

# INTERACTIVE DIRECTION GIVING AGENT

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# INTRODUCTION

TO  
↑

## DIFFICULT TASK

Direction giving is a difficult task because of the ambiguity and versatility of the real world.

## COMPREHENSION ISSUES

Incomprehension are common and even more with synthetic voices. They often lead to a failure in the task in case of direction giving agent and need to be corrected

## MAPS CAN BE MISLEADING

Maps can be difficult to read on a small screen and even dangerous if the user need to interact with it

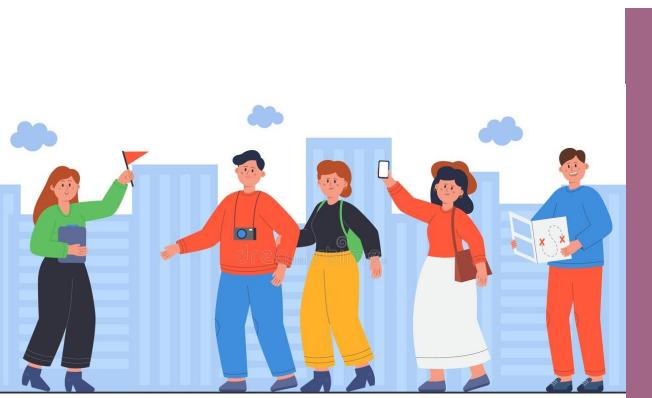
## ENJOYABLE CONVERSATIONS

Most of the people don't enjoy looking at virtual map. Some have a preference for asking for indications. What if they could use the data of a map and at the same time enjoy an interaction with a conversational agent?

# RESEARCH QUESTIONS

## RESEARCH QUESTION 1

What grounding strategies do humans use to improve direction giving efficiency?



## RESEARCH QUESTION 2

Can grounding strategies in a direction giving agent replace the use of a map?

# HUMAN-HUMAN CORPUS



02

## 2. HUMAN-HUMAN CORPUS

# DATA COLLECTION

Participants:

