers	- ✓	- ✓	✓ (Painted - Black)	✓ (Machined)
Exterior Specifications					
Front Grille Garnish	Chrome	Chrome	Satin Chrome	Satin Chrome	
Skid Plate (Front & Rear)	Silver	Silver	Silver - Petrol, S-CNG	Silver - Petrol, S-CNG	
All Door Gloss Black Out Tape	-	-	✓	✓	
Front Door UV Cut Glasses	-	-	✓	✓	
Rear Door Dark Green Glass	-	-	✓	✓	
Body Coloured Outside Door Handles	-	✓	✓	✓	✓
ORVMs with Turn Indicators	✓	✓	✓	✓	✓
Roof Rails	-	✓	✓	✓	✓
Rear & Quarter Spoiler	✓	✓	✓	✓	✓
Shark Fin Antenna	✓	✓	✓	✓	✓
Aero Vents & Aero Edges	✓	✓	✓	✓	✓
Front Variable Intermittent Wipers	-	-	✓	✓	
Rear Window Wiper & Washer	-	-	✓	✓	
LED High Mount Stop Lamp	✓	✓	✓	✓	✓
INTERIOR					
Interior Theme	Dual Tone Interior (Black + Ivory) with Silver Accents All Black Interior with Champagne Gold Accents	✓	✓	✓ (Petrol, S-CNG)	✓ (Petrol, S-CNG)
Upholstery	Plush Leatherette Seats (Black & Ivory-Petrol / Black-Strong Hybrid)	-	✓	Strong Hybrid	Strong Hybrid
64 Color Custom Ambient Light	Instrument Panel	Black Fabric	Black Fabric	Ivory PVC + Stitch-Petrol, S-CNG/Black PVC+Stitch-Strong Hybrid	Ivory PVC + Stitch-Petrol, S-CNG/Black PVC+Stitch-Strong Hybrid
In-Cabin Illumination	Door Trim Armrest Leatherette Steering Wheel Front Footwell Light (Driver & Co-Driver Side) Courtesy Lamp Trunk/Luggage Room Lamp Rear Reading Lamps Multi Information Instrument Cluster	- -	- -	Backlit pattern Spot ✓ ✓ ✓ ✓ - 10.66 cm (4.2") TFT Fully Digital 26.03 cm (10.25") TFT	6AT 6AT
COMFORT & CONVENIENCE					
Panoramic Sunroof	Smart Powered Tailgate with Gesture Control	-	-	✓	✓
Seating	Ventilated Seats (Driver + Co-Driver) 8-Way Driver Powered Seat Seat Height Adjuster 60:40 Folding Rear Seats Adjustable Headrests - All Seats Front Seat Back Pocket	- - - - - -	- - ✓ ✓ ✓ ✓	- - ✓ ✓ ✓ ✓	(O) (O)
Head Up Display	SmartPlay Pro 17.78cm (7") Touch Screen SmartPlay Pro X 25.5cm (10.1") HD Touch Screen	-	-	✓	✓
Wireless Charger with Active Cooling	-	-	✓	✓	✓
Auto Purify with PM 2.5 Display	-	-	-	✓	✓
Charging	USB Charger Rear Type C+C (45 W + 45 W, Max 60 W)	-	✓	✓	✓
Push Start with Smart Key	✓ (Type A)	✓ (Type A)	✓ (Type A)	✓ (Type C-15W+ Type C-45W)	✓ (Type C-15W+ Type C-45W)
Auto AC	Pollen	PM 2.5	PM 2.5	PM 2.5	PM 2.5
Cabin Air Filter	✓	✓	✓	✓	✓
Rear AC Vents	-	-	-	✓	✓
Auto Folding ORVMs	-	✓	✓	✓	✓
Electrically Foldable ORVMs	-	✓	✓	✓	✓
