

DESIGN OF A MOTORCYCLE CONCEPT FOR YEAR 2030

DESIGN PROJECT 3

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Guided by | Prof. Sugandh Malhotra



Master of Design (M.Des.)
Mobility and Vehicle Design
IDC School of Design
Indian Institute of Technology, Bombay
2019

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Submitted By:
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IDC School of Design
अभिकल्प विद्यालय

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2019

DECLARATION

I declare that this written report represents my own idea in my own words, and where other's ideas or words have been included, I have mentioned the original source. I also declare that I have adhered to all principles of academic honesty and integrity and have not falsified, misinterpreted or fabricated any idea, data, facts or source in my submission. I understand that any violation of the above will cause disciplinary action by the institute and penal action from the source from which proper permission has not been taken, or improperly cited.



Date: June 28th, 2019

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APPROVAL SHEET

This Mobility and Vehicle Design project report entitled “Design of a Motorcycle concept for year 2030” by Nipurn Solanki is approved in partial fulfilment of the requirement for Master of Design in Mobility and Vehicle Design.

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Date : June 28th, 2019

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I would also like to thank Prof. Nishant Sharma for his inputs on the project.

I take this opportunity to thank all the people who provided much-needed information and insights for the project.

I thank my family and friends for their support and guidance.

A handwritten signature in blue ink, appearing to read 'Nishant', is written over a faint, light blue rectangular stamp.

ABSTRACT

Design always has been inseparable from the socioeconomic, cultural and technological factors and therefore automotive styling has been influenced by it in many ways. Motorcycles, unlike its four wheel counterpart, had a moderate history of advancements, followed by sudden explosions of innovative engineering excellence. Without a solitary creator who can lay sole claim to being the innovator, it appears that the thought have struck various specialists and designers around Europe at around a similar time in the late 18th century. In spite of the fact that the essential structure continues as before, its appearances, function and the manner in which it is been used has changed drastically.

This project focuses on studying trends which in turn has helped in creating a scenario of the future. The concept electric motorcycle that is going to be designed is based on the predicted scenario and makes use of the cutting edge technology and human factors such as life style, needs in the future.

Research phase began with a comprehension of the motorcycle design evolution layered with numerous influencing factors in a chronological manner. Emerging technology and styling trends in motorcycle industry were identified and how have these developments changed the overall form of motorcycle was also studied through silhouettes. Finally User profile was created to culminate the design brief and the subsequent steps such as creation of mood board, ideation, concept generation was carried out based on the foundation laid by the research phase.

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01

Introduction

1. INTRODUCTION

As far back as from early motorcycles, engineers looked through the best approach to make transport on open streets increasingly automated and quicker. In light of that objective, in last one and a half century numerous innovators attempted to make their interpretation of the motorcycles. The straightforward thought of the 1885 Daimler Reitwagen with two wheels, a motor and a spot to sit has duplicated into a wide assortment of models, classes, execution and application. We have come a long way since then with alternative propulsion methods offering alternative packaging possibilities which directly impact the aesthetic of the vehicle. Motorcycles are also prime examples of how a vehicle's aesthetic is dependent on its packaging .

In any case, the magnificence of motorcycle ride is as shiny as it was and will continue to be. Riding on a motorcycle is a multi-tangible encounter of the environment. Motorcycle riding requests the total responsibility of the rider both rationally and physically, which makes motorcyclist considerably more associated with his machine than a driver with any other kind of vehicle. As we anticipate further technological development, efficiency will never again be a driving component, rather experience will be the prime factor. New innovations are making rides proficient, more secure and experience rich. Motorcycles previously being the products offering best of the experience; it will be energizing to see what more they would offer.

02

Methodology

2. METHODOLOGY

Background Research

- Evolution into the modern day form
- Design evolution in a century and half
- Evolution in last 2 decades (vision through concept)

Setting the Context

- Anticipating Society and Technology of 2030

Product Study

- Emerging Trends
- Silhouette Study
- Vehicle Dynamics

Scenario Building

Design Brief

Ideation

- Exploration Sketches
- Design Direction

Concept Refinement

- Detailing

03

Background Research

3.1. EVOLUTION INTO THE MODERN DAY FORM (THE WAY IT IS TODAY)

In order to indicate the development of motorcycles, we look at a brief visual timeline of landmark advancements in motorcycle design. All of below milestones have contributed into the evolution of the motorcycles that we see today.

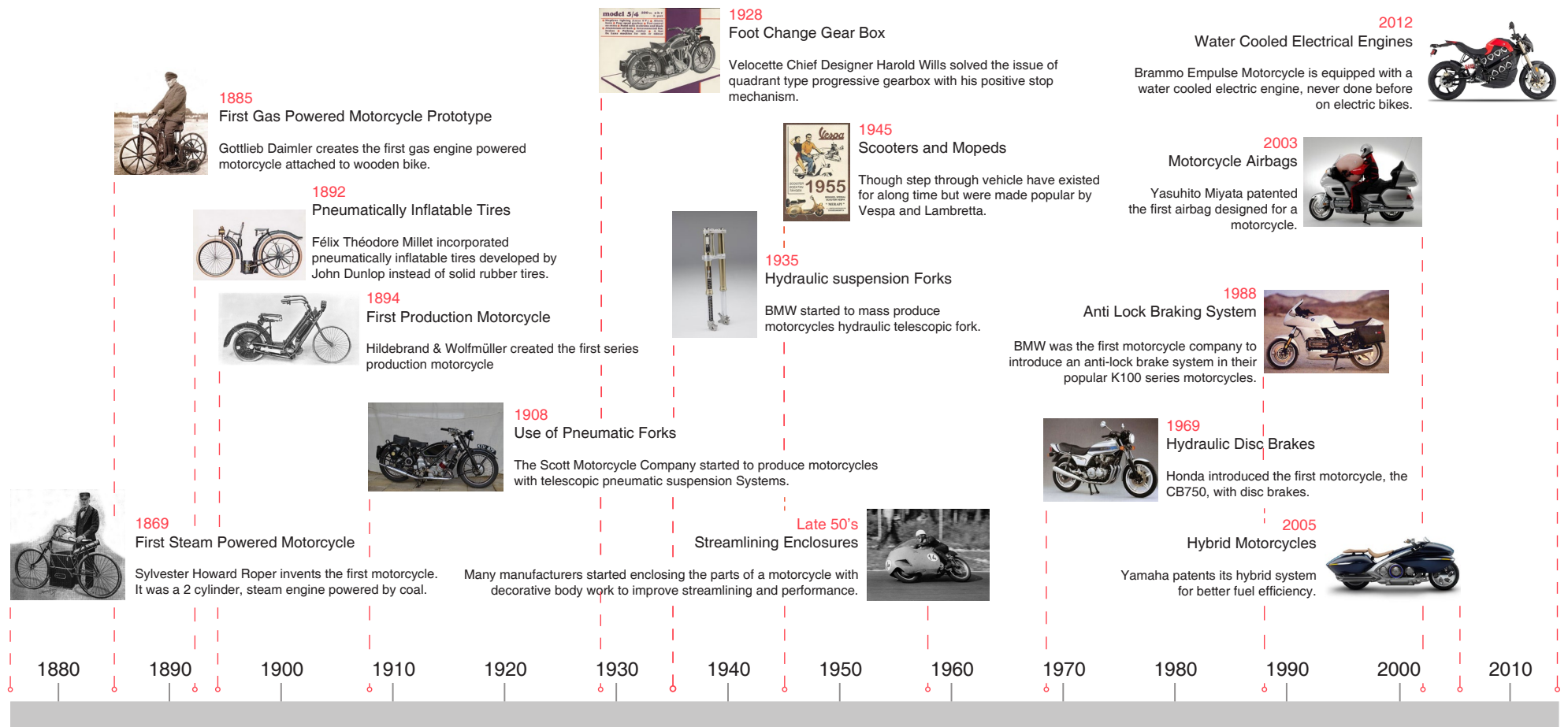


Image 1: Evolution into the modern day form

EVOLUTION INTO THE MODERN DAY FORM (THE WAY IT IS TODAY)

As you can see in the image above, The first ridden two-wheeled machine with handlebars and a combustion engine was Wilhelm Maybach and Gottlieb Daimler's Reitwagen which also is viewed as the world's first motorcycle. The reitwagen made use of two stabilizing wheels because the now well known principles of rake and trail were not employed then. Also the motorcycle employed an Iron strip over wood rim with wooden spokes as wheels. Millet motorcycles in 1892 may have been the first motorcycle to use pneumatically inflatable tires developed by John Dunlop. After Daimler's Reitwagen it almost took another decade before Hildebrand and Wolfmuller of Germany would monetarily create a fueled motorcycle that was freely accessible in the open market in 1894. By 1900 numerous producers were changing over bicycles by including little, halfway mounted spark ignition engines. Scott Motorcycle Company, In 1908 replaced the old girder suspension, with telescopic pneumatic suspension systems and would continue to use them until 1931. In 1935 BMW became the first manufacturer to produce a motorcycle with hydraulically damped telescopic forks. Step through vehicles were made popular by Vespa and Lambretta by Mid 40's. The requirement for reliable construction prompted street motorcycles preliminary tests and rivalry between manufacturers. The first Tourist Trophy motorcycle races were hung on the Isle of Man in 1907 to test the dependability and endurance. Such occasions have been the demonstrating ground for some new thoughts from mid two-stroke-cycle structures to supercharged, multi-valve motors mounted on streamlined (carbon-fiber strengthened) bodywork. The 1969 Honda CB750 introduced hydraulic disc brakes on a large scale to the wide motorcycle public. In 1988, BMW introduced an electronic/hydraulic ABS for motorcycles, ten years after Daimler Benz and Bosch released the first four-wheel vehicle ABS for series production. Yamaha is developing a hybrid motorcycle based on the Gen-Ryu concept that first debuted at the Tokyo Motor Show way back in 2005. Brammo Empulse became the first motorcycle in 2012 to be equipped with a water cooled electric engine, never done before on electric motorcycles.

These are few significant occasions of the previous one and a half century of motorcycle development. There are many different motorcycles that were earth shattering in some or the other way; either quicker than prior models, or better handling, or lighter, or increasingly dependable. But, the above noted developments have made their place in the list as they brought changes in the primary and essential structure of the motorcycle.

But just listing the chronology of events won't be enough to comprehend the Motorcycle design evolution. In order to have a thorough understanding, we also need to relate significant socioeconomic, cultural incidents and technological headways in that period with the design evolution as well. The next section deals with the same.

3.2. DESIGN EVOLUTION IN A CENTURY AND HALF

At any point of time, hundreds of incidents happening in many parts of the world. Here we try to figure out connection between most significant incidents (Social, Cultural, Economic and Technological advancement) that have happened around the world and evolution of motorcycle design.

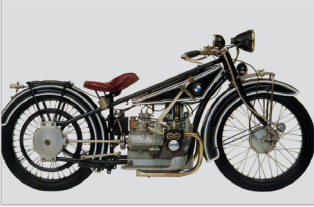
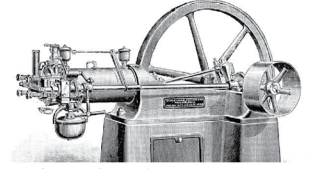
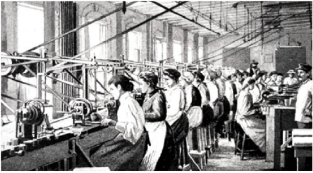
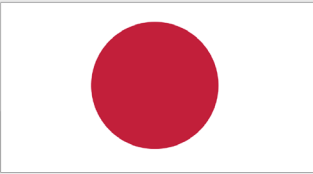
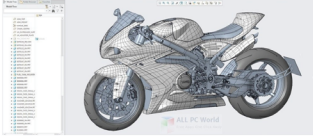
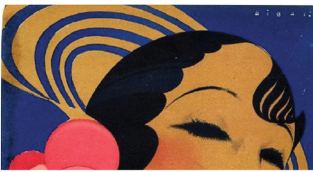
The Birth Years	The Baby Steps		Decline of the Empire	Rise of the East	
Europe	Europe and US		Japan	India, China and Indonesia	
19th Century	War and between the wars		Post World War	1975-2000	Early 21st Century
					
1902 Werner Motorcycle	1923 BMW R32	1932 Moto Guzzi GT 17	1969 Honda CB 750	1993 Ducati Monster	2014 HD Live Wire
Bicycle closely resembles the starting visual metaphor.  Age of Scientific Awakening in Europe Two great breakthrough inventions i.e. the internal combustion engine and Bicycle  (1760-1840) Industrial Revolution - Shift from craft to Mass Manufacturing - Took production from home to factories -Created Jobs and hence need to commute  Horse Carriages demanded maintenance and became unaffordable, catalyzed by frequent Napoleonic wars (1803-1815) 	Motorcycles retained its visual metaphor of a horse. Unique in its frame architecture and visual architecture as well with its double down-tube frame forming its visual style. The style statement was well ahead of its time with cubist design as the main attraction.  Was first seen as a war machine during World War 1. Used by the dispatch riders to deliver orders or messages from headquarters to military units . Pannier bags got added to the military versions of motorcycles. Gas tank became more wider for increased fuel capacity Augmented because of technological advances due to the war like hardening of metals. Tubular Frames  Settling down and scaling up of Industries. Among motorcycles, cruiser evolved as a category of motorcycles. 	Technological advancement due to war such as hardening of metal  Harley Davidson and Indian Motorcycle rose and bagged huge supply contract from European country militaries.  The Great Depression Between 1929 and 1932, worldwide gross domestic product (GDP) fell by an estimated 15%. 	Shift from heavy multi-cylinder high capacity bikes to small single-cylinder. Nothing new in visual architecture.  BSA, surrendered their position of world's largest motorcycle manufacturer to Honda. Post-war effort by US in Economic Revival of Japan. Emergence of Honda, Suzuki and Yamaha, who eventually dominated the late twentieth century.  Cheap cars replacing motorcycles as the main mode of personal transport and motorcycle became a means of thrill, adventure, and enjoyment in western world. Motorcycles became more of a social and emotional statement as a result of cult movies like The Easy Rider and The Wild One  Scooters and mopeds branched out as a completely new breed. Bipolar World with US and Soviet Union dominance 	Fundamental social codes of rural dominance and urban quest for grace and class for motorcycle owners in India. Having discarded socialist pretensions, India opened the windows for foreign technology, leading the Japanese giants to open shops in India. Hero-Honda, Escorts-Yamaha, TVS-Suzuki, and Kawasaki-Bajaj were the joint ventures as the result.  Oil Crisis in US and Europe in Mid 70's  Advent of 3D CAD Modeling and its application allowed flexibility in design  Advancement in Plastic Technology New materials and Man. Technology  Collapse of Soviet Union, US became the global leader and most powerful Nation 	Autonomy of Vehicles  Electrification  Developed nations shifts to service economy  Multiple Emerging World Power such as Russia, Japan, China and India as Well 
Romanticism, Realism in Fine Arts and literature (The emphasis was on simple narrative in fiction and simple rhythmic style). Neo-Renaissance and Gothic Revival Architecture (structure emphasized on simplicity of shapes) 	Expressionism, Cubism (emphasis on simple geometric shapes) (Modernist movement in design is continuation of this) (Example First BMW Motorcycle). 	Stylistic influences came from Art Deco (influenced by Cubism and Fauvism) and Impressionism (laid emphasis on use of primary colors). 	Stylistic influences in this period mainly came from modernist architecture where clean lines with high use of technology ruled the roost. 	Stylistic influences in this period shifted from modernist to post modernist style. (Reaction against the perceived shortcomings of modern architecture, particularly its rigid doctrines, its uniformity, its lack of ornamentation) 	Contemporary Art - The art is a dynamic combination of materials, methods, concepts, and subjects that continue the challenging of boundaries that was already well underway in the 20th century. 