6 couples

ENS students

7 males and 5 females

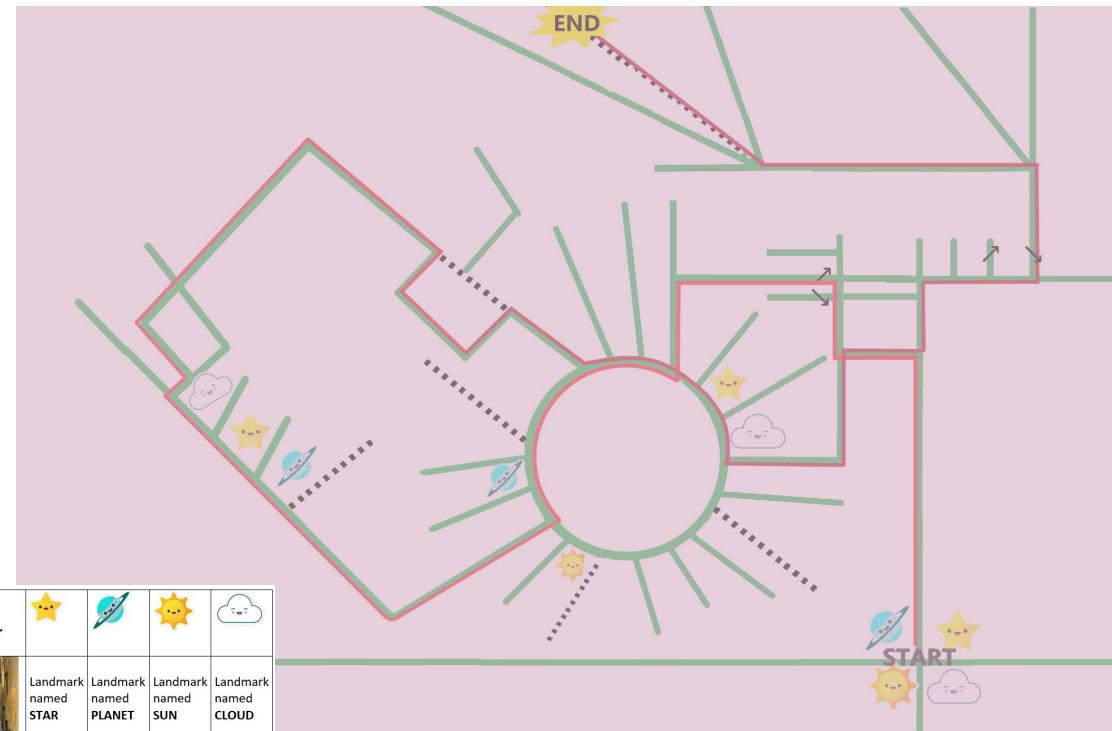
5 different L1s, fluent

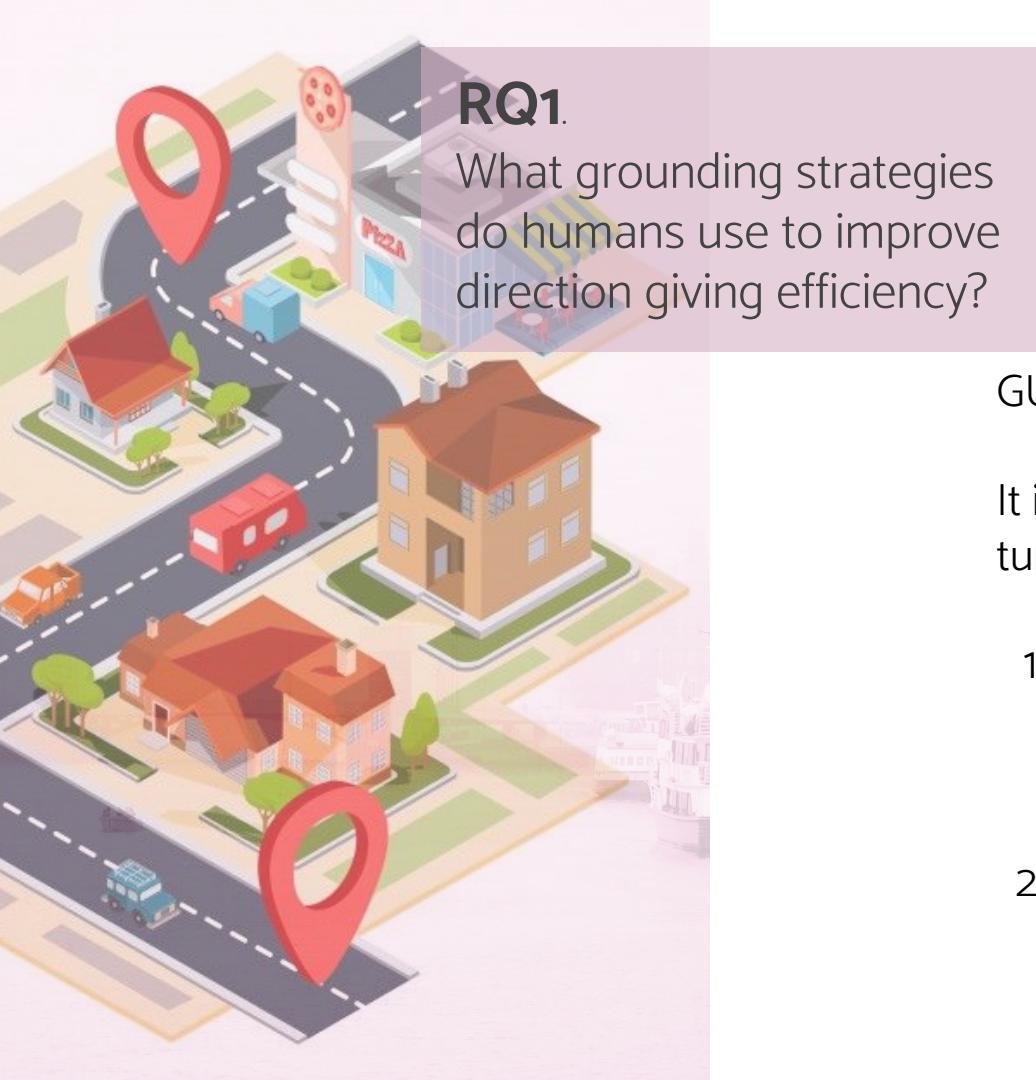
English L2

1 Direction giver

1 Direction taker

				Landmark named STAR	Landmark named PLANET	Landmark named SUN	Landmark named CLOUD





