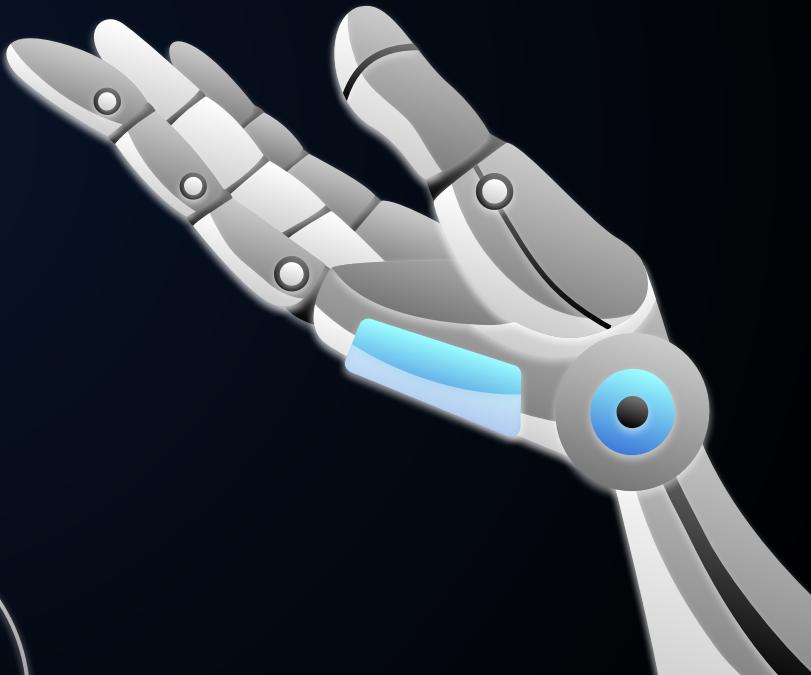
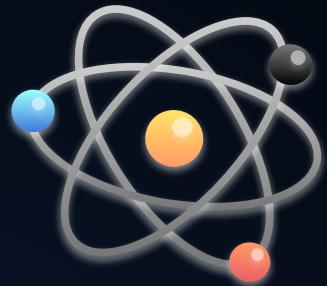


HUMANOID ROBOT

By : Muhammad Akmal Nasrullah Bin
Jamalludin (1917137)



Contents



Introduction



History &
Application



Main
Components



01

Introduction

Introduction

A humanoid robot is a type of robot that is designed to resemble and interact with humans in term of physical appearance, behavior, and capabilities.

The word “humanoid” implies that the robot has characteristics or features similar to those of a human being.

They were equipped with various sensors, actuators and artificial intelligence technologies to perceive and interact with their environment





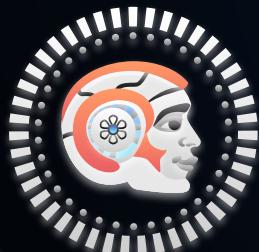
02

History & Applications

HISTORY

Ancient to 19th Century civilizations, such as ancient Egypt and Greece, had mythical tales of automata, humanoid-like machines.

Early Concepts and Automata



WABOT



Early Industrial Age

In the late 19th century, the term "robot" was coined by Czech writer Karel Čapek in his play "R.U.R. (Rossum's Universal Robots)" (1920).

The WABOT-1 (WAseda roBOT-1), developed in Japan in 1973, was one of the earliest humanoid robots. It had the ability to walk, manipulate objects, and communicate through speech recognition and synthesis.

HISTORY

ASIMO (Advanced Step in Innovative Mobility), developed by Honda, made its debut in 2000. It became one of the most famous humanoid robots, known for its bipedal walking, dexterity, and interaction capabilities.

Companies like Softbank Robotics have developed robots like Pepper, designed for human interaction in various settings.

Honda's ASIMO



Recent Advancements



Boston Dynamics and Advanced Humanoid Robots

Boston Dynamics, a robotics company, developed several advanced humanoid and bipedal robots, including PETMAN, Atlas, and Spot. These robots showcased impressive mobility, agility, and balance.



APPLICATIONS



01

PERSONAL ASSISTANCE

assist individuals with daily tasks such as household chores

02

HEALTHCARE

utilized in healthcare settings to provide companionship to patients

03

EDUCATION

serve as educational tools, assisting in teaching various subjects, languages, or skills

04

CUSTOMER SERVICES

act as customer service representatives, providing information, guiding customers, and assisting with transactions.

APPLICATIONS



05

ENTERTAINMENT

used for entertainment purposes, such as performing shows

06

RESEARCH & DEVELOPMENT

Employed in research laboratories to study human-like movement, cognition, and social interaction

07

SOCIAL COMPANIONSHIP

provide social companionship, engaging in conversations and recognizing emotions



03

Main Components

MAIN COMPONENTS



Frame &
Design



Propulsion
System



Navigation
& Control
System



Data
Collection

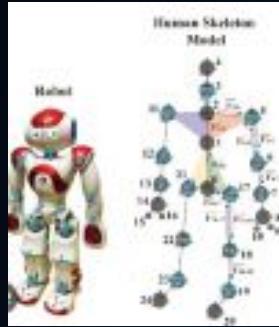


Data
Transmission



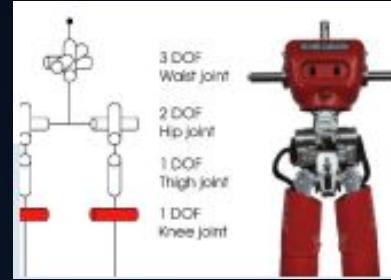
Power
Management

i. FRAME & DESIGN



1. Structural Frame

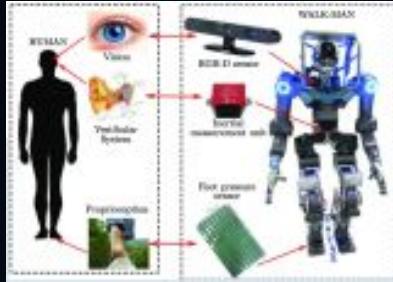
- provides support and stability to the overall robot's body.
- It is usually made of lightweight and rigid materials such as aluminum, carbon fiber composites, or high-strength plastics.
- The frame is designed to withstand the loads and forces generated during movements and interactions



2. Joints & Actuators

- Humanoid robots have multiple joints, allowing them to achieve a range of movements and postures similar to Humans.
- Joints are usually actuated by motors, hydraulic systems, or pneumatic systems to provide the necessary force and flexibility.

i. FRAME & DESIGN



3. Sensory Integration

- incorporate various sensors throughout their body which include cameras, depth sensors, touch sensors, force sensors, accelerometers, and gyroscopes.
- The design of the frame and hull takes into account the optimal placement of sensors to enable effective perception and feedback.



4. Ergonomics & Anthromorphism

- Humanoid robots strive to mimic human form and movement, which involves considering anthromorphic proportions and ergonomics in their design.
- The frame and hull are designed to resemble human body segments, with considerations for limb length, joint placement, and range of motion.

ii. PROPULSION SYSTEM

Electric Motors

provide rotational motion and actuation for the robot's joints, enabling it to walk, grasp objects, and perform various movements.

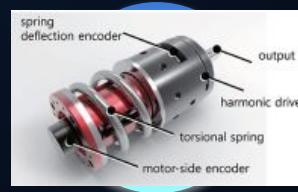


Hydraulic Systems

used in robots designed for heavy lifting or demanding tasks.