Image 2: Design Evolution in a century and Half

The Birth Years

With the start of industrial revolution in Europe a subtle shift from handicraft to mass manufacturing took place. Industrialization took production from home to factories. Numerous industries and workshops demanded people to commute daily. Increasing jobs also increased the transportation need. This increasing demand of commute needed less complex and more efficient way than horse carriage. Adding to this horse carriages became unaffordable due to increase in fodder prices which happened because of frequent Napoleonic Wars. To fill this gap in an automated way motor enthusiast started combining two breakthrough inventions in a hope to invent an automatic commuter. These inventions were IC engines and bicycles. This was the time when enthusiasts across Europe started to couple an IC engine to a bicycle, 1902 Warner Motorcycle is one of the example to this. Starting visual metaphor of a motorcycle was the bicycle which was not changed much. The Frame, handle bars and even seats were directly borrowed from the bicycle. Since the very initial motorcycles resembled bicycle very closely and hence the aesthetics were been influenced by two very famous architectural style , Gothic revival and Neo renaissance. Both emphasized on simplicity of shape hence motorcycles of that era were simple and basic in terms of design.

War and between the wars

During world war 1 motorcycles were first seen as a war machines, Used by dispatch riders used to deliver messages from the military headquarters to the troops on such machines. Therefore the pannier bags were added also the gas tanks became wider for increased fuel capacity. Also some manufacturing technology which advanced during the war era such as hardening of metal also helped in the evolution of motorcycles.

In the beginning of 20th century, motorcycles retained their visual metaphor as derived from the horse. Later during the war era Motorcycles started evolving according to the cubist art moment having the primitive shapes. This influence of art into the motorcycles saw a rise during the great depression where motorcycles sales dropped massively. To tackle this situation Harley Davidson used Art Deco inspired paint job in their motorcycles to attract the customers.

Decline of the Empire

The destruction faced by Japan during world war 2 forced its people to use two wheelers as a primary mode of transport. This further led to the development of Japanese brands such as Honda, Kawasaki, Yamaha etc. US President Harry S Truman's 21 point fair deal which included lowering of taxes, increase in minimum wage, lowering of prices helped the citizens to save money and increased people's aspirations. This also made cars more affordable which led to a surge in number of people owning cars. Therefore the motorcycle market in U.S.A. took a hit. The rise in use of motorcycles in Japan and the decline of the motorcycle market in USA made Japan one of the powerhouses of motorcycle production. Motorcycle became more of a personal statement- thanks to movies such as The Easy Ride, The Wild one. Motorcycles in this case were portrayed more as a social and an emotional entity rather than a medium to commute. Motorcycle aesthetics was also influenced by Modernist architecture as the bare evident blocks seen in this type of architecture was also evident in the motorcycle styling.

Rise of the East

The transition from socialist economy to a capitalist economy in India opened doors to brands like Yamaha, Honda, Kawasaki but most of the brands functioned in India in terms of joint venture. This brought India into limelight in the motorcycle market. Advancement in CAD modelling during the late 1990s and early 2000s enabled the designers to generate complex surfaces. Advancement of plastic technology during this period. Easy creation of moulds from aluminium and the ease of creating complex surfaces using CAD propelled the motorcycle styling in creating complex surfaces with intricate details.

Switching from gasoline power to battery power in vehicles opened many possibilities. With the internet becoming more accessible and the products becoming more interactive, innovations such as Internet of things, autonomous driving etc. Easy access to internet has led to much more digitally connected environment which has in turn led to rise in renting or sharing products and rather than owning it. Battery powered vehicles has also changed the appearance of motorbikes as the front portion of the vehicle looks more bulky compared to gasoline vehicles. Though the basic packaging remains the same, the volume has shifted more in the front which could also be due to the absence of exhaust. The styling of the vehicle is also influenced by the maximalist movement where the attention is not only given to the overall form of the vehicle but also various intricacies which is pretty evident in the current trends. Recent update in technologies such as 3D printing can also be credited for these factors. Ability to design complex surfaces and quickly print the prototype and examine it has also given designers to come up with complex surfaces with intricate details.

3.3 EVOLUTION IN LAST TWO DECADES (VISION THROUGH CONCEPTS)

In this section we look at the motorcycles that have debuted in the industry in last two decades. Most of these are the concept models presented by the manufacturers at the international auto shows or are under development. Only the concept models from different manufacturers were studied as they give us a glimpse of future and hence this study will give us an idea of what is the industry's vision of future.



2000
MTT Y2K



2003, North American Autoshow
Dodge Tomahawk



2007, Tokyo Motor Show
Suzuki Biplane



2008, Cologne, Germany
Honda V4 Concept



2010, December
Tron Legacy

Extreme Performance

Hubless



2012, Tokyo Motor Show
Yamaha Tesseract



2013, Tokyo Motor Show
Kawasaki J Concept



2013, Tokyo Motor Show
Yamaha PES 1



2014, July
Harley Davidson Live Wire



2017, Concorso D'eleganza Villa D'este
BMW Concept Link

Leaning

Electric Mobility

Image 3.1: Evolution in last two decades (vision through concepts)



2016, LA Motor Show
BMW Motorrad Vision Next 100



2016, Consumer Electronic Show
Yamaha Motobot Concept



2017, Tokyo Motor Show
Yamaha Motorroid Concept



2017, Consumer Electronic Show
Honda Riding Assist



2018
BMW Motorrad Autonomous Testing

Self Balancing, Smart, Autonomous Vehicles and Motobots



2018, EICMA
MV Agusta Superveloce



2018, EICMA
Royal Enfield KX Concept



2018, June
AP Works Light Rider Concept



2017, Nov.
Big Rep Nera

Retrofuturistic Styling

Alternative Manufacturing Technologies

Image 3.2: Evolution in last two decades (vision through concepts)

EVOLUTION IN LAST TWO DECADES (VISION THROUGH CONCEPTS)

The aforementioned visual infers that two wheeler industry has moved from extreme performance machines to smarter and automated concepts in the recent years. Many manufacturers through their concepts have presented Self Balancing, Smart, Connected and Sustainable vehicles as their vision for future. A lot of experimentation is being done using new materials and new manufacturing technologies, which are finding their way into the main stream production. Many of these concepts are claimed to be as futuristic as of the next 100 years whereas, others are ready to be launched in the open market today.

Motorcycle industry is experiencing this influence from the 4 wheeler industry whether it be the rising safety standards or the autonomy of vehicles. This could also be the result of anticipation by the manufacturers that governments soon might be pushing strict safety norms.

But is this what the near future looks like? How will motorcycles evolve in the next 10 years? The advancement of battery technology in terms of improvement of capacity, efficient in terms of space occupied, the internal combustion engine might be a thing of the past. When the whole spectrum of dedicated electric two wheeler manufacturer appearing across the world is seen, it is known that this is definitely not too far fetched and therefore this development is also pushing the traditional manufacturers to venture into such projects.

In this scenario of rapidly evolving technologies, there is a wide scope of exploring the aesthetics of these futuristic motorcycles and also defining new design standards for the futuristic motorcycles.

04

Product Study

Technology Trends



Smart Displays

Ather 450 & BMW Concept Link



Winglets

Ducati Panigale and Ninja H2R



Self Balancing

Honda Riding Assist & Yamaha Motoroid Concept



New Manufacturing Tech.

Light Rider (First 3D Printed Motorcycle)

Image 4: Technology Trends

Technology Trends

- Self Balancing Vehicles
- Autonomy and Riding Assist
- Drive by wire
- Intelligent riding gears
- New manufacturing processes like 3D printing, CNC milling etc.
- Advanced materials (Lightweight, strong and durable)
- Seat and handle grip heater
- Anti lock breaking system, Traction Control and Rider Air-bag
- In wheel suspensions
- SOS signalling system built in
- Automatic lighting

Styling Trends



Reinventing the Icons

BMW 1923 R32 to BMW Motorrad Vision Next Concept



Surface Treatment

Ducati Panigale 1299



Authenticity of Materials

MV Agusta F4 Claudio (Carbon Fiber Fairings used)



Image 5: Styling Trends

Styling Trends

- Retro styling is a common tool to celebrate the heritage of the company.
- Minimal and simple surfaces with exposed engines and other mechanisms, Often observed in cruisers and baggers.
- Authenticity of the material is used achieve the crude appearance. New materials and textures are used with the help of new technology.
- Sports bikes and electric motorcycles generally have modern surface treatments. Most of the modernly styled motorcycles are marketed on their technological excellence.
- Head lamps and tail lamps have become very sleek with LED technology, except for retro styled models.
- Sharp and aggressive lines are very common.
- Complex surface treatments such as layered surfaces is also becoming popular, with designers boldly trying surface layers with contrasting colors.

4.2 SILHOUETTE STUDY

It has been well established that consumer's impression of product forms can influence their purchasing choices. And therefore automakers are likewise keen on making ideal motorcycle forms that can outwardly pass on the message of environmental friendliness and safety to customers. This study also helps us understand that how in its totality have the form evolved in last 2 decades when motorcycle industry have observed some revolutionary advancements.

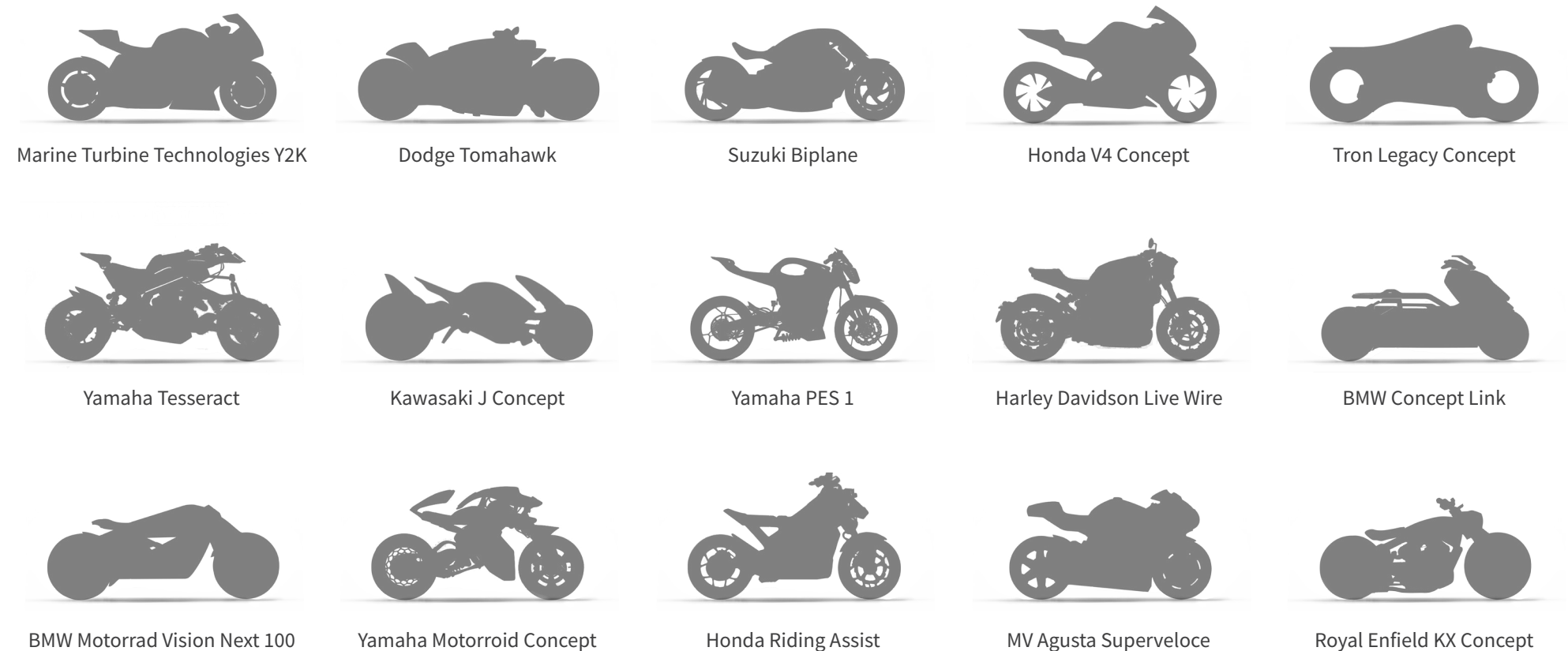


Image 6.1: Silhouette Study

SILHOUETTE STUDY



Marine Turbine Technologies Y2K



Yamaha PES 1



Honda Riding Assist



Yamaha Gen 04 Concept



Beverley Touring Scooter



BMW Concept Link

Image 6.2: Silhouette Study

Apart from the socioeconomic and cultural influences, evolution in technology and law enforcement plays a vital role in the form and styling of a vehicle. Particularly in case of two wheelers this change is very evident whether it be a motorcycle or a scooter the new electric power-train have allowed new interpretations of the vehicle form and styling. In case of motorcycles typical layout of a gas tank placed over the backbone and in front of rider seems to be changing, vehicles also have become visually much lighter depending upon the design intent of the manufacturer.

A restriction of this exploration is that lone silhouettes and profile perspectives on the vehicle shapes were examined. Whereas in a real showroom, customers, will integrate more insights regarding the vehicles, including the colour, material, performance specifications (e.g., fuel efficiency and safety data), and physical contact.