## 2. HUMAN-HUMAN CORPUS

### RQ1.

What grounding strategies do humans use to improve direction giving efficiency?

## FINDINGS

### GUIDEES

It is very rare that direction-takers don't take a turn after the new direction is given.

1. When understanding:
  - backchannels
  - repetition of the information
  
2. When not understanding or unsure:
  - rephrasing
  - ask for further information.



## 2. HUMAN-HUMAN CORPUS

### RQ1.

What grounding strategies do humans use to improve direction giving efficiency?

## FINDINGS

GUIDES

|

# AGENT DESIGN



30

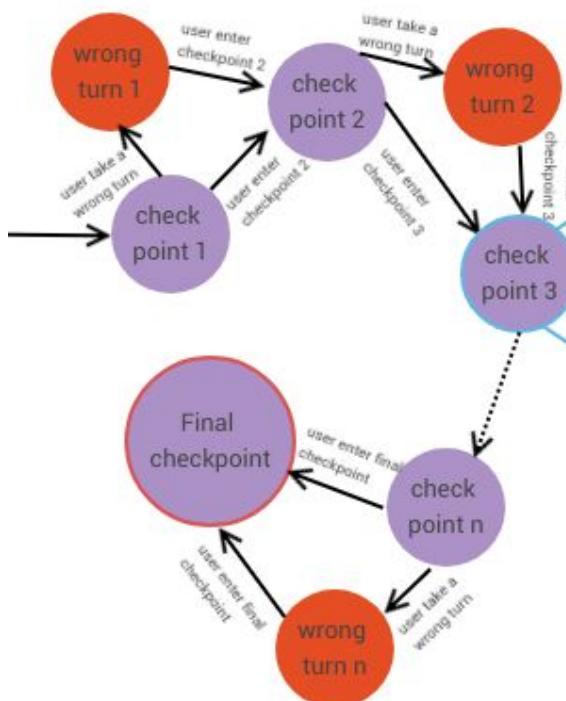
### 3. AGENT DESIGN

## INSTRUCTION DESIGN

2 versions for each instruction :

- Simple version  
(first input of the participants)

- Complex version  
(inferred from the corpus)