Pneumatic Systems

Use compressed air or gas, can provide fast and responsive actuation for humanoid robots.



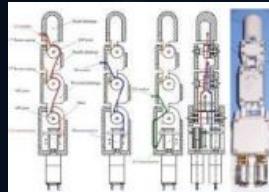
Series Elastic Actuators

incorporate elastic elements between the motor and the joint to provide compliant and force-controlled movement.

ii. PROPULSION SYSTEM

Tendon Drive Systems

utilize cables or tendons connected to the robot's joints and driven by motors or actuators

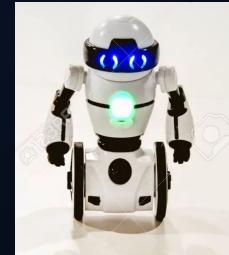


Hybrid

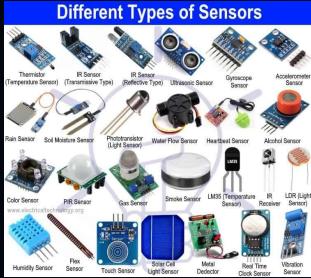
combine multiple propulsion systems to achieve versatile and adaptive locomotion

Wheeled/Legged

- Wheeled systems, often combined with stabilizing mechanisms, allow for efficient movement on flat surfaces.
- Legged systems, resembling human or animal legs, enable the robot to traverse diverse terrains and navigate obstacles.

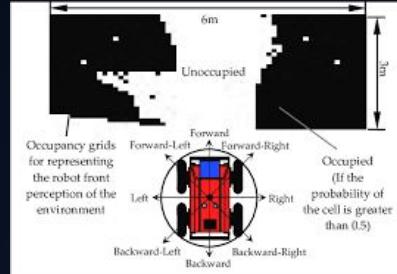


iii. NAVIGATION & CONTROL SYSTEM



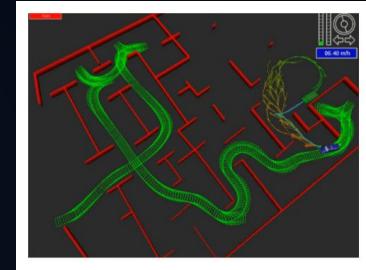
1. Sensors

sensors provide information about the robot's position, orientation, distance to object, and obstacle detection



2. Perception & Mapping

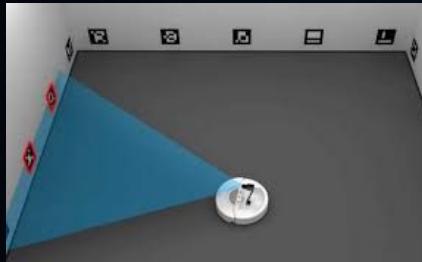
creating a map of the surroundings, identifying objects, and estimating their positions and distances. Advanced perception algorithms, such as simultaneous localization and mapping (SLAM)



3. Path Planning

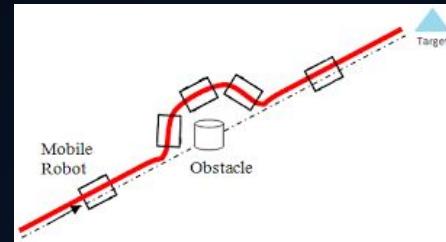
Path planning algorithms take into account obstacles, the robot's physical capabilities, and any constraints or objectives specified by the task at hand.

iii. NAVIGATION & CONTROL SYSTEM



4. Localization

This is often done by comparing the sensor data to the map and estimating the robot's pose (position and orientation) relative to the map.



5. Obstacle Avoidance

The navigation system continuously monitors the environment and uses the sensor data to detect obstacles.

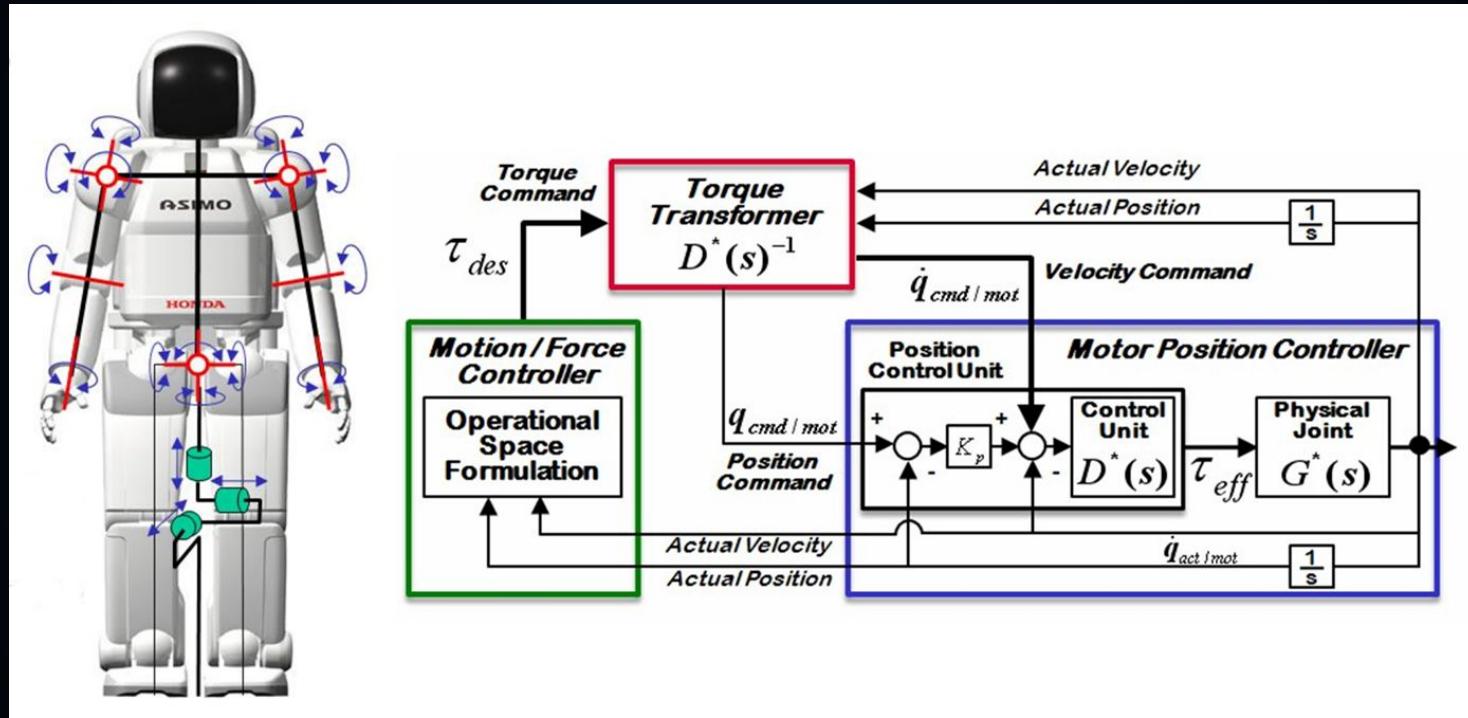
Algorithms like potential field methods or artificial potential fields are commonly used to plan robot movements.