Img 7: Energica Ego



Img 8: Brammo Empulse



Img 9: Harley Davidson Live Wire



Img 10: Mission R Motorcycles



Img 11: Lightning Motorcycles



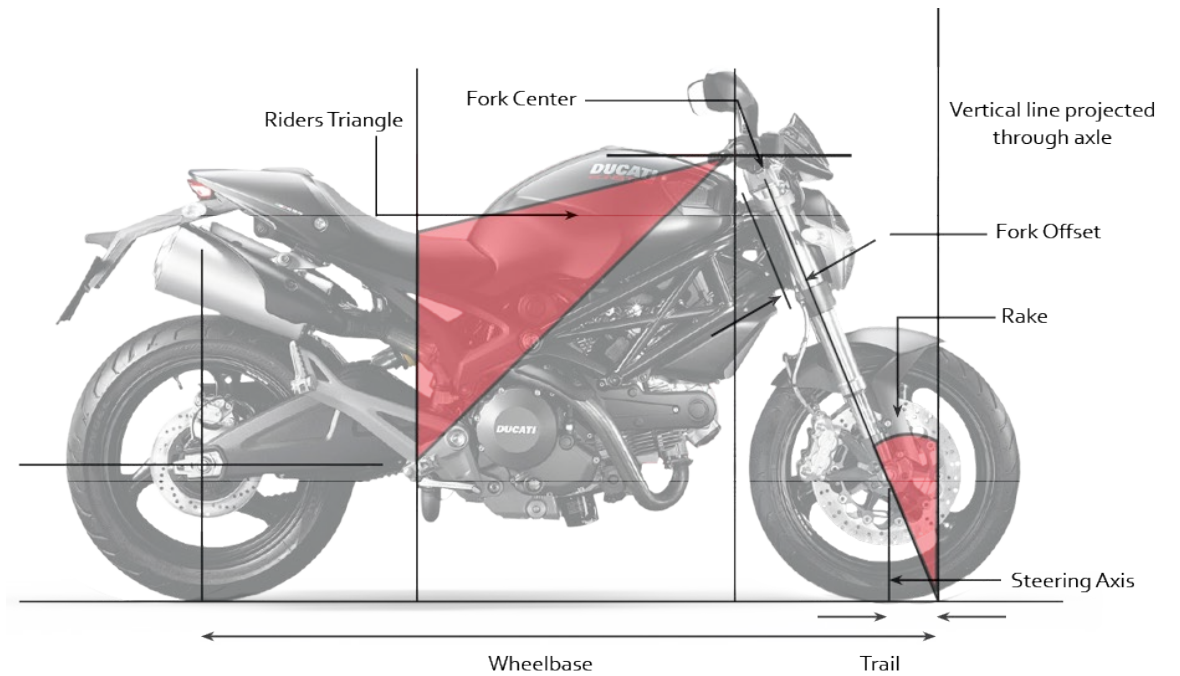
Img 12: Moto Czysz



Img 13: Zero SR/F

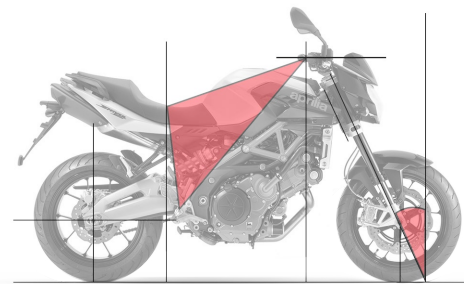
Leading electric motorcycle manufacturers are still reluctant in removing the gas tank like shape and creating a new identity because of multiple reasons such as the perception of motorcycles and control over the motorcycle though they are trying to achieve it through advanced surface treatment and detailed work near the battery pack.

4.3 VEHICLE DYNAMICS

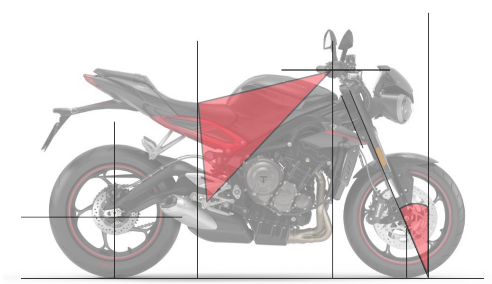


Ducati Monster

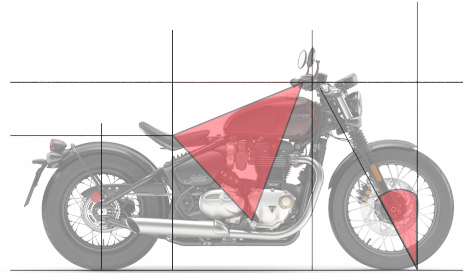
Image 14: Vehicle Dynamics



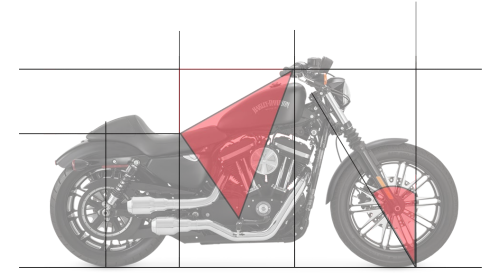
Img 15: Aprilia Shiver SL750



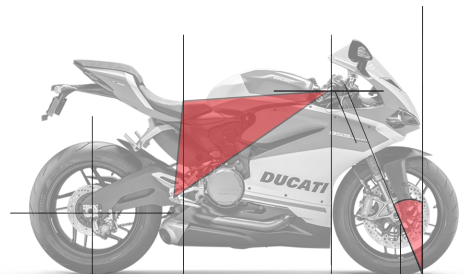
Img 16: Triumph Street Triple



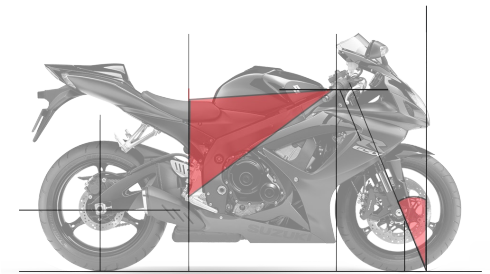
Img 17: Triumph Bonneville



Img 18: Harley Davidson Sportster



Img 19: Ducati Panigale



Img 20: Suzuki GSX R

Motorcycles have, in recent years become more focused and specialized in their function. A variety of sub genres has evolved bringing a nuanced skill set to particular types of bike which are capable of tackling everything from the most extreme off road scenarios to track setting a wide variety of everything in between.

There is no universal system for classifying all type of motorcycle however a motorcycle is basically segmented by the type of its application and motorcyclists riding position.

The Motorcyclists Riding Position depend upon the rider body geometry (anthropometry combined with the geometry of motorcycle). These factors create a set of three basic postures viz. Sports, Standard and Cruiser.

Out of these three, street commuter provides the best of all three having good agility and the comfort of using the vehicle everyday. Hence, becomes a favorable choice to explore the futuristic possibilities.

05

Setting the Context (2030)

5.1 SOCIETY AND TECHNOLOGY(2030)

Society (Present Day and Future)

The coming decades will bring further profound changes to the size and spatial distribution of the global population with a projected 2.5 billion people to add to urban population by 2050.

Culture is who we are and what shapes our identity. Strong migration flows, combined with higher birth rates have led to an unprecedented level of ethnic, cultural and religious diversity in developed markets.

Transhumanism as a movement has developed gradually over the past two decades and is based on the premise that the human species in its current form does not represent the end of development but a comparatively early phase.

From the Urbanization to Sustainability, and from economy to politics. We look at how the world will change in next 10 years.



Image 21: Society 2030

Technology (Present Day and future)

Since the beginning of the present decade, innovation has been driven towards developing smarter gadgets and devices that are always associated with a larger ecosystem.

We are witnessing the first steps towards creating a fully functional artificial intelligence, in the form of smartphone assistants such as Siri and Cortana. We are looking at interacting with our devices in the form of touch, gestures, voices and even thoughts. Newer materials and manufacturing like 3d printing, smart materials and self healing materials all influence the way things look and function.

This change in outlook in automotive technology is facilitating a shift in styling as well. Most recent manufacturing techniques have enabled designers to have a greater degree of freedom on surface quality and detailing than ever before. Other important innovations include airless wheels and flex materials with structural properties.

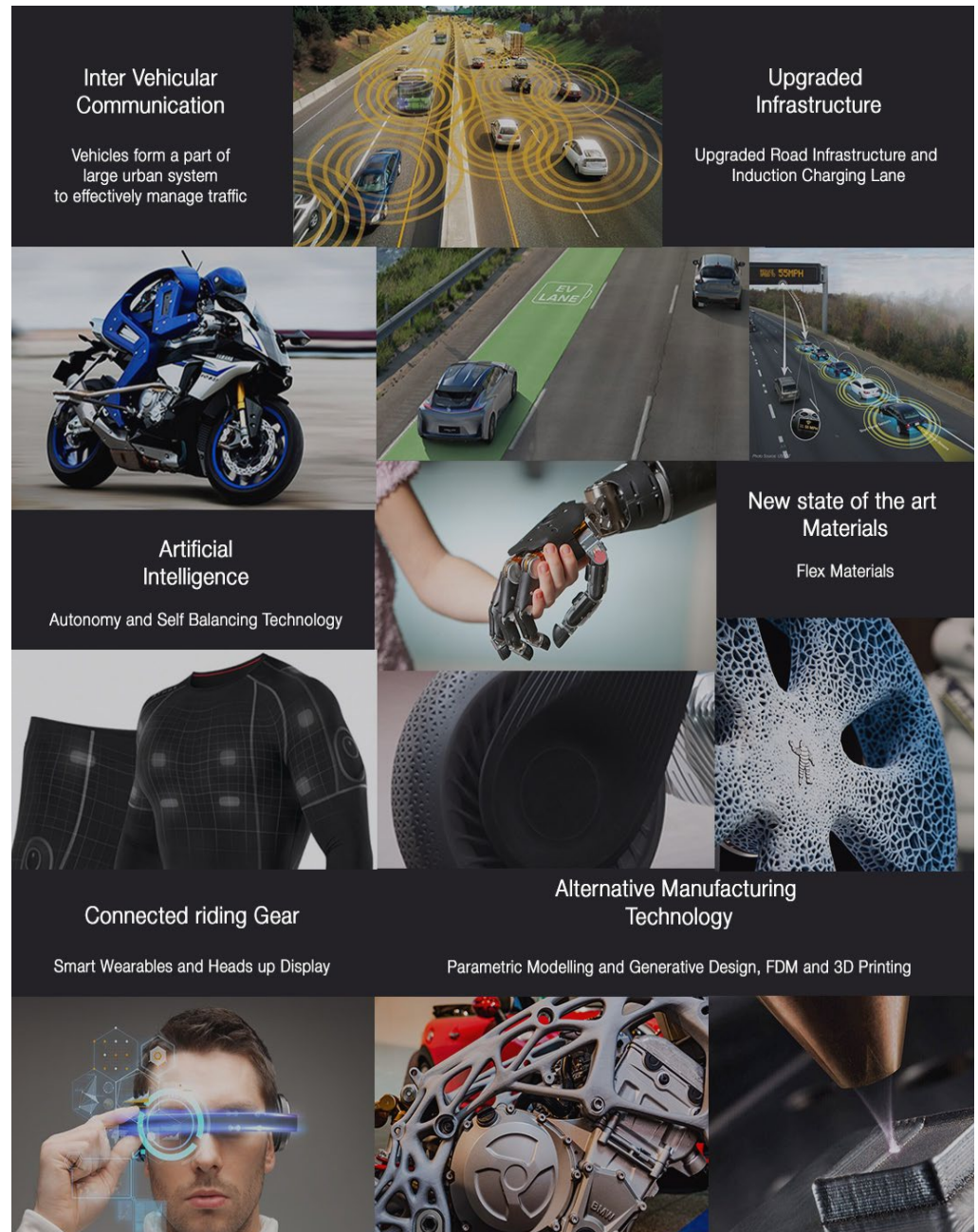
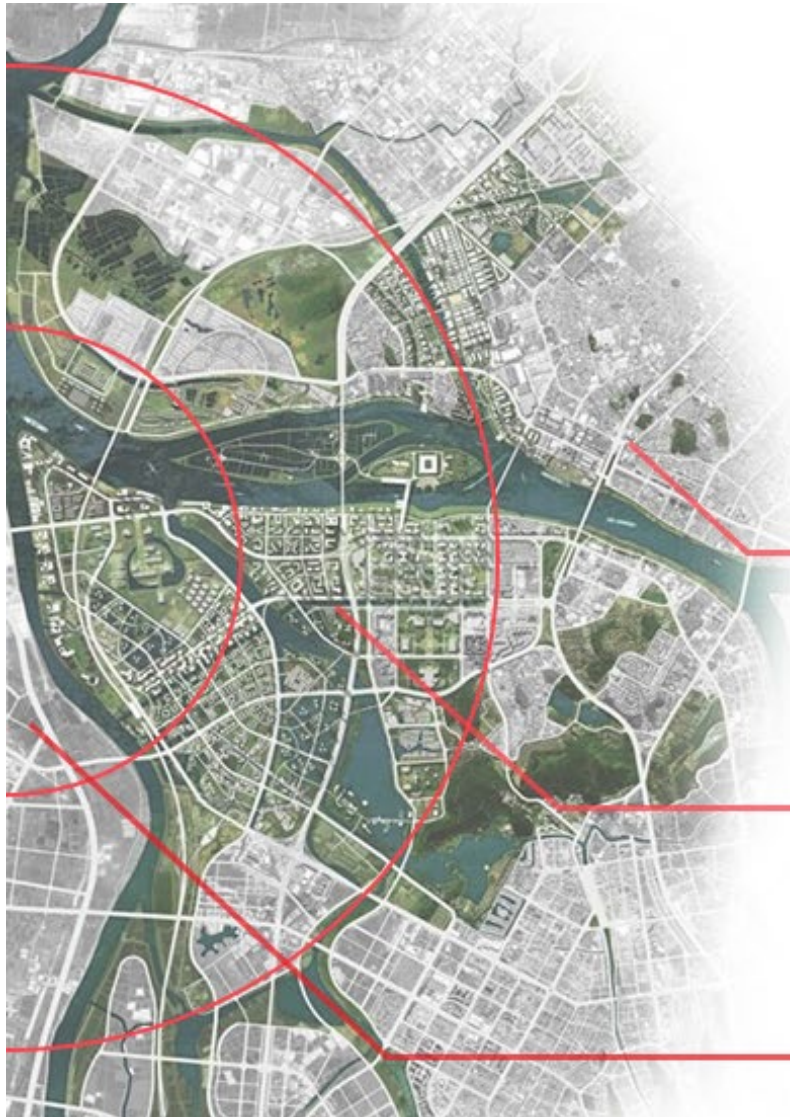


Image 22: Technology 2030

5.2 SCENARIO



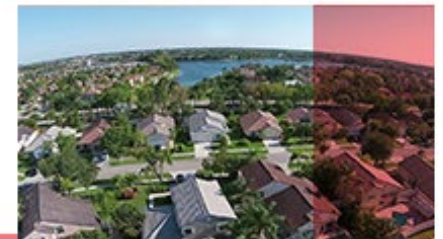
The Void Lands

A lot of abandoned infrastructure and beautiful landscape will be available for exploration.
(Least traffic on roads)



Suburbs

An all residential living space away from the chaotic city life.
(Less road traffic subjected to variation)



Centres

Mostly Populated with a mix of corporate offices, Shopping Malls and Social hangouts
(Moderate road traffic)



Hyper-centres

Skyscrapers, High Rise towers and modern day installations, Cities hub for MNC's offices
(Heavy Road Traffic)





City Roads

Charging Grids

Mega Highways

Smart Roads
Dynamic Induction
Charging Lanes

Escape Roads

Free Ways
Off Grid

Next Phase of Electrification

5.3 USER PROFILE

- Generation born in 21st Century (Generation Z)
- Living in a metropolitan city of 2030. He owns a motorcycle which he uses for long rides on weekends to get off the grid.