**Enter state :**

Agent : Simple instruction

**User ask for reformulation :**

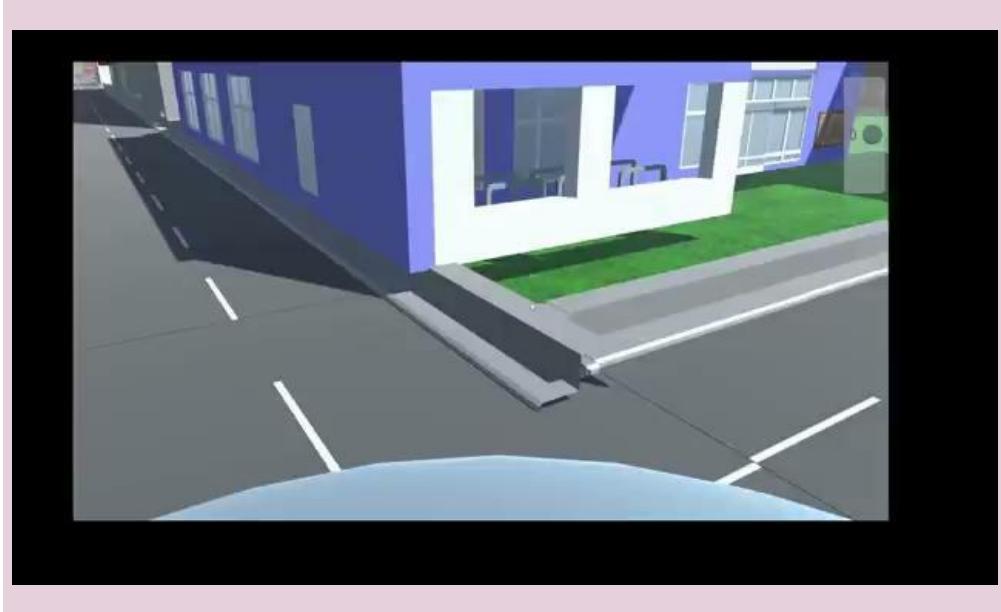
Agent : Complex instruction

**User perform a backchannel :**

Agent : Backchannel

## IMPLEMENTATION

- Unity Game engine and Microsoft Azure
- No language understanding module  
(list of possible backchannels inferred from the corpus)



# USER STUDY

Go

Ok



04

## 4. USER STUDY

### 1. PRE-QUESTIONNAIRE

- Sex
- Relationship with assistants (frequency, liking, usefulness)
- Familiarity with videogames

### 2. SIMULATION

- 10 participants
- 2 conditions
- trial
- instructions (get the coins, reach the end quickly, voice and map)

### 3. POST-QUESTIONNAIRE

- Perception of the interaction
- Perception of the agent
- Open feedback

# CONTROL VARIABLES

## VIDEO GAME ABILITY



- May have an impact on the command use
- Significantly unequally distributed across conditions

## SEX



- May have an impact on navigation
- Equally distributed across conditions

## 4. USER STUDY

### ASSISTANT PERCEPTION



- May have an impact on the agent use
- Significantly unequally distributed across conditions

## RQ2

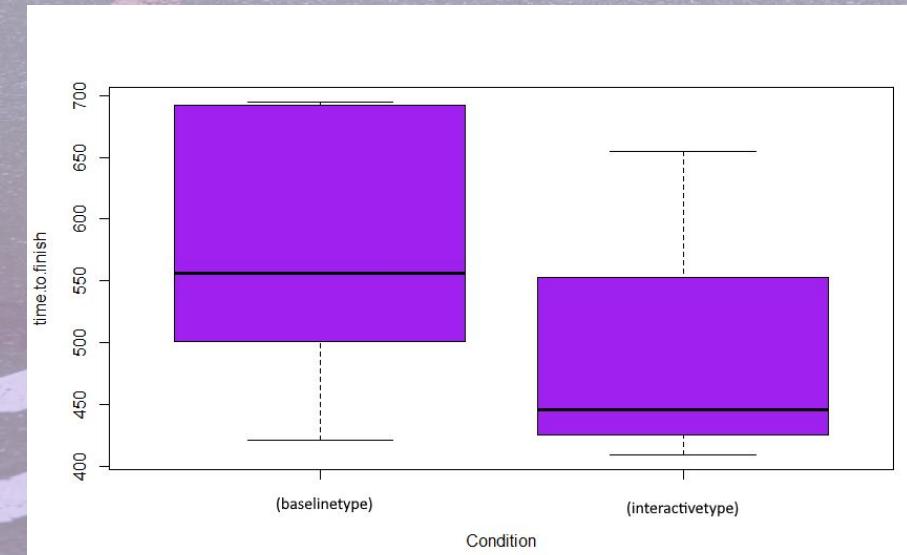
Can grounding strategies  
in a direction giving agent  
replace the use of a map ?