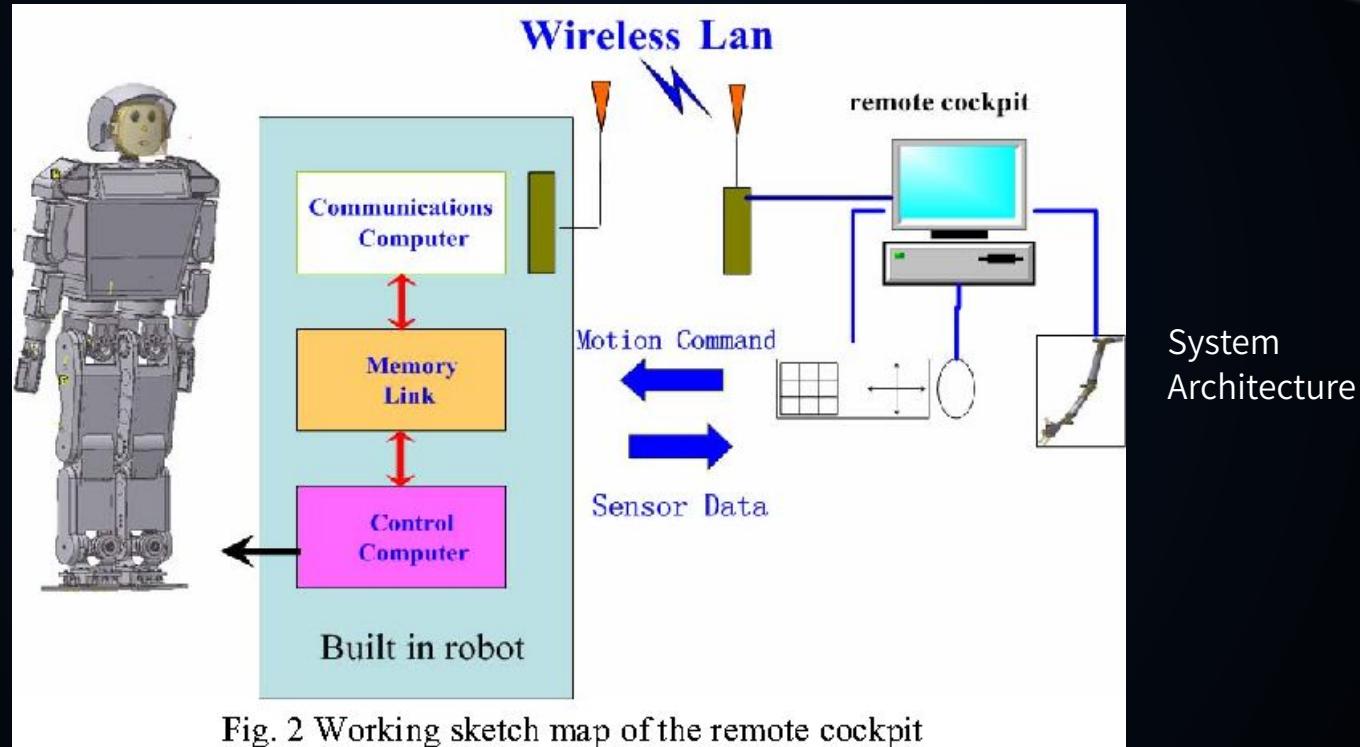
6. Human-Robot Interaction

This involves recognizing and responding to human commands, following gestures, or adapting the robot's behavior based on social cues from humans in the environment.

iii. NAVIGATION & CONTROL SYSTEM



iii. NAVIGATION & CONTROL SYSTEM



iv. DATA COLLECTION

HARDWARE



SENSORS

1. Cameras
2. IMUs
3. LiDAR
4. Ultrasonics sensor
5. Force/Torque sensor
6. Tactile sensor
7. Proximity Sensor
8. Joint Encoders
9. Microphones



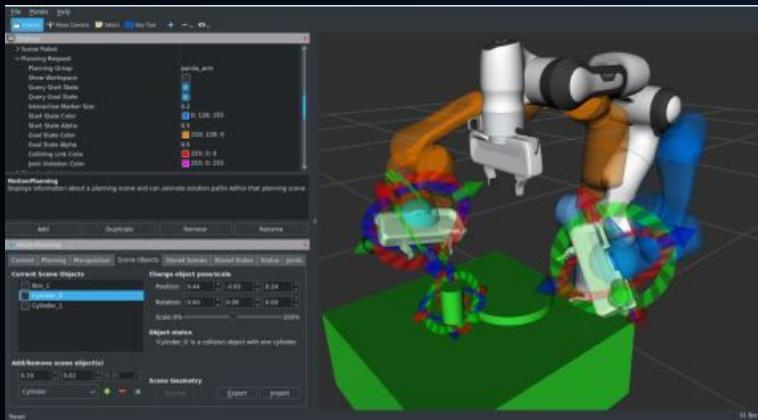
ACTUATORS

1. Electric Motors
2. Hydraulic Actuators
3. Pneumatic Actuators
4. Series Elastic Actuators (SEA)
5. Tendon Drives
6. Grippers/End Effectors
7. Walking Mechanisms