Identified by their Interests in:



Outlaw Explorer (Personality Type)

- Freedom to find out who you are through exploring the world
- To experience a better, more authentic and more fulfilling life
- Journey, Seeking out and experiencing new things, Escape from boredom

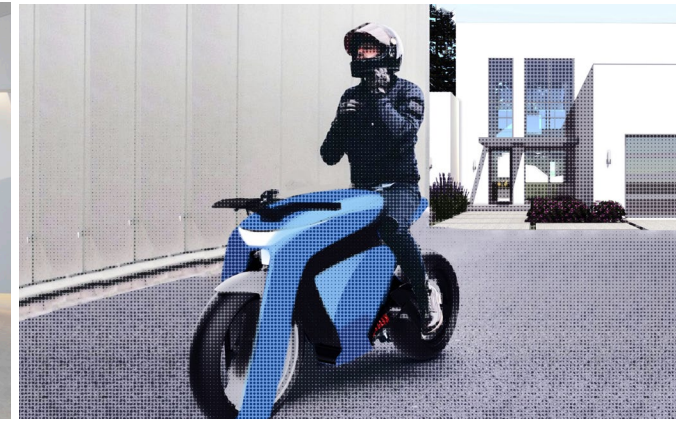
Storyboard



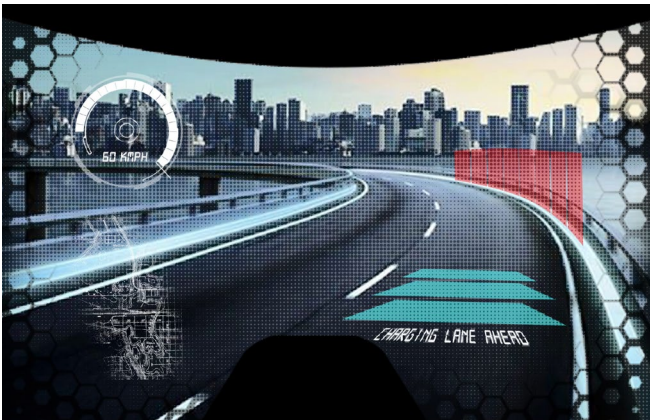
Where He Lives



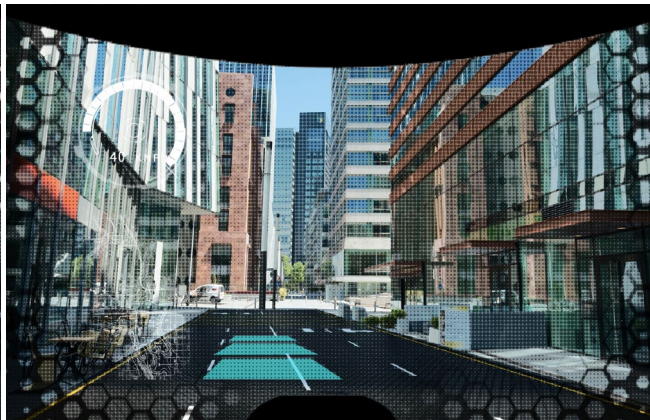
Home



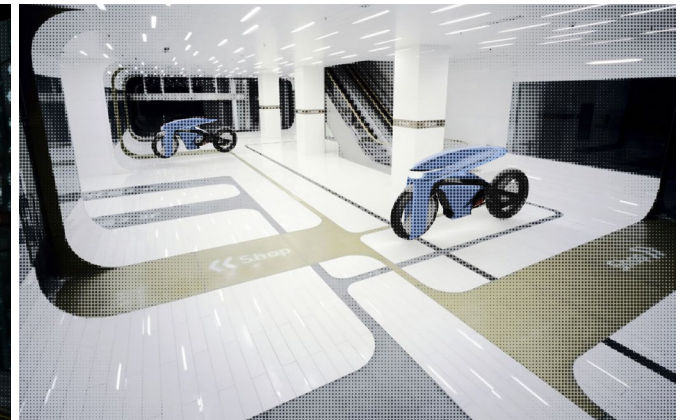
Leaving home for office



Approaching the city where he works



Approaching his office locality



Office parking space

06

Design Brief

6. DESIGN BRIEF

To conceptualize a Street Electric motorcycle concept for year 2030.

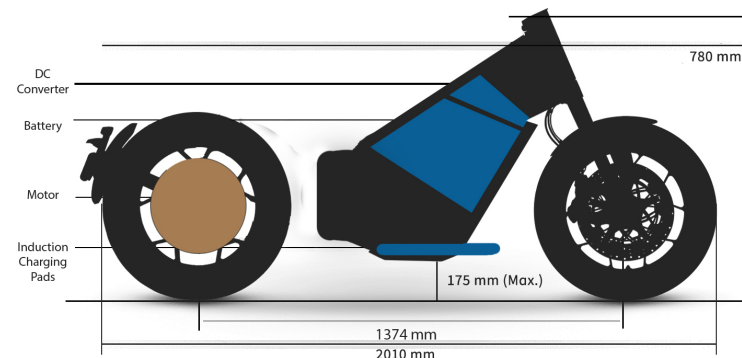
Targeted user being the working professionals (Age: 25-32 years) living in a metropolitan city.

The concept should fulfil the following requirements:

- Attract new generation riders and reinvent the joy of riding
- Should be a part of larger and connected ecosystem
- Use state of the art Technology
- Expressing the notion of an electric vehicle through advanced surface treatment
- Reflection of the theme: sculpted and detailed

Technical Specifications

Overall length: 2100 mm Rake Angle: 25-26 degree
Seat Height: 750-790 mm Rider 's Forward Lean : 20-25 degree (Max)



07

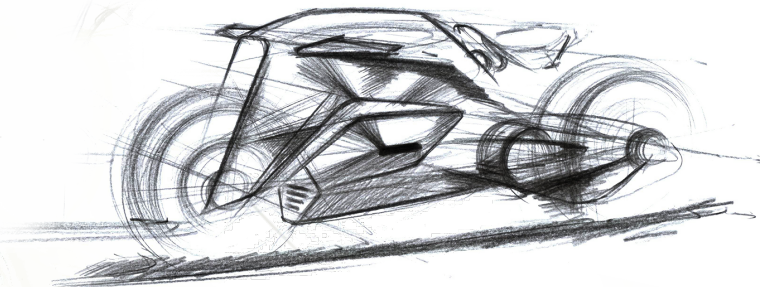
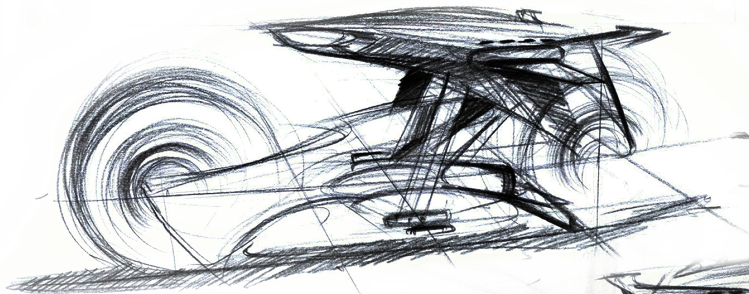
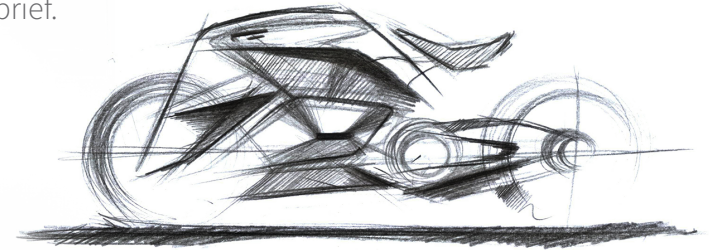
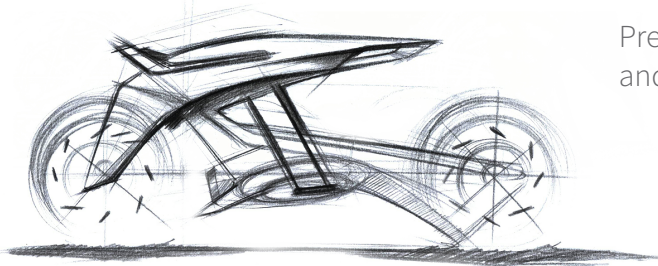
Exploration Sketches

MOOD BOARD

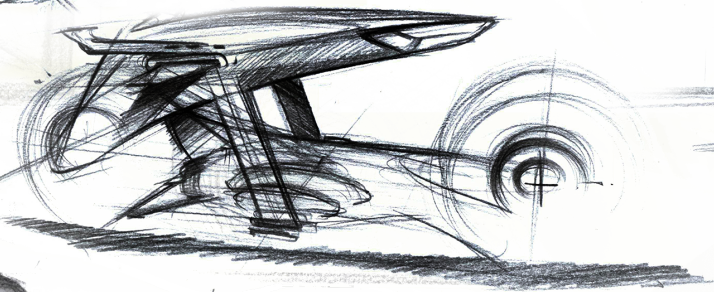
Sculpted
Detailed



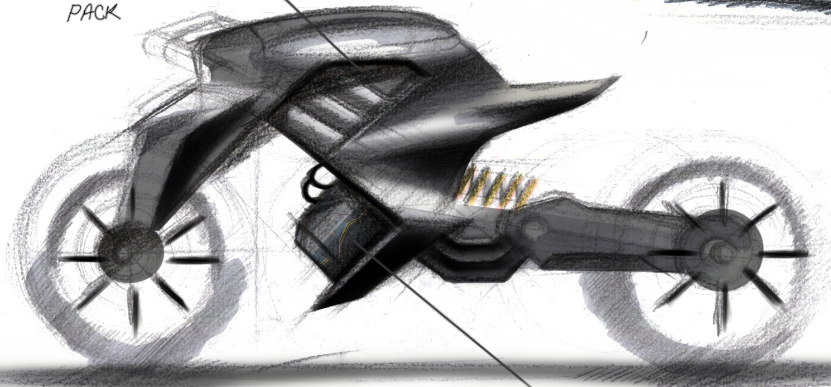
Pre ideation was done to explore volume, character and stance after understanding the design brief.



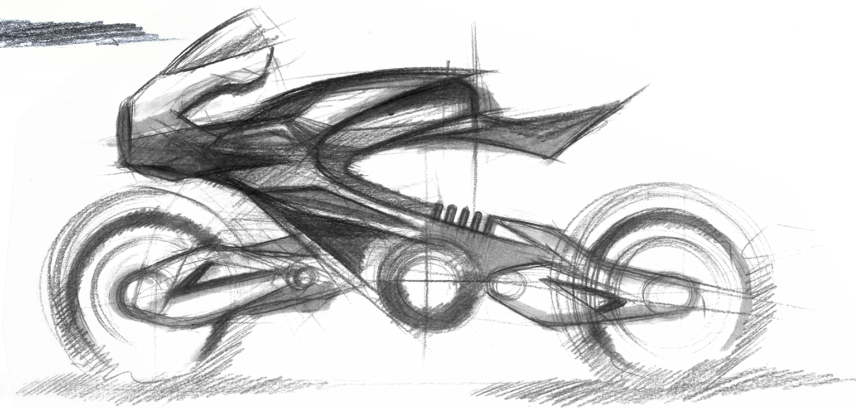
FLEX FRAME WITH STRUCTURAL PROPERTY AS WELL

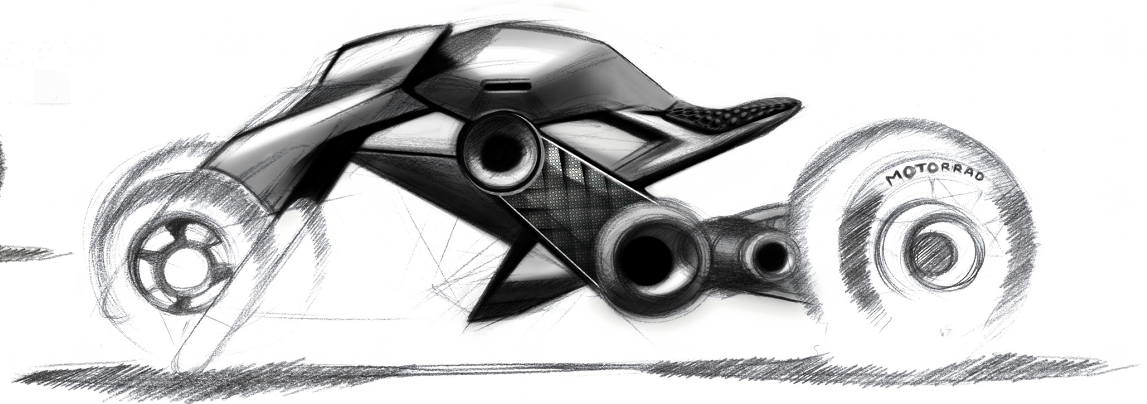
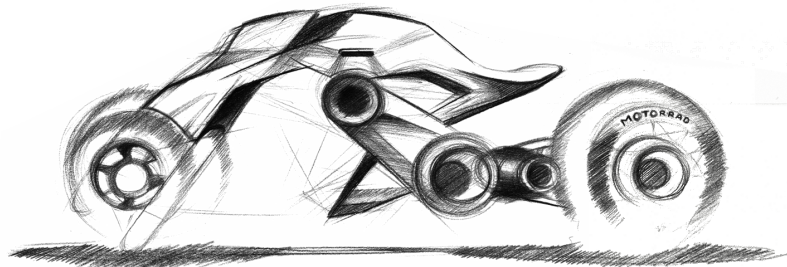
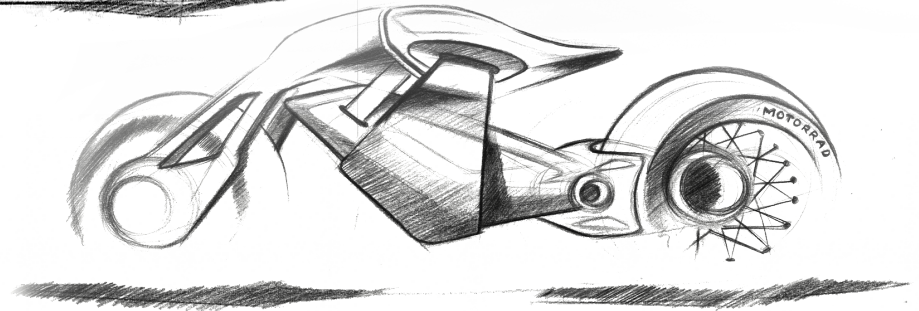
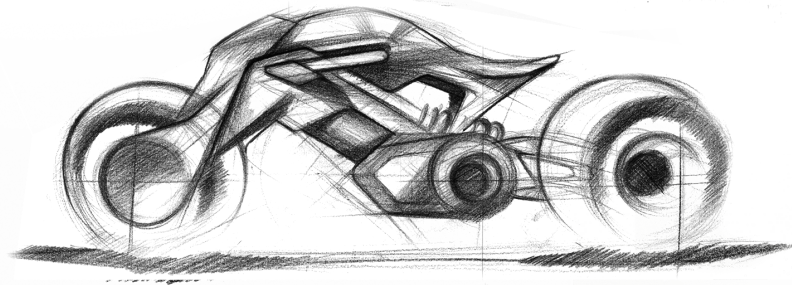
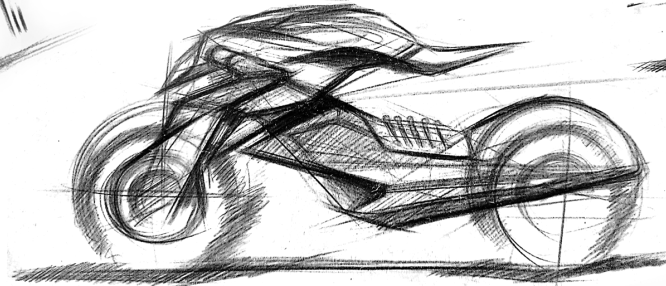
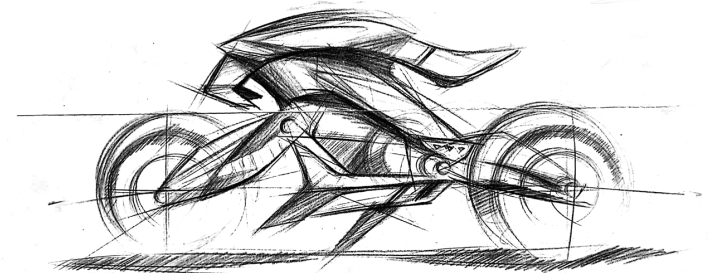
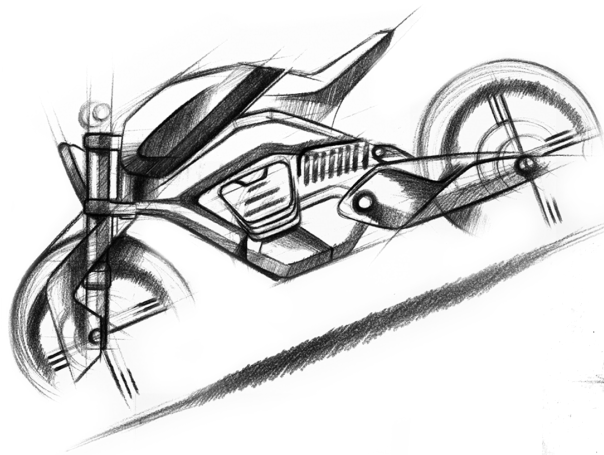