## EFFICIENCY : TIME

- Linear regression to take controls into account
- interactive condition 100s faster than baseline
- no significant effect ( $p=0,4$ )

## 4. USER STUDY

**H1 :** The interactive condition is **more efficient** than the baseline condition.



## RQ2

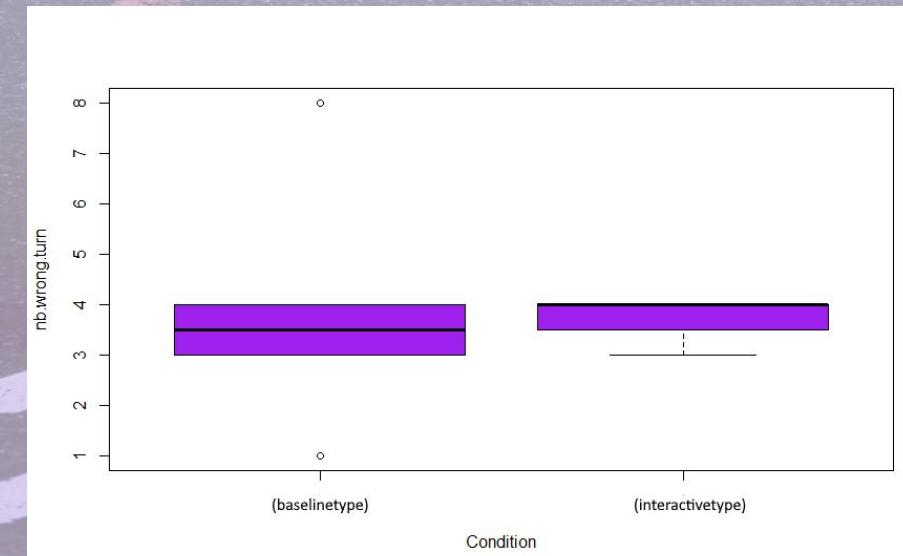
Can grounding strategies  
in a direction giving agent  
replace the use of a map ?

## EFFICIENCY : WRONG TURNS

- Linear regression to take controls into account
- interactive condition : -0,16 ( $p=0,91$ )
- significant videogame ability effect : -0,79 ( $p=0,1$ )

## 4. USER STUDY

**H1 :** The interactive condition is **more efficient** than the baseline condition



## RQ2

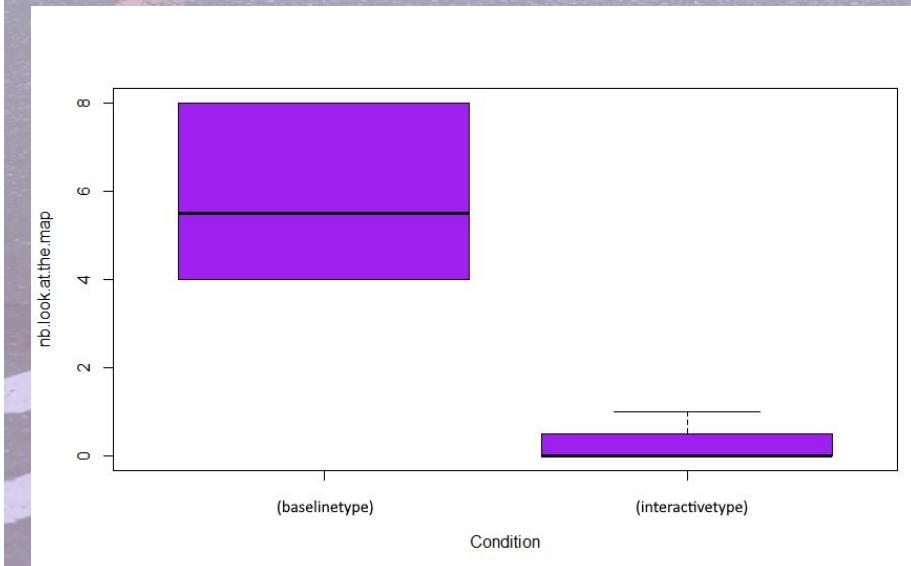
Can grounding strategies  
in a direction giving agent  
replace the use of a map ?