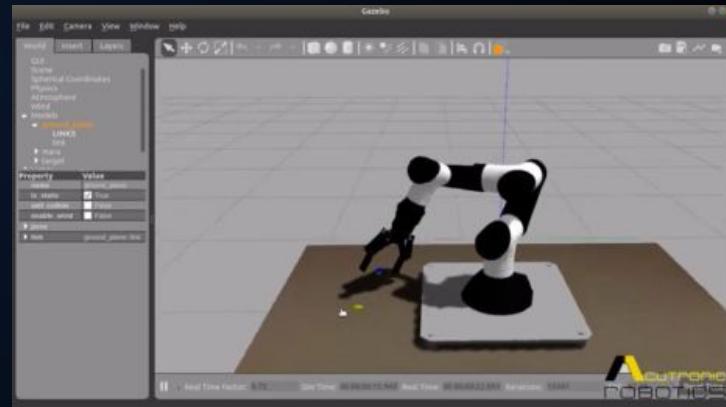
SOFTWARE

iv. DATA COLLECTION

MOVEIT



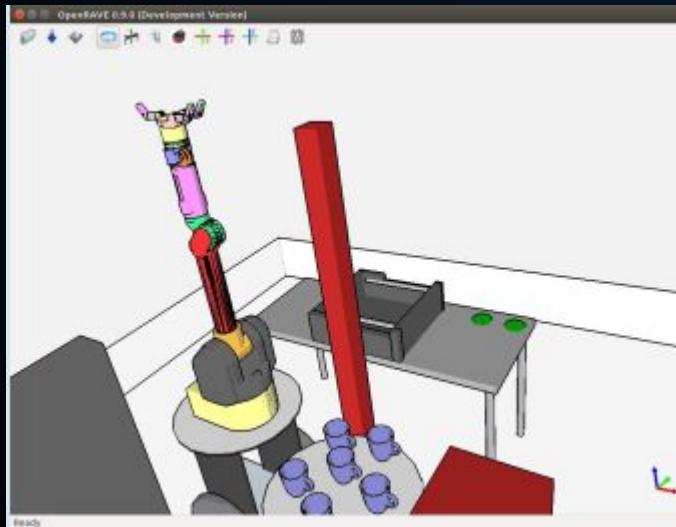
GAZEBO



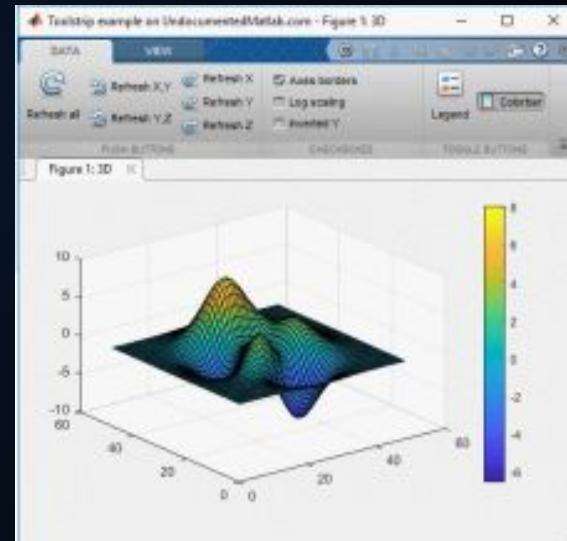
SOFTWARE

iv. DATA COLLECTION

OPENRAVE



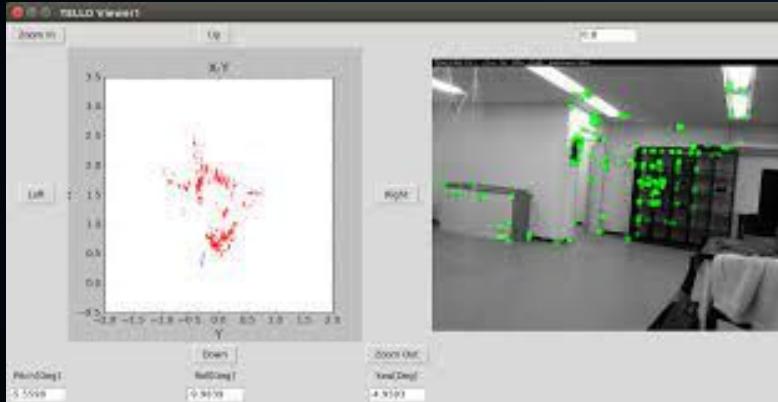
MATLAB/SIMULINK



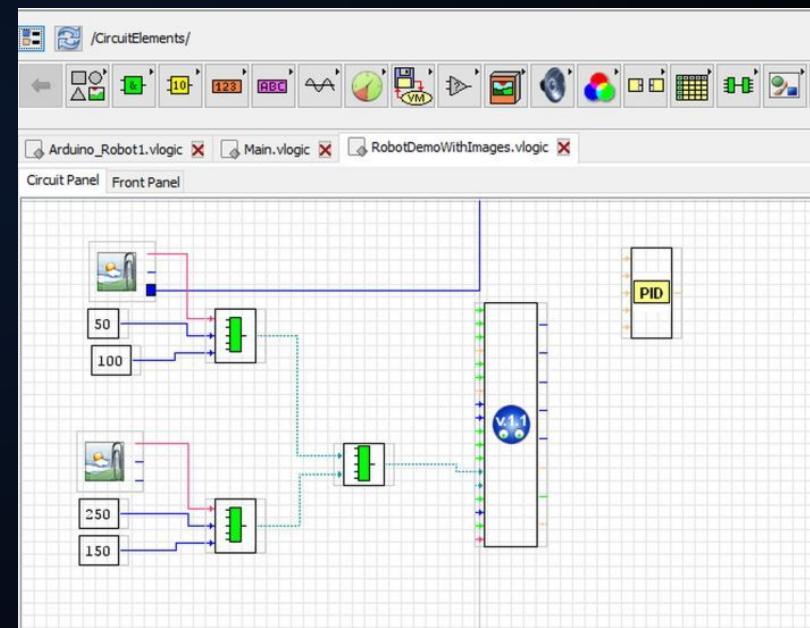
SOFTWARE

iv. DATA COLLECTION

SLAM



LABVIEW



v. DATA TRANSMISSION

Ethernet



USB



WIFI



RS-232



v. DATA TRANSMISSION

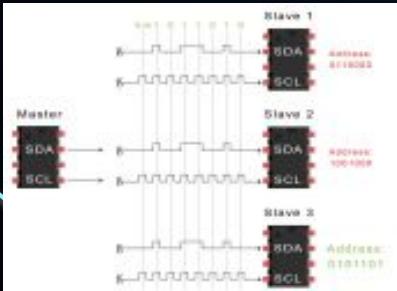
Zigbee



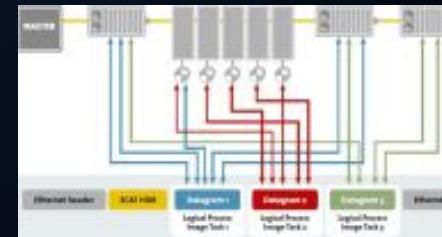
Radio Frequency



I2C



CAN



EtherCAT

vi. POWER MANAGEMENT



01

Battery Power Management

regulated the charging and discharging of batteries to ensure optimal performance

02

Power Saving Techniques

utilize sleep or idle modes for subsystems that are not actively performing tasks

03

Power Distribution & Regulation

PDUs distribute power from main source to various subsystems and components of the humanoid robot.

04

Energy Harvesting

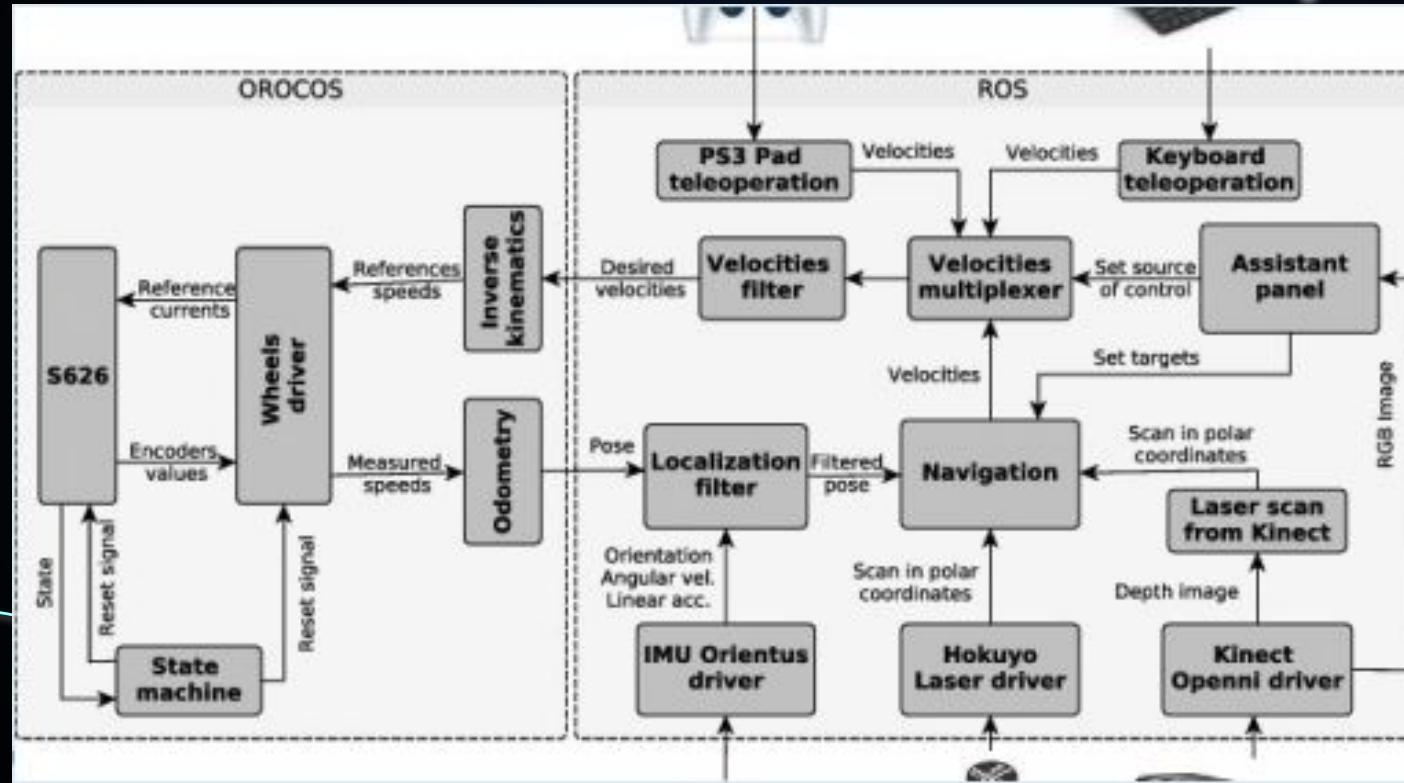
providing a renewable and continuous power source