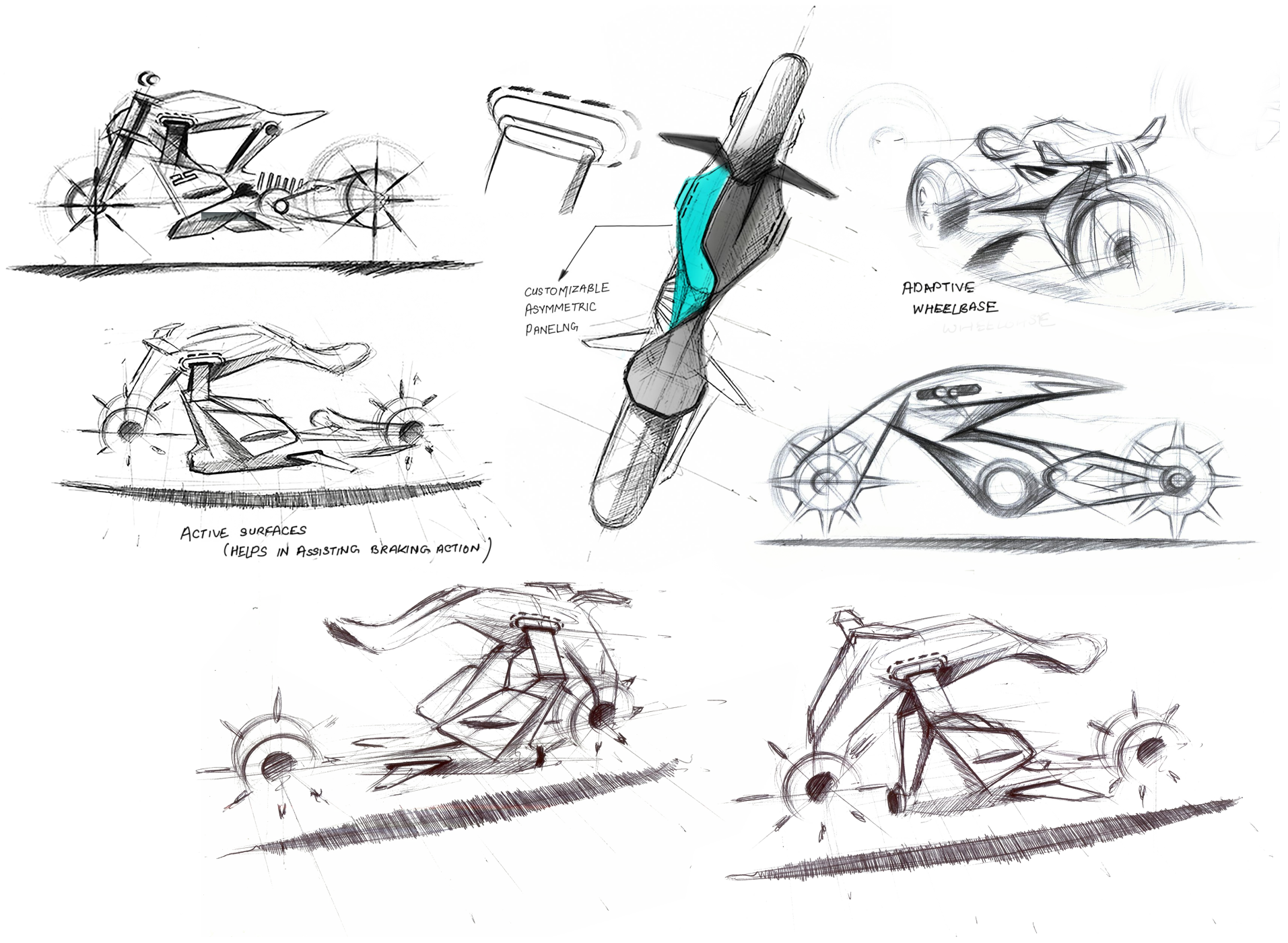
BATTERY
PACK

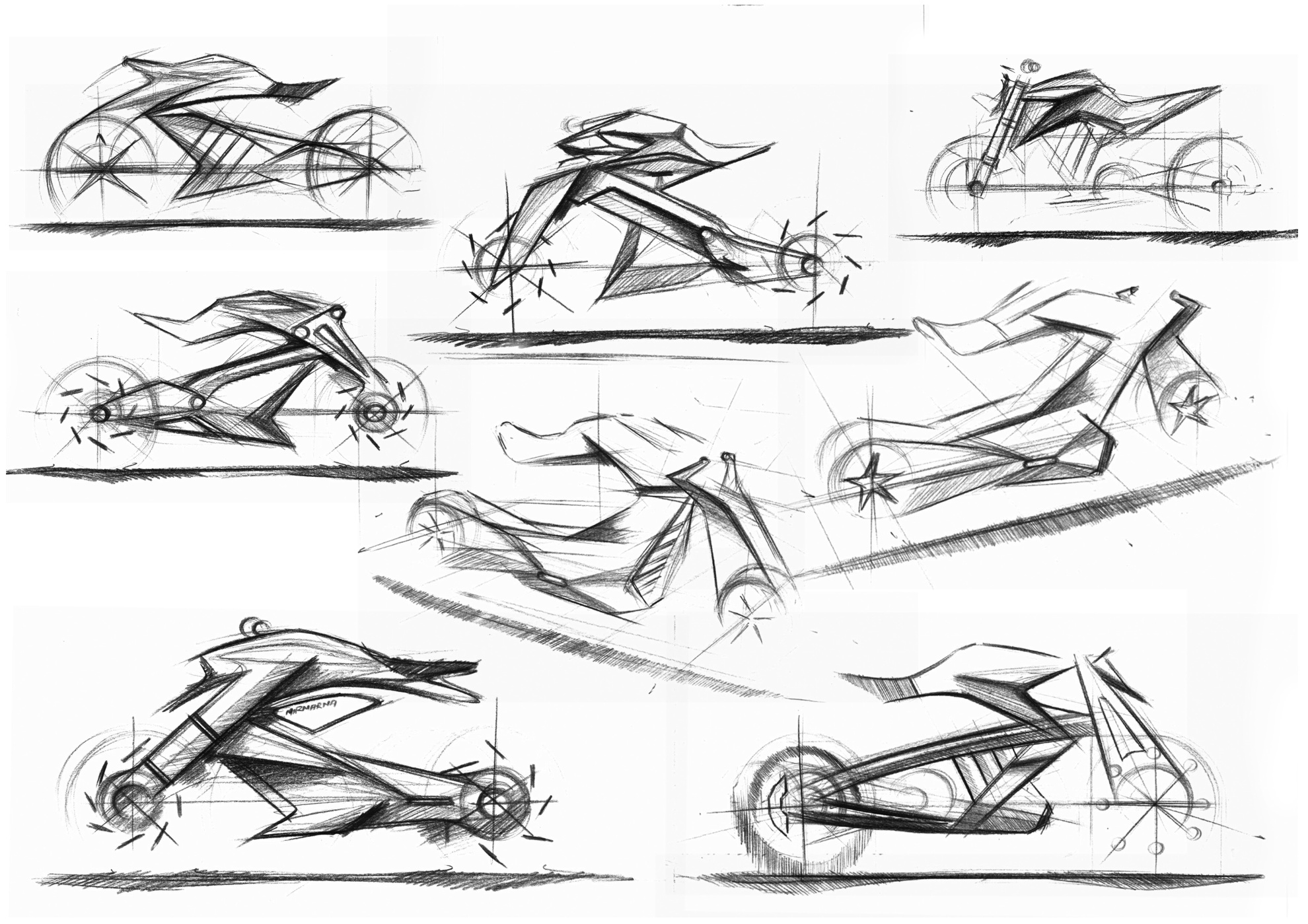


ELECTRO-MECHANICAL GYRO







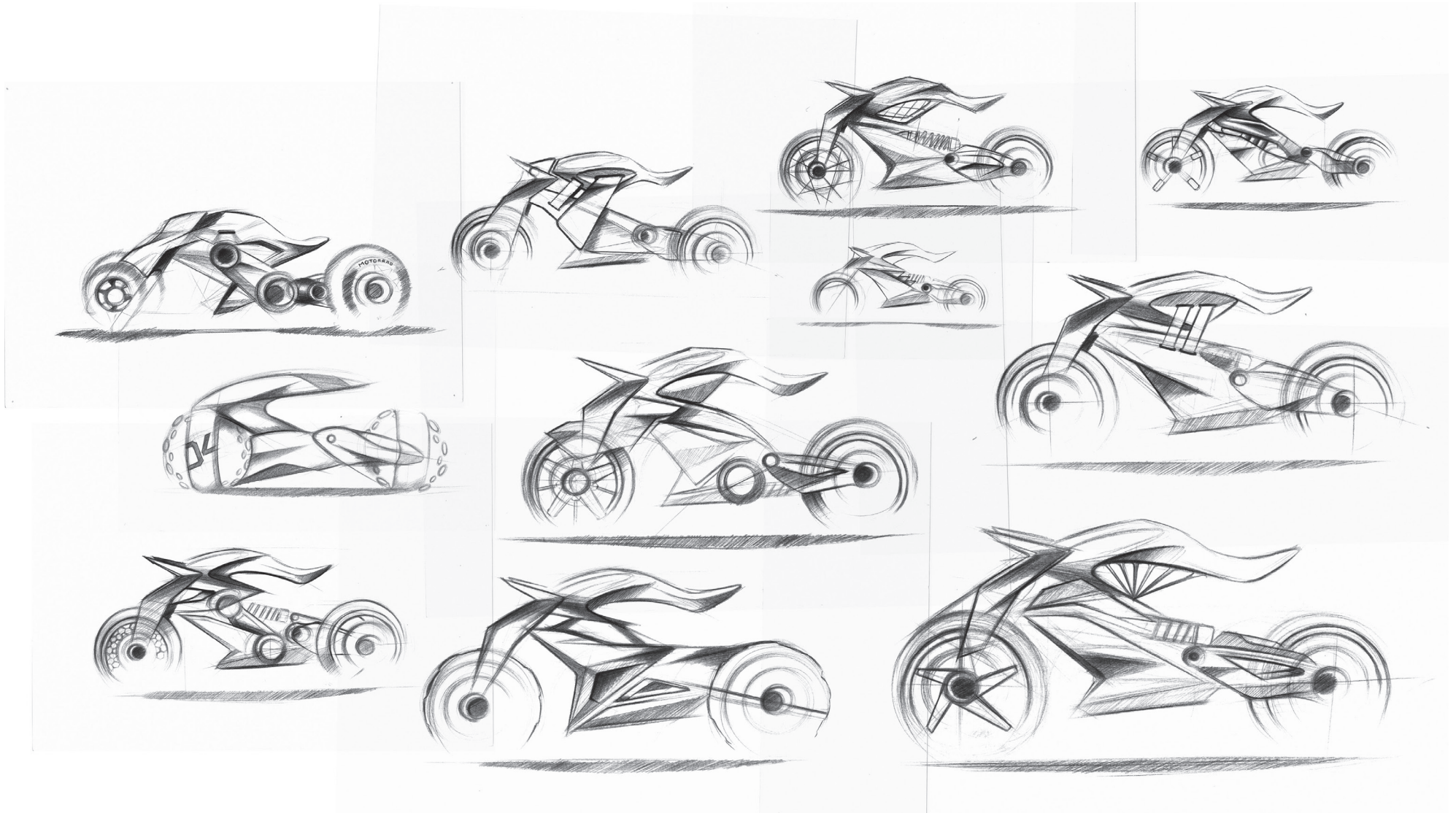


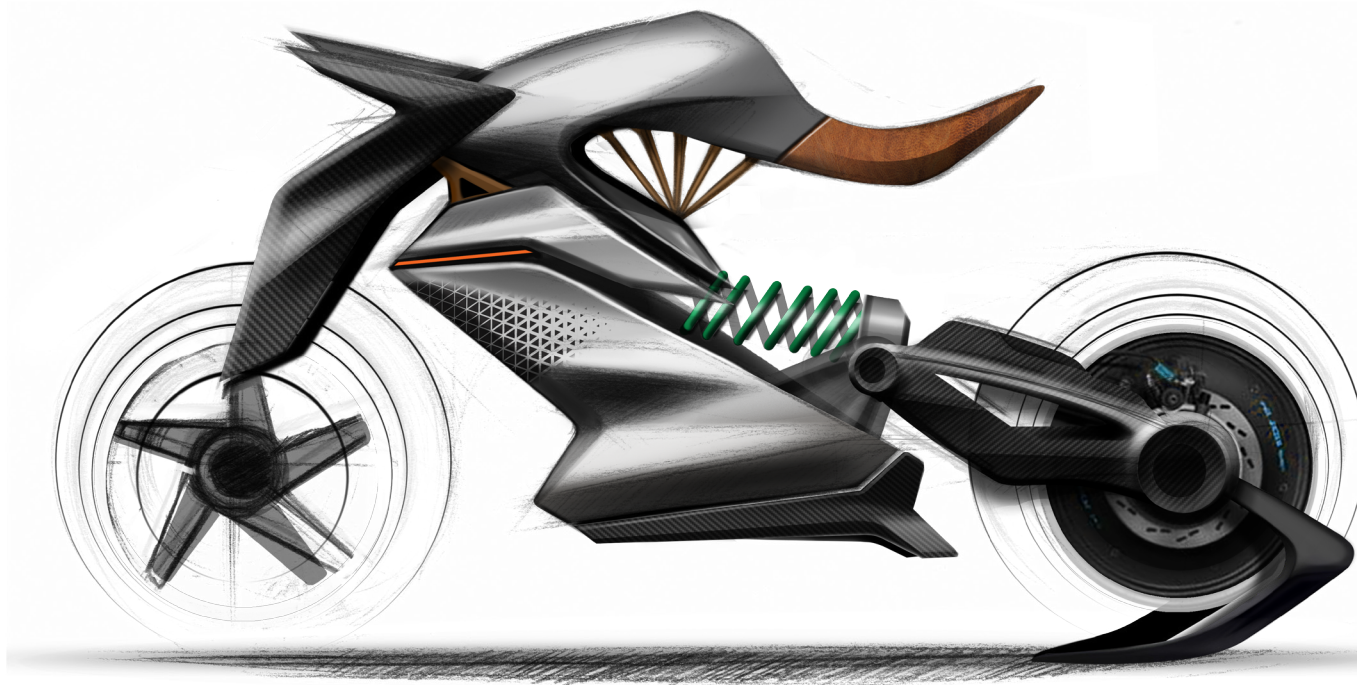
08

Ideation

Direction 1

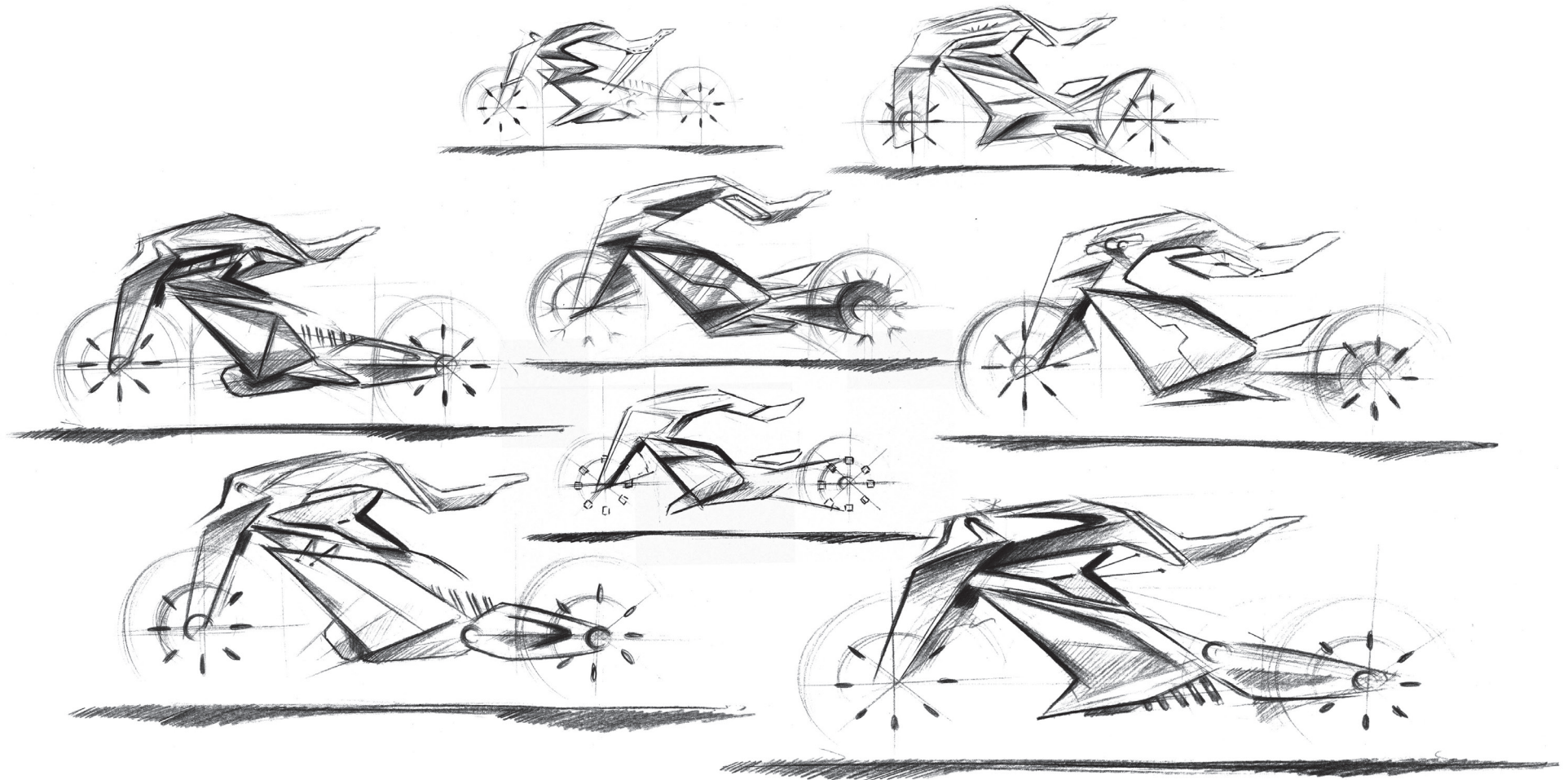
The intent of ideation in direction 1 was to keep a long stretched stance of the bike inspired from some initial explorations proportional ideations were done for this direction.