## EFFICIENCY : LOOK AT THE MAP

- Linear regression to take controls into account
- significant interactive condition effect : -5,75 ( $p=0,01$ )

## 4. USER STUDY

**H1 :** The interactive condition is **more efficient** than the baseline condition



## RQ2.

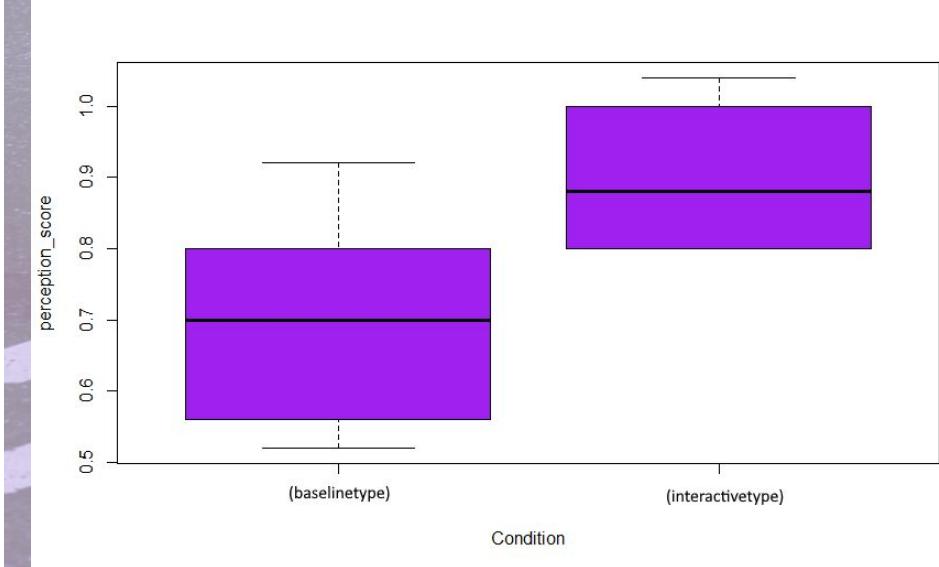
Can grounding strategies  
in a direction giving agent  
replace the use of a map ?

## PERCEPTION :

- Linear regression to take controls into account
- significant interactive condition effect : 0,37 ( $p=0,007$ )

## 4. USER STUDY

**H2 :** The interactive condition is **better perceived** than the baseline condition



SO



## 5. CONCLUSION

# RESEARCH QUESTIONS

### RESEARCH QUESTION 1

What grounding strategies do humans use to improve direction giving efficiency?



### RESEARCH QUESTION 2

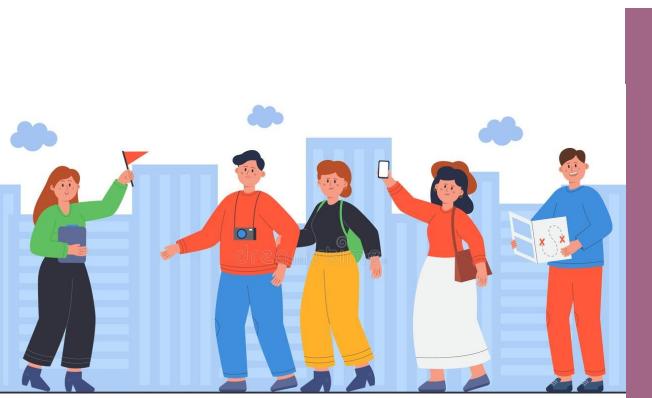
Can grounding strategies in a direction giving agent replace the use of a map?

# RESEARCH QUESTIONS

## 5. CONCLUSION

### RESEARCH QUESTION 1

What grounding strategies do humans use to improve direction giving efficiency?



- Guidee :
  - Signal understanding
  - Ask for further instructions
- Guide :
  - Reformulate instructions

## 5. CONCLUSION

- Interactive agent is **perceived significantly better** than a map based application
- Interactive agent **seems to be more efficient** than a map based application
  - » need a bigger user study



## RESEARCH QUESTION 2

Can grounding strategies in a direction giving agent replace the use of a map?

# RESEARCH QUESTIONS

## 5. CONCLUSION

### LIMITATIONS

- Size of the user study
- Bugs in the program that should have been corrected with a pre-run
- Simplification of the strategies and no ability to answer precise questions

### FUTURE WORKS

- Take the frequency of backchannels into account
- Add a language understanding module
- Bigger user study

# QUESTIONS TIME!



## POSSIBLE DISCUSSION TOPIC :

- Do you think that interacting with a direction-giving conversational agent could someday be a similar experience to asking directions to a person in the street?
- Do you think you would personally use it? Why and in what occasion (walking, driving, riding a bike...)?