05

Charging and Docking Stations

provide a convenient and automated way for robots to recharge their batteries when they are not actively performing tasks

vi. POWER MANAGEMENT



Complete
Humanoid Robot
System Architecture

CONTENTS OF THIS TEMPLATE

This is a slide structure based on a pitch deck

You can delete this slide when you're done editing the presentation

Fonts	To view this template correctly in PowerPoint, download and install the fonts we used
Used and alternative resources	An assortment of graphic resources that are suitable for use in this presentation
Thanks slide	You must keep it so that proper credits for our design are given
Colors	All the colors used in this presentation
Infographic resources	These can be used in the template, and their size and color can be edited
Customizable icons	They are sorted by theme so you can use them in all kinds of presentations

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TABLE OF CONTENTS



01

PROBLEM VS
SOLUTION

You can describe the
topic of the section
here

02

PRODUCT
OVERVIEW

You can describe the
topic of the section
here

03

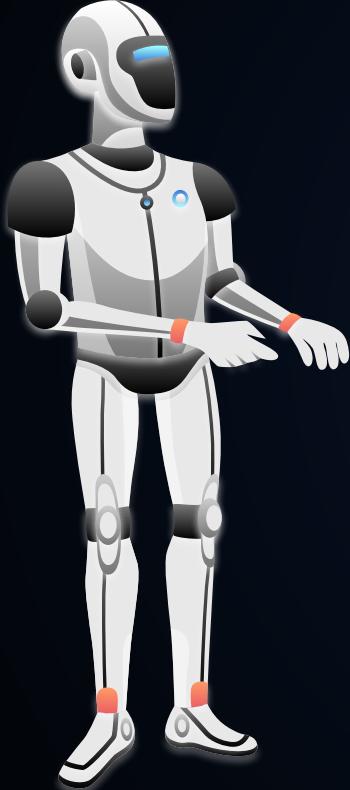
MARKET &
COMPETITION

You can describe the
topic of the section
here

04

BUSINESS
MODEL

You can describe the
topic of the section
here



INTRODUCTION

You can give a brief description of the topic you want to talk about here. For example, if you want to talk about Mercury, you can say that it's the smallest planet in the entire Solar System

OUR TEAM



JOHN SMITH

You can speak a bit about
this person here



ANNA BATES

You can speak a bit about
this person here



TIM PATTERSON

You can speak a bit about
this person here

PROBLEM

Do you know what helps you make your point clear?

Lists like this one:

- They're simple
- You can organize your ideas clearly
- You'll never forget to buy milk!

And the most important thing: the audience won't miss the point of your presentation



SWOT ANALYSIS

STRENGTHS

Mercury is the closest planet to the Sun and the smallest of them all



OPPORTUNITIES

Venus has a beautiful name and is the second planet from the Sun



WEAKNESSES

Earth is the third planet from the Sun and the only one that harbors life



THREATS

Mars is full of iron oxide dust, which gives the planet its reddish cast



THEM VS US



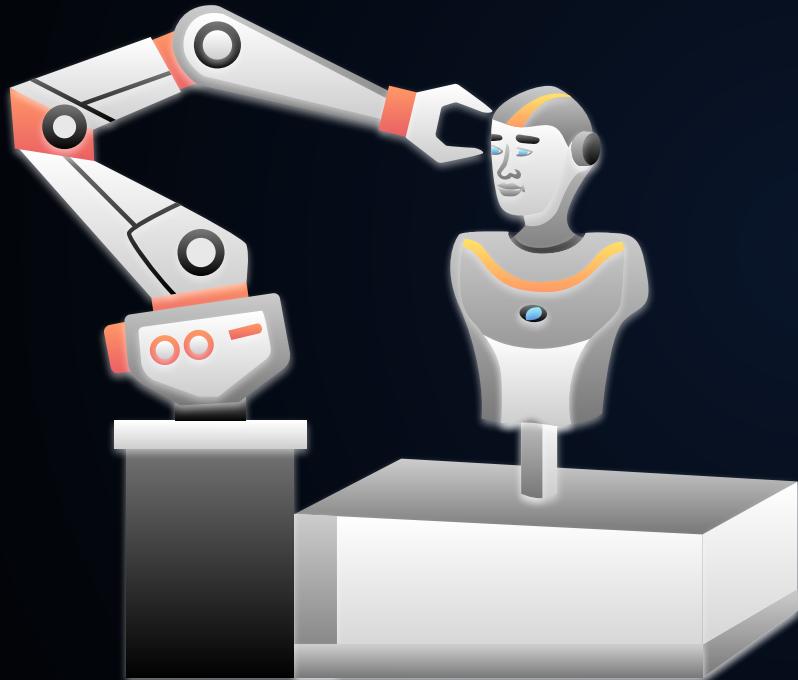
THEM

Earth is the third planet from the Sun and the only one that harbors life in the Solar System. This is where we all live on



US

Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's only a bit larger than the Moon



“This is a quote, words full of wisdom that someone important said and can make the reader get inspired.”