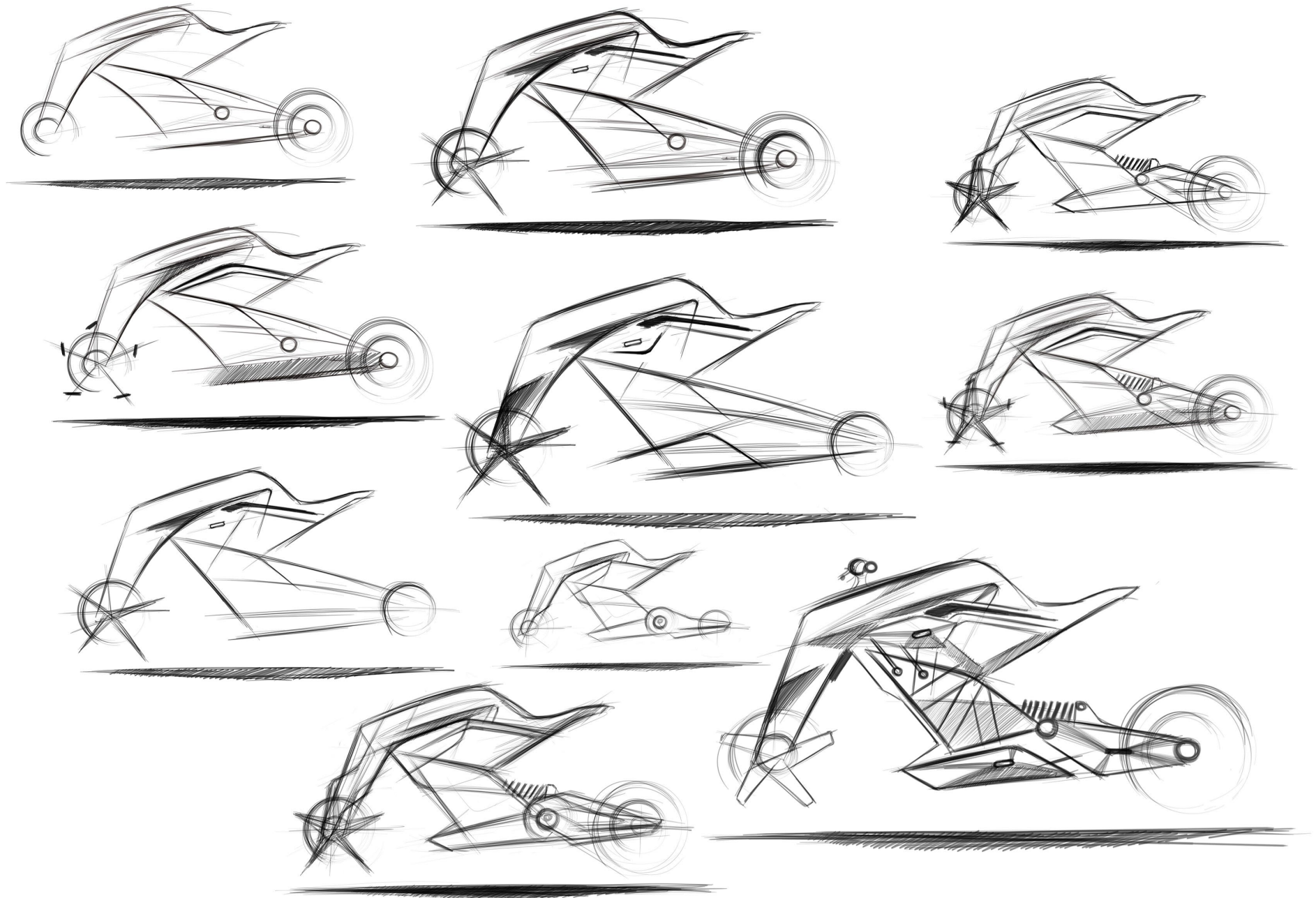


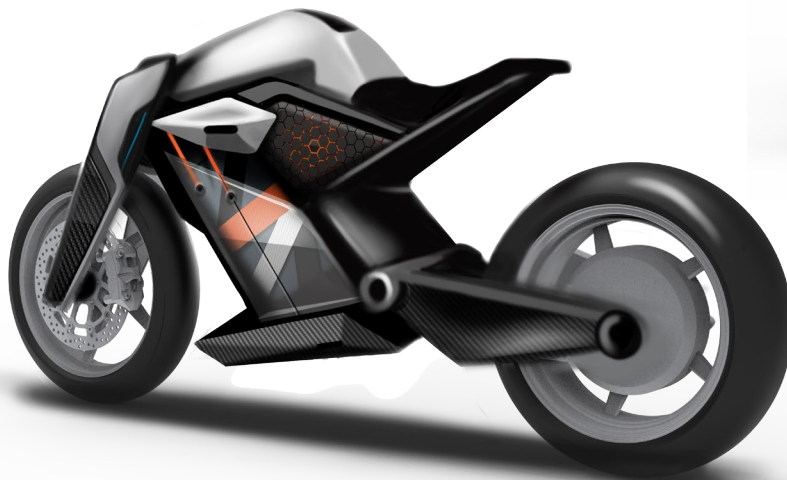
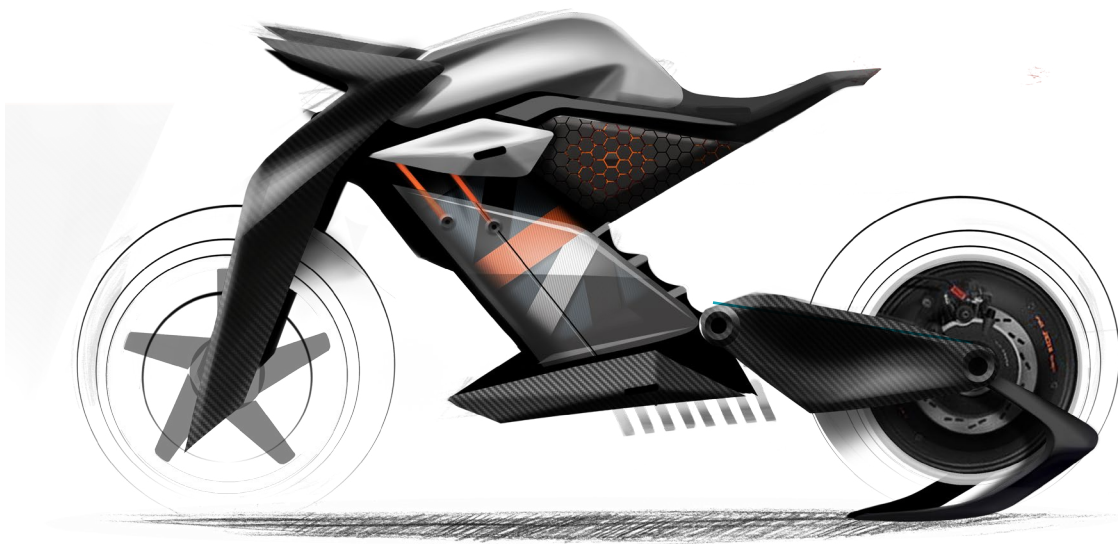


Direction 2

The ideation in direction 2 was to keep the silhouette same and at the same time reduce the surface area of the tank to give it more perceivable electric motorcycle look with sculpted treatment of the surfaces.