Vanity Mirror (Driver + Co-Driver)	-	✓	✓	✓	✓

FEATURE SPECIFICATIONS		Lxi	Vxi	Zxi / Zxi (O)	Zxi+ / Zxi+ (O)
COMFORT & CONVENIENCE					
Front Sliding Armrest (with Storage)	-	-	-	✓	✓
Rear Center Armrest with Cup Holder	✓	✓	✓	✓	✓
Sunglass Holder	-	-	✓	✓	✓
Adjustable Tilt & Telescopic Power Steering	✓	✓	✓	✓	✓
Cruise Control	-	✓	✓	✓	✓ (MT + Strong Hybrid)
Keyless Entry	✓	✓	✓	✓	✓
Paddle Shifters	-	6AT	6AT	6AT	6AT
Gear Shift Indicator	Petrol MT	Petrol MT	Petrol MT	Petrol MT	Petrol MT
TRIPS AND DRIVING BEHAVIOR					
Trip Summary	-	-	✓	✓	✓
Driving Behaviour (Score, Ranking, Comparison, Suggestions)	-	-	✓	✓	✓
Share Trip History	-	-	✓	✓	✓
Terrain Modes - Snow, Sport, Lock, Auto	-	-	-	✓	✓
Vehicle Location Sharing	-	-	✓	✓	✓
SAFETY & SECURITY					
Adaptive Cruise Control with all Speed Following & Stop Keeping & Curve Speed Reduction (ACC)	-	-	-	6AT	
Over speeding	-	-	-	✓	✓
Lane Keep Assist (LKA)	-	-	-	6AT	
Lane Departure Prevention (LDP)	-	-	-	6AT	
Lane Departure Warning (LDW)	-	-	-	6AT	
Vehicle Sway Warning	-	-	-	6AT	
Low Fuel	-	-	✓	✓	✓
Emergency Stop (ESS)	-	-	-	6AT	
Electronic Stability Program (ESP®)	✓	✓	✓	✓	✓
Traction Control System (TCS)	✓	✓	✓	✓	✓
Engine Drag Control (EDC)	✓	✓	✓	✓	✓
Hill Hold Assist	✓	✓	✓	✓	✓
ABS with EBD and Brake Assist	✓	✓	✓	✓	✓
Hill Descent Control	-	-	-	ALLGRIP	
Emergency Parking Brake with Brake Hold	-	6AT	6AT	6AT	
360° HD View Camera with 11 Views	-	-	✓	✓	✓
Front Parking Sensors with Auto 360° Camera Activation	-	-	-	✓	✓
Rear Parking Sensors	✓	✓	✓	✓	✓
Reverse Parking Camera	-	-	✓	✓	✓
Tire Pressure Monitoring System (TPMS)	-	✓	✓	✓	✓
6 Airbags (Front, Side and Curtain)	✓	✓	✓	✓	✓
Front Seat Belt Pre-Tensioner with Force Limiters	✓	✓	✓	✓	✓
Front Seat Belt Height Adjuster	✓	✓	✓	✓	✓
All Seats Belts (3-Point ELR) with Seat Belt Reminders (Lamp + Buzzer)	✓	✓	✓	✓	✓
Seat Belt Reminder (All Occupants) - Lamp & Buzzer	✓	✓	✓	✓	✓
ISO FIX Child Seat Anchorage	✓	✓	✓	✓	✓
Engine Immobilizer	✓	✓	✓	✓	✓
Day & Night Adjustable IRVM	Manual	Manual	Auto	Auto	Auto
Warning Lamp/ Reminder for (Low Fuel, Door Ajar, Headlamp On)	✓	✓	✓	✓	✓
Speed Warning Buzzer	✓	✓	✓	✓	✓
Tyre Repair Kit	✓	✓	✓	✓	✓
Acoustic Vehicle Alert System (AVAS)	-	Strong Hybrid	Strong Hybrid	Strong Hybrid	Strong Hybrid

FEATURE SPECIFICATIONS		Lxi	Vxi	Zxi / Zxi (O)	Zxi+ / Zxi+ (O