—SOMEONE FAMOUS

OUR PLANS



\$175

STANDARD

Jupiter is the biggest planet
in the Solar System



\$250

BUSINESS

Earth is the beautiful planet
where we all live on



\$320

PROFESSIONAL

Mercury is the smallest
planet of them all

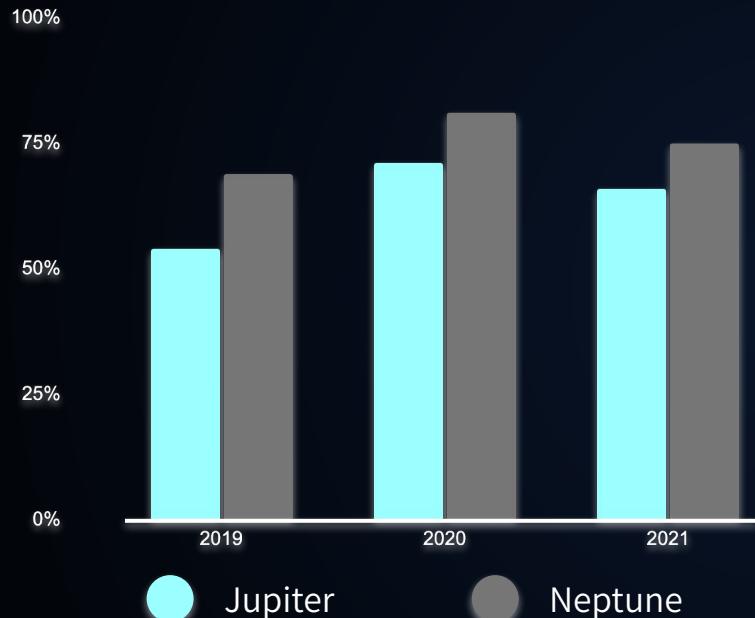
HUMANOID ROBOT PRODUCT DEMO



You can replace the image on the screen with your own work. Just right-click on it and select “Replace image”



OUR TRACTION



\$960,700

Average revenue in 2022

~1,380

Registered businesses

\$220

Average user savings per deal

Follow the link in the graph to modify its data and then paste the new one here. For more info, [click here](#)

AWSOME WORDS



CASE STUDY

Neptune is the fourth-largest planet in the Solar System

Jupiter is the biggest planet in the entire Solar System

CHALLENGE

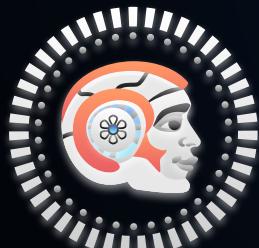


SOLUTION



RESULTS

Saturn is the second-largest planet in the Solar System



REVIEWS



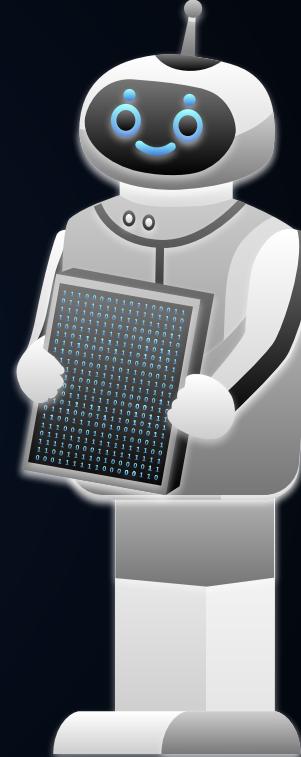
“Earth is the third planet from the Sun and the only one that harbors life in the Solar System”

—JENNA DOE



“Neptune is the farthest planet from the Sun and the fourth-largest in the Solar System”

—TIMMY JIMMY

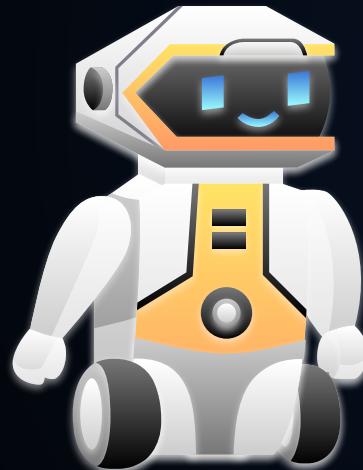


ED TO LANDING PAD



A PICTURE IS WORTH A THOUSAND WORDS

AWARDS



MARS

Mars is full of iron oxide dust, which gives the planet its reddish cast



EARTH

Earth is the third planet from the Sun and the only one that harbors life



JUPITER

Jupiter is a gas giant and the biggest planet in the Solar System

MARKET SIZE



NEPTUNE

Neptune is the fourth-largest planet in the Solar System



SATURN

Saturn is the second-largest planet in the Solar System

TARGET

GENDER



45%

Men



33%

Women



12%

Other

AGE RANGE

21-35



62%

36-50



45%

51-65



17%

HOBBIES



Neptune is the
farthest planet
from the Sun



Despite being
red, Mars is a
cold place



Earth is the
planet where
we all live on

COMPETITOR ANALYSIS

COMPETITORS

COMPANY 1

- Pluto is considered a dwarf planet
- Mercury is a very small planet



COMPANY 2

- Neptune is very far away from the Sun
- Despite being red, Mars is very cold



COMPANY 3

- Ceres is in the main asteroid belt
- Earth is the planet that harbors life



COMPANY 4

- Jupiter is the biggest planet
- Saturn is a gas giant and has rings





387,821

Big numbers catch your audience's attention



BUSINESS MODEL



MARKETING	TRAINING	ASSESSMENT	TECHNOLOGY
Mercury is the closest planet to the Sun and the smallest one	Earth is the third planet from the Sun and harbors life	Jupiter is a gas giant and the biggest planet in the Solar System	Saturn is composed mostly of hydrogen and helium
Venus is very hot	Mars is very cold	Saturn has rings	Pluto is a dwarf planet

TO REINFORCE THE CONCEPT, TRY USING AN IMAGE

Images reveal large amounts of data, so remember: use an image instead of a long text. Your audience will appreciate it



TIMING

PHASE 1



SATURN

Saturn is a gas giant
and has several rings

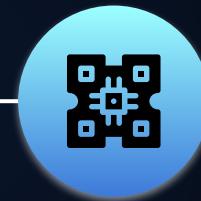
PHASE 2



NEPTUNE

Neptune is very far
away from the Sun

PHASE 3



MARS

Despite being red,
Mars is a cold place

PHASE 4



EARTH

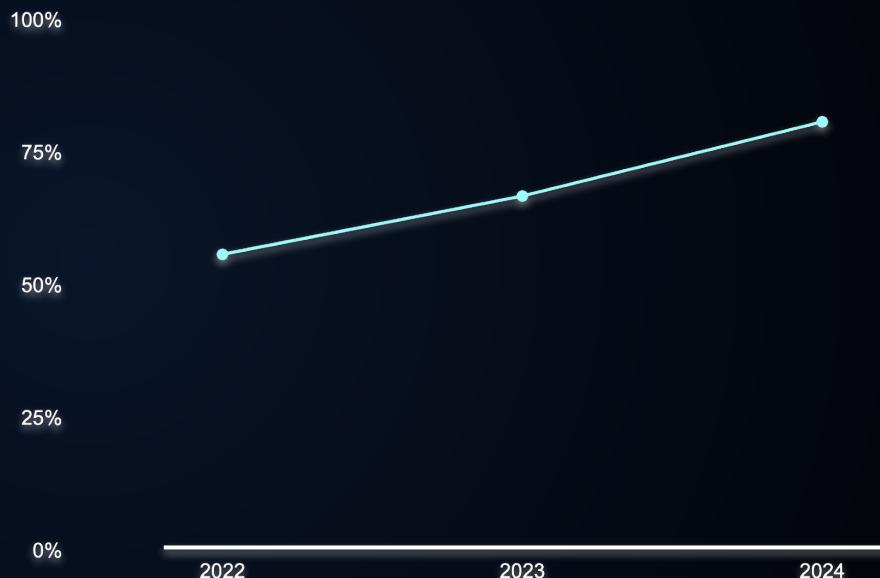
Earth is the planet
where we all live on