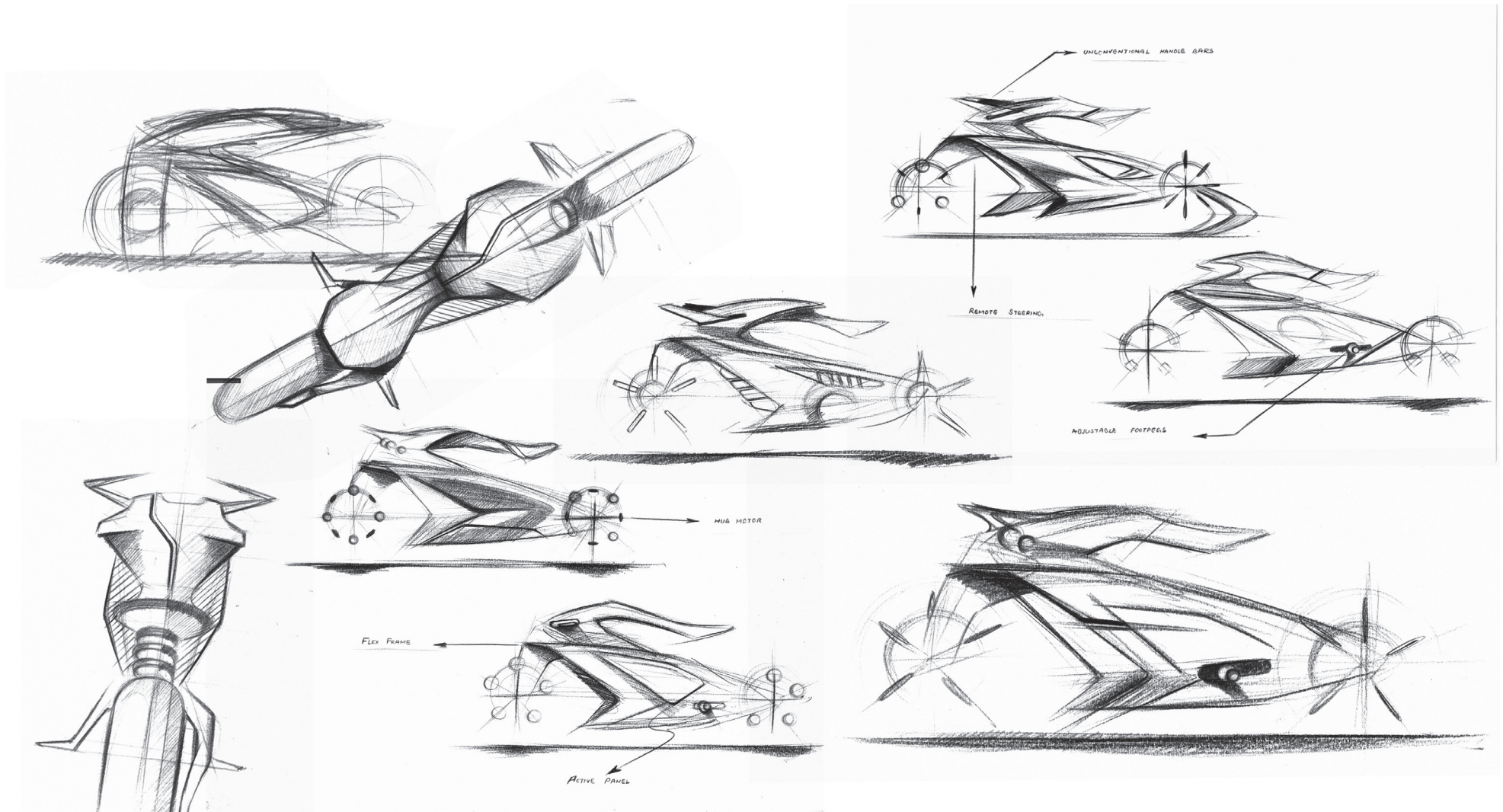


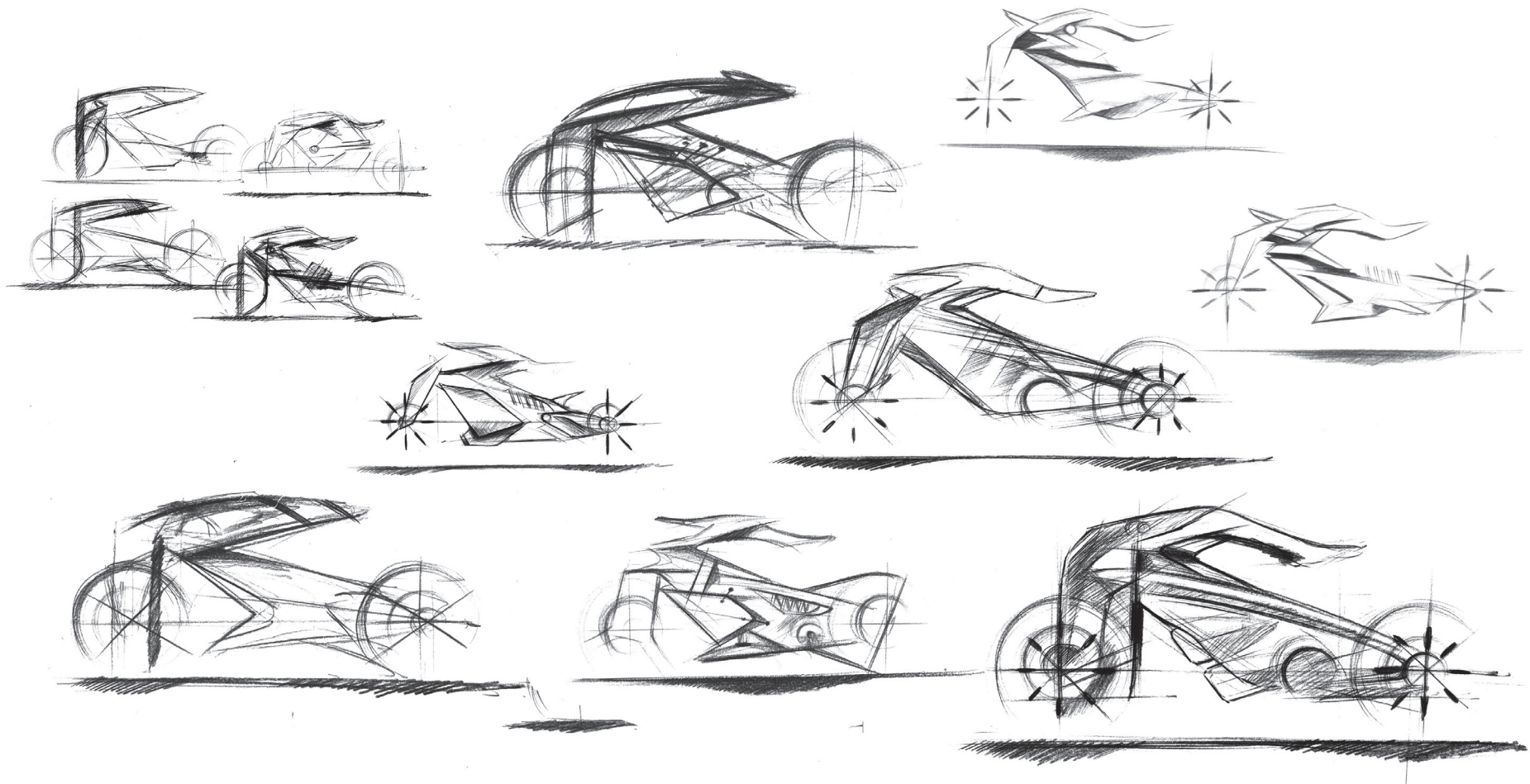


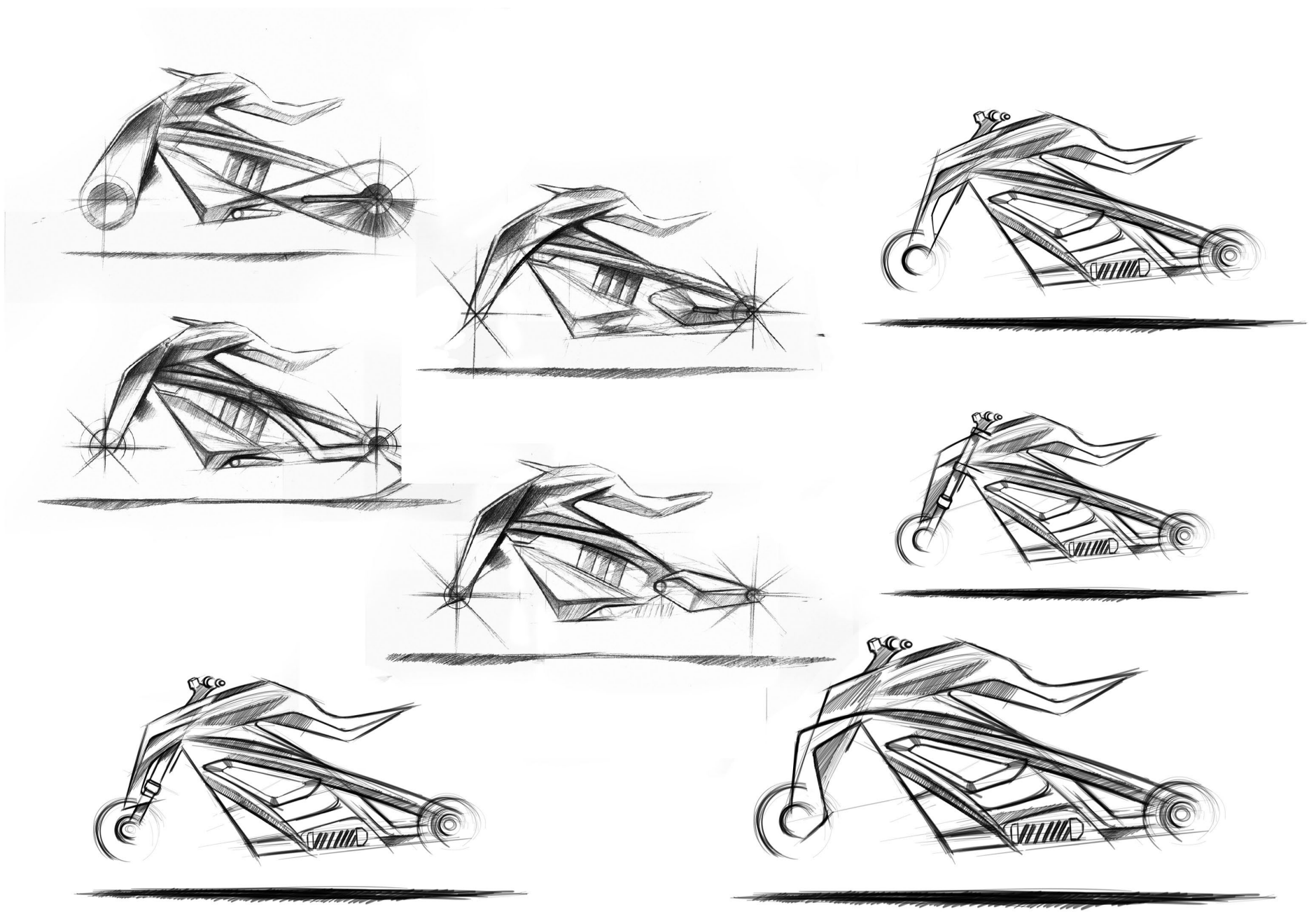


Direction 3

The idea in direction 3 was to use a single dominating curve/element which actually defines the character and stance of bike along with the advanced surfaces treatment. The dominating element also gives us a strong sense of momentum.





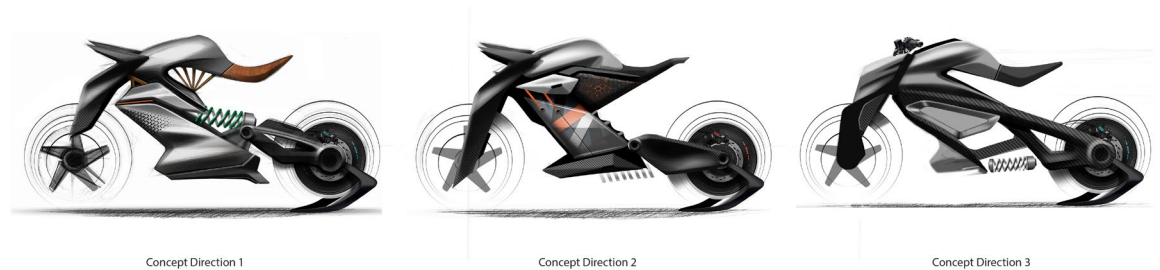






Concept Evaluation

A brief user evaluation was done to understand users reaction users about the concepts. The evaluation was done with users of same age group. They were asked to rate the concepts based on keywords.