PREDICTED GROWTH



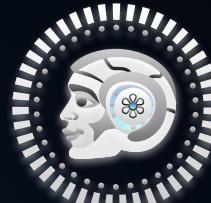
56% to 81%
2022 - 2024

Neptune is the farthest planet from the Sun. It's also the fourth-largest by diameter in the Solar System



Follow the link in the graph to modify its data and then paste the new one here. For more info, [click here](#)

INVESTMENT



28%

MARS

Despite being red, Mars
is actually a cold place

19%

EARTH

Earth is the only planet
that harbors life

21%

SATURN

Saturn is a gas giant
and has several rings

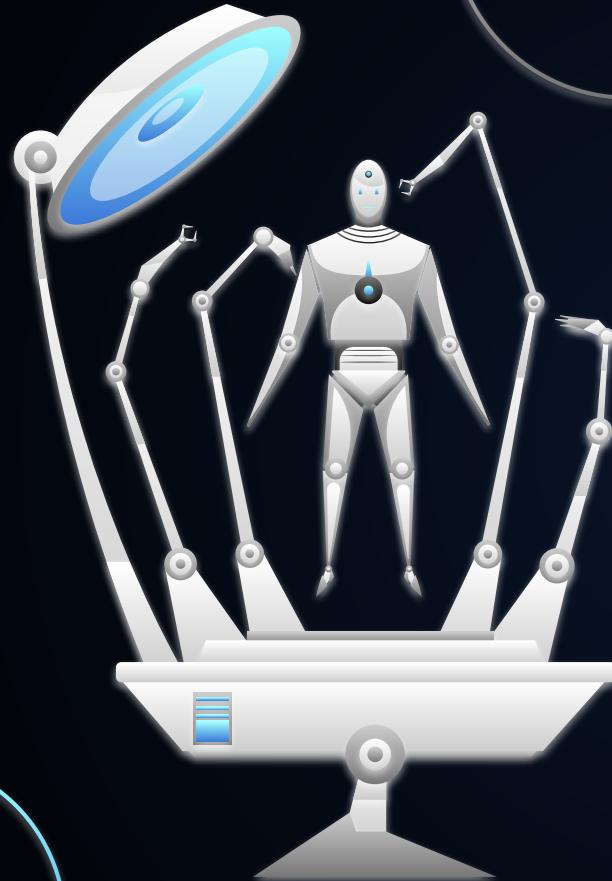
32%

VENUS

Venus is the second
planet from the Sun



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Do you have any questions?

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ICON PACK

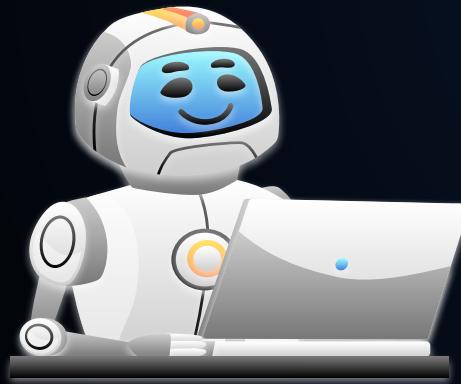


ALTERNATIVE RESOURCES

Here's an assortment of alternative resources whose style fits that of this template:

VECTORS

- Realistic robots collection



RESOURCES

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Get them for free at our other websites:

VECTORS

- Realistic robots collection
- Artificial intelligence design concept with medical robot for surgery operation android scientists and surgeons

ICONS

- Robotics icon pack | Filled

PHOTOS

- Business people in conference room
- Close up on young businesswoman
- Male technician repairing computer motherboard on wooden desk
- Woman working on digital monitors
- Woman working on digital monitors I



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(<https://fonts.google.com/specimen/Assistant>)

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#767676

#9cffff

#ea5e64

#ffe366

#ff9966

#3c78d8

Storyset

Create your Story with our illustrated concepts. Choose the style you like the most, edit its colors, pick the background and layers you want to show and bring them to life with the animator panel! It will boost your presentation. Check out how it works.



Pana



Amico



Bro



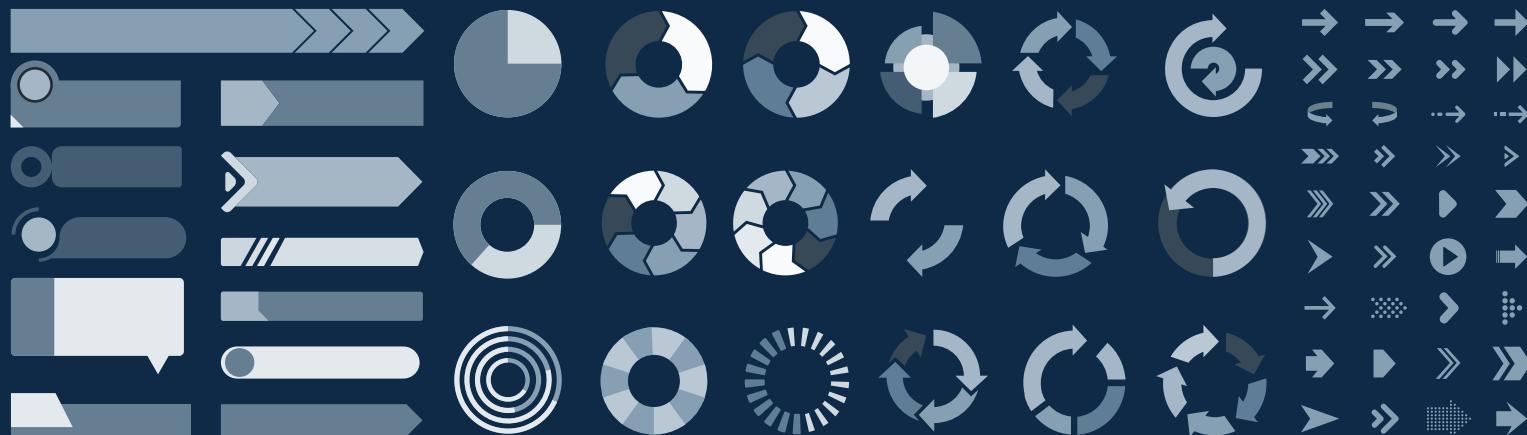
Rafiki



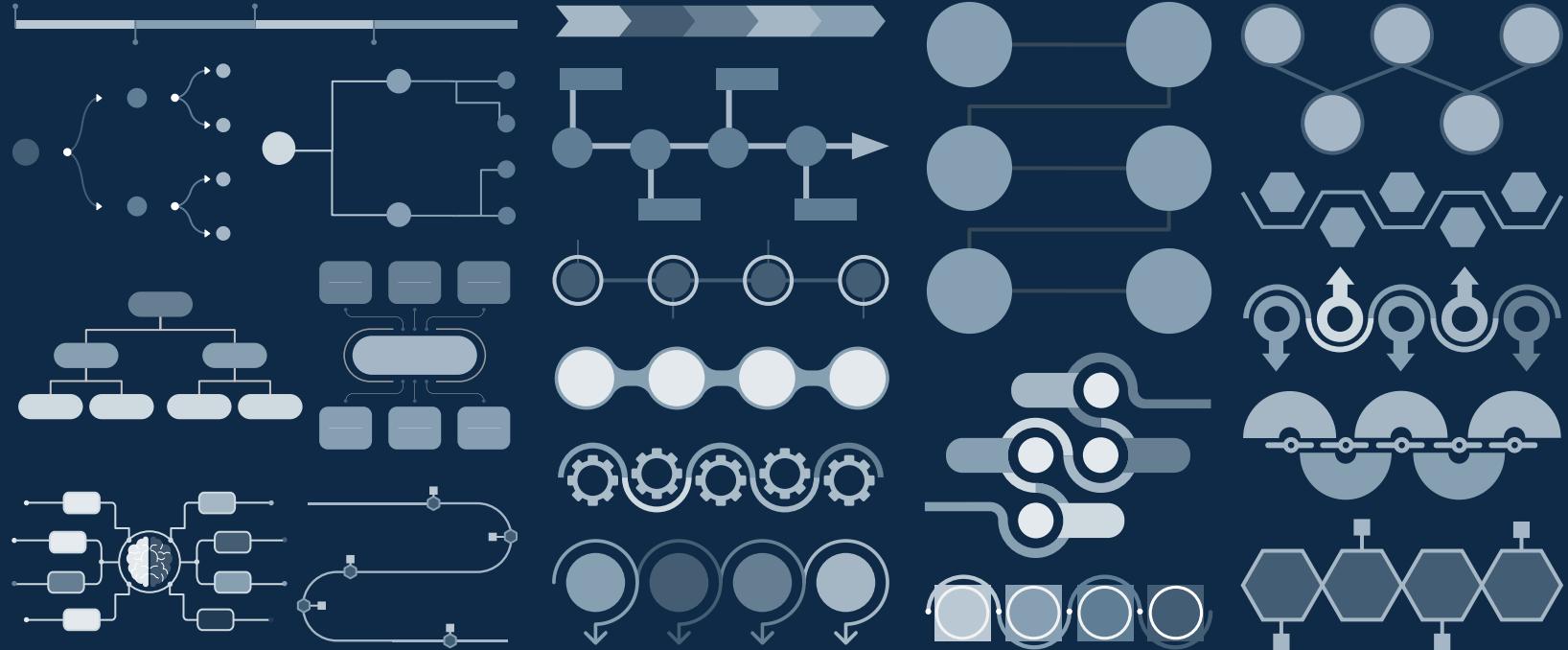
Cuate

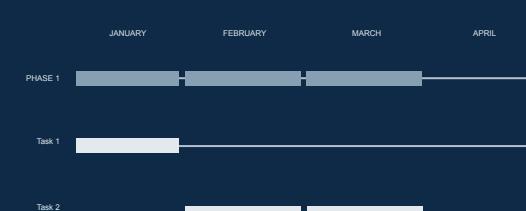
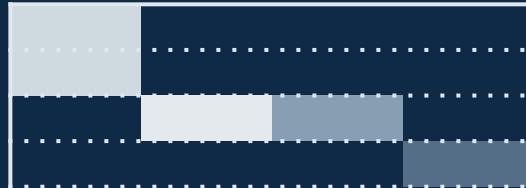
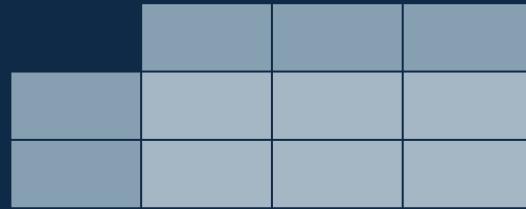
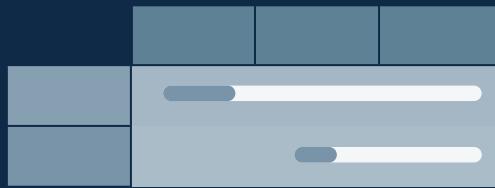
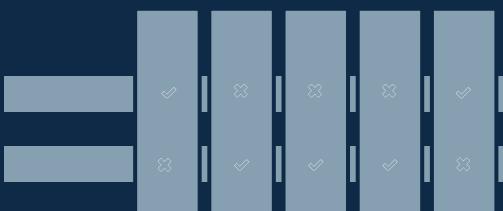
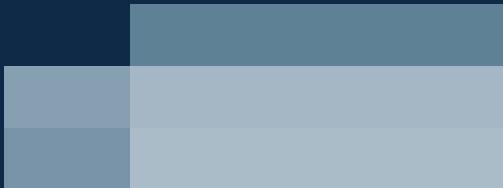
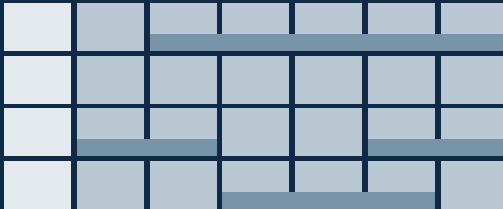
Use our editable graphic resources...

You can easily resize these resources without losing quality. To change the color, just ungroup the resource and click on the object you want to change. Then, click on the paint bucket and select the color you want. Group the resource again when you're done. You can also look for more infographics on Slidesgo.

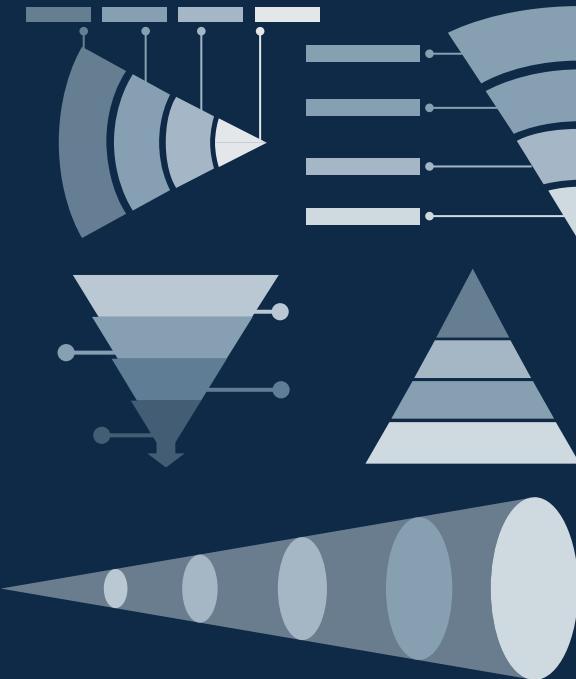
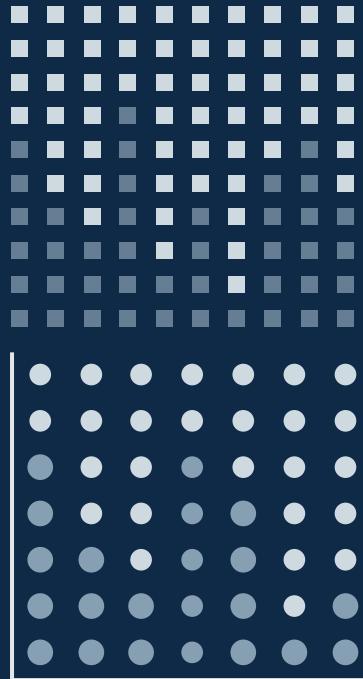












...and our sets of editable icons

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You can change the stroke and fill color; just select the icon and click on the paint bucket/pen.

In Google Slides, you can also use Flaticon's extension, allowing you to customize and add even more icons.



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Medical Icons



Business Icons



Teamwork Icons



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Avatar Icons



Creative Process Icons



Performing Arts Icons



Nature Icons



SEO & Marketing Icons