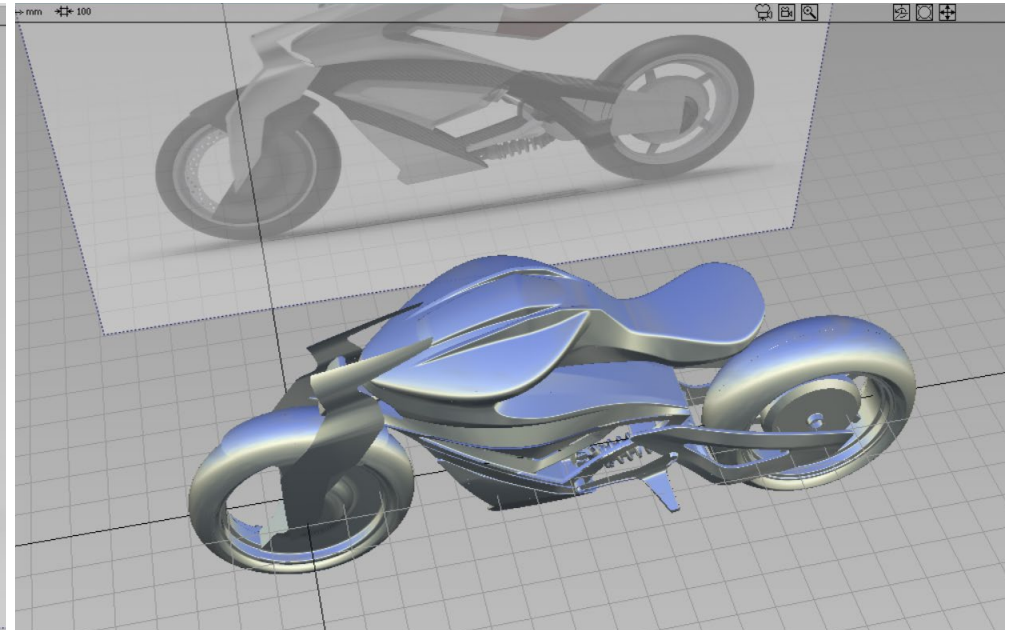
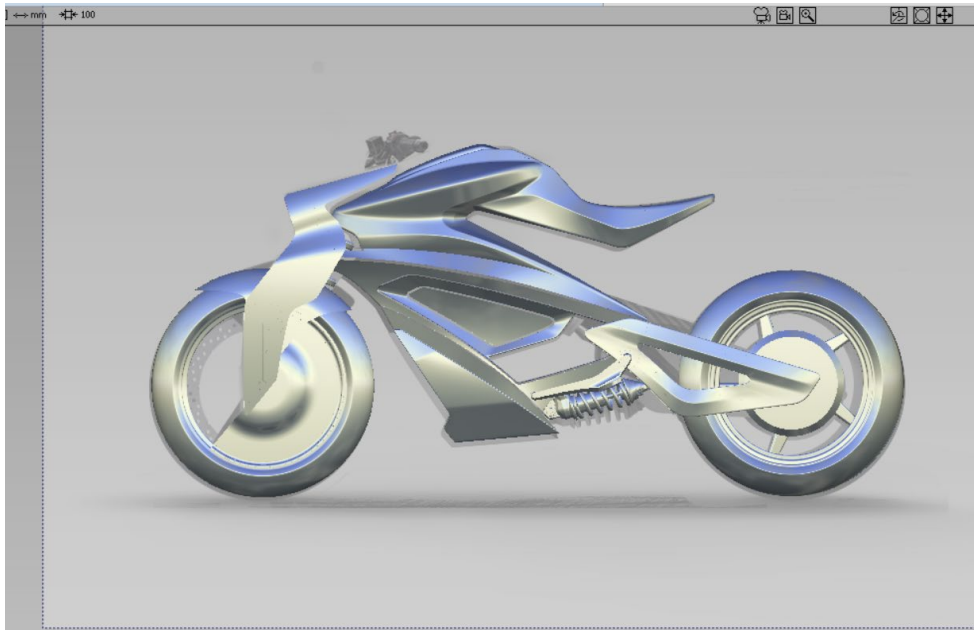
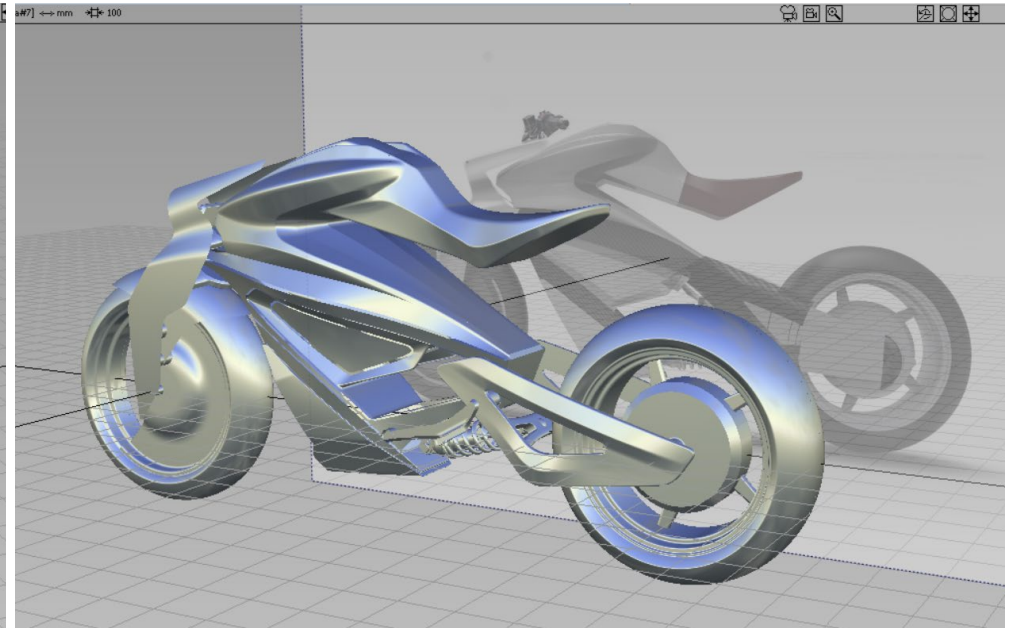
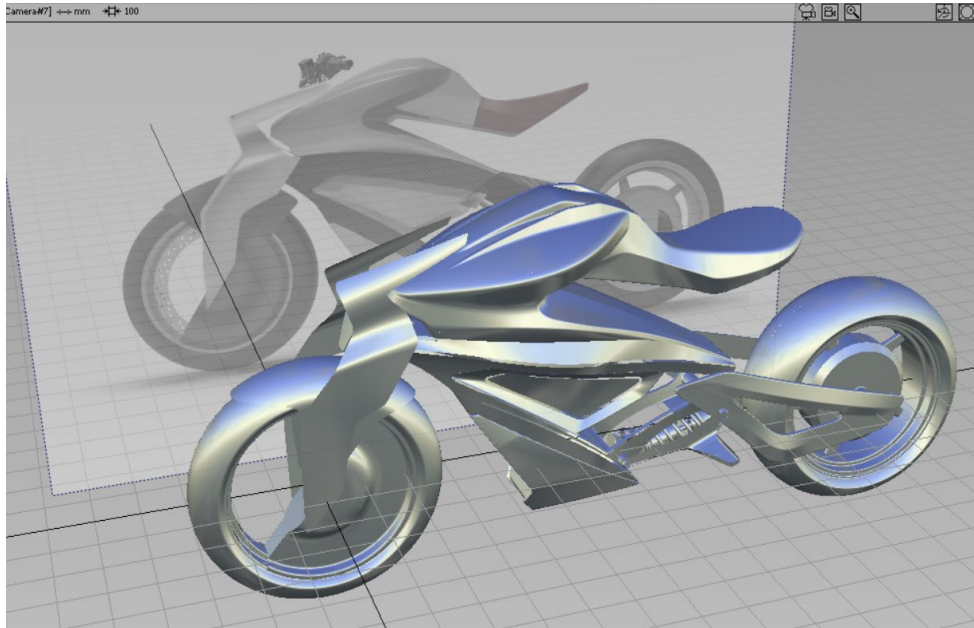


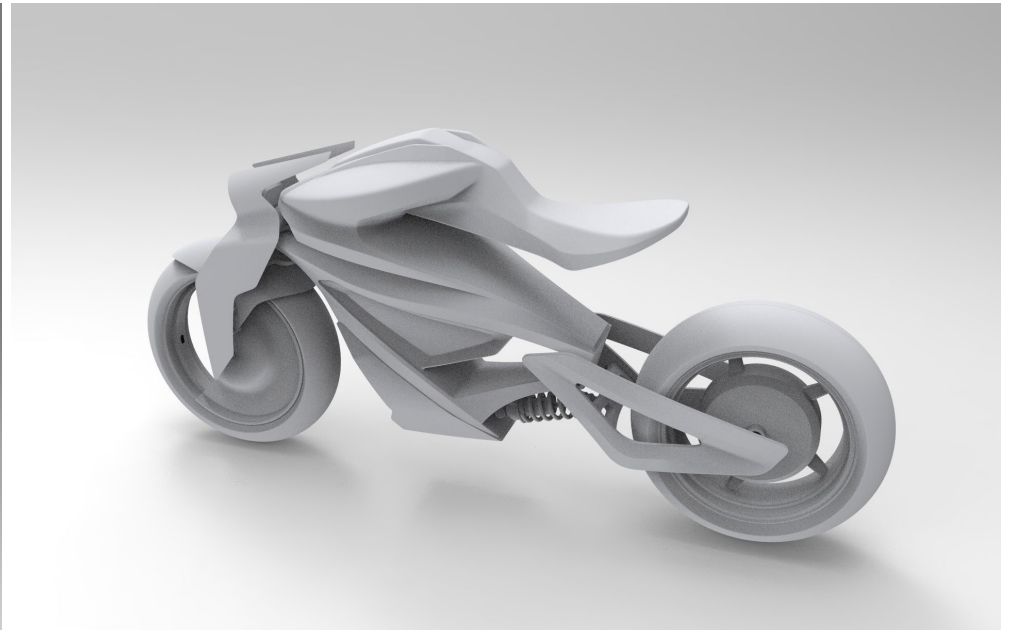
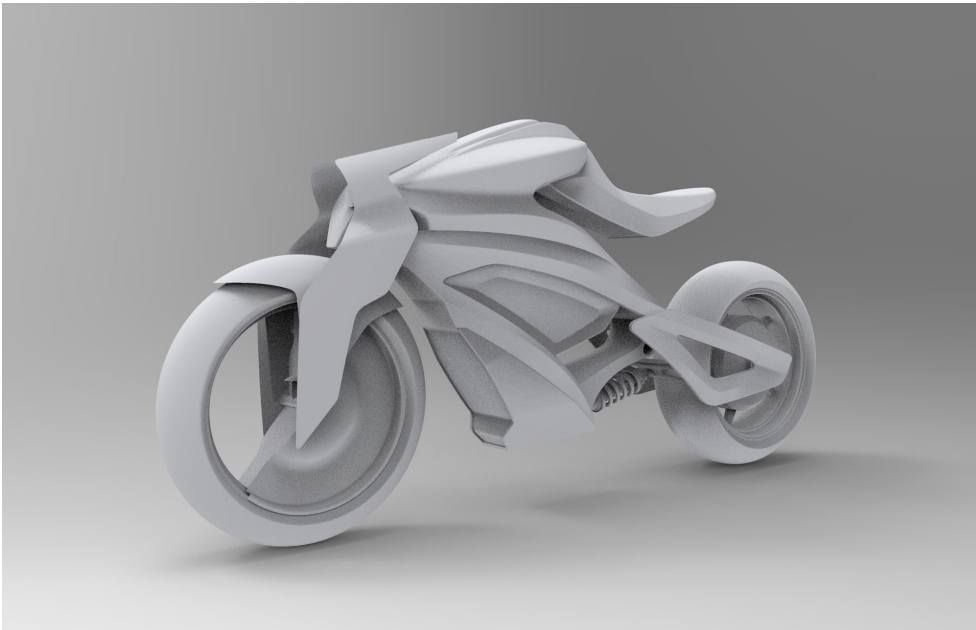
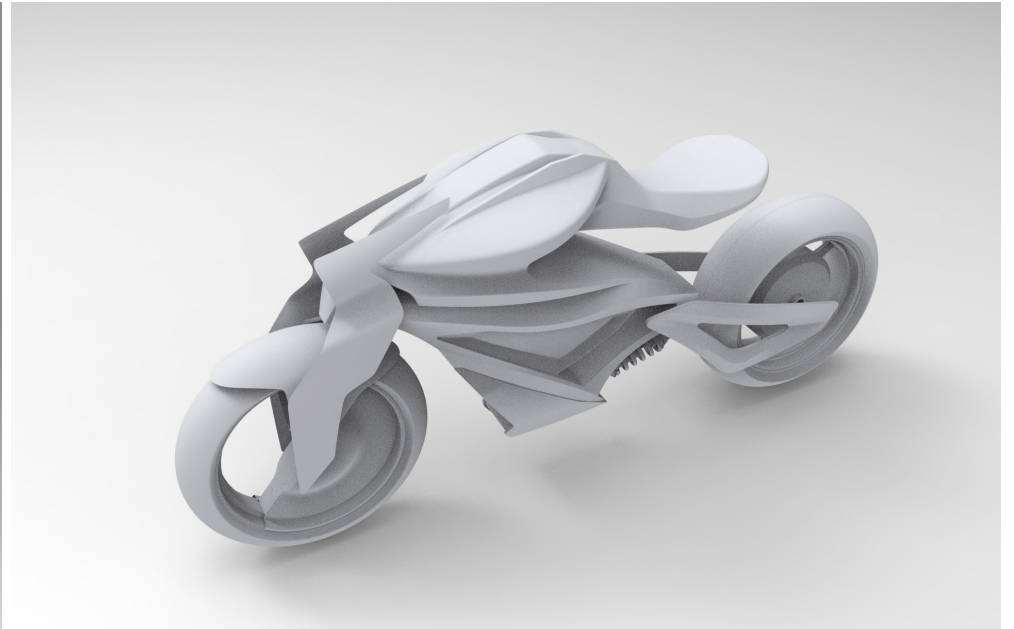
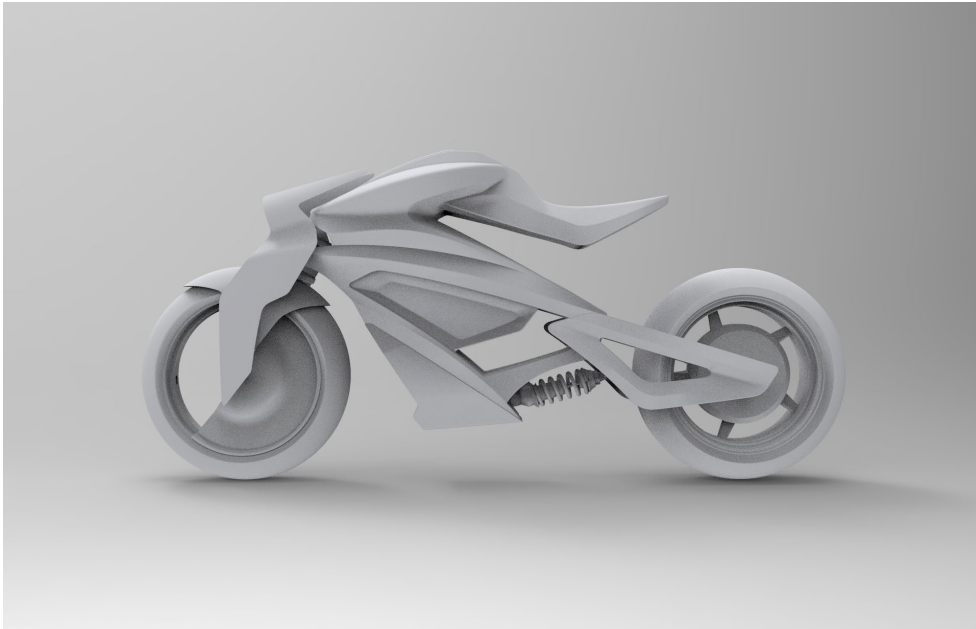
	Concept 1	Concept 2	Concept 3
Sculpted	6.3	5.8	7.7
Detailed	5.1	7.5	5.6
Overall Appeal	5.8	6.7	7.6
Total	17.2	20	20.9

Concept 3 received the highest score hence concept 3 is taken forward and developed digitally in CAID Software.

9

Digital Development





Final Renders



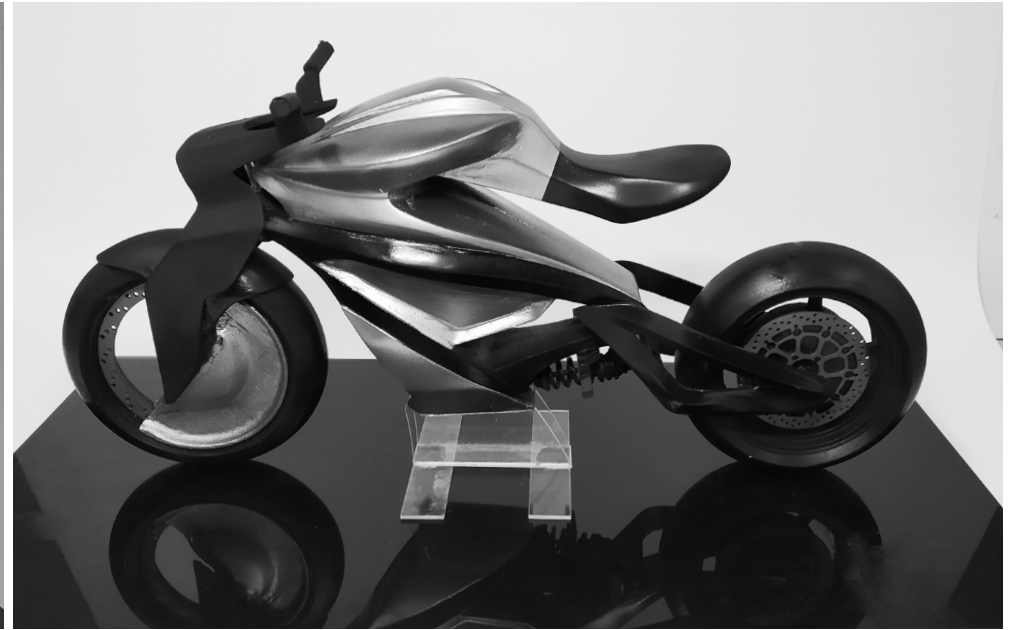






10

Physical Model



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