## REFERENCES

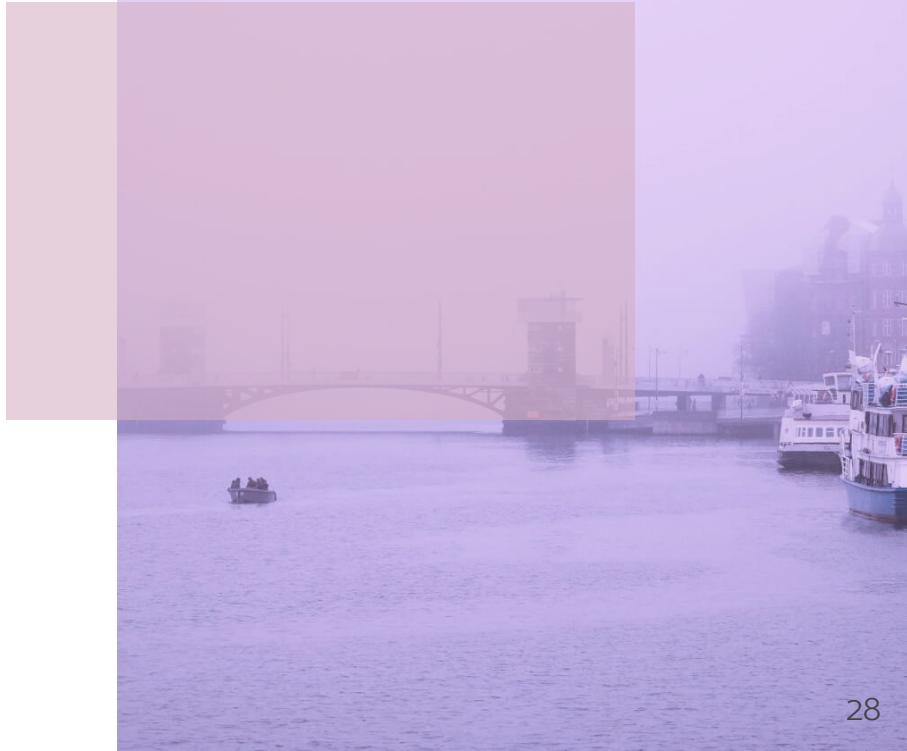
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# OUR COMPANY

Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's only a bit larger than our Moon. The planet's name has nothing to do with the liquid metal since it was named after the Roman messenger god, Mercury



# WHAT WE ARE WORKING ON



## GAS PIPELINES

Yes, Saturn is the ringed one. This planet is a gas giant, and it's composed mostly of hydrogen and helium

## TUNNEL WORKS

Jupiter is a gas giant and the biggest planet in our Solar System. It's the fourth-brightest object in the sky

## WATER TREATMENT PLANTS

Despite being red, Mars is a cold place, not hot. It's full of iron oxide dust, which gives the planet its reddish cast



## ABOUT THE PROJECT

Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's only a bit larger than our Moon. The planet's name has nothing to do with the liquid metal since it was named after the Roman messenger god, Mercury



“Here comes the quote. Words full of wisdom that someone important said and can make the reader get inspired.”

**—SOMEONE FAMOUS**

NOW



Mercury is the closest planet to the Sun and the smallest one in our Solar System—it's only a bit larger than our Moon. The planet's name has nothing to do with the liquid metal, since it was named after the Roman messenger god



# FUTURE

Venus has a beautiful name and is the second planet from the Sun. It's terribly hot—even hotter than Mercury—and its atmosphere is extremely poisonous. It's the second-brightest natural object in the night sky after the Moon.

The background of the slide is a photograph of the Manhattan Bridge in New York City. The bridge's iconic blue steel trusses and cables are visible against a clear sky. In the foreground, on the left, there's a dark, multi-story brick building with many windows. On the right, a portion of a red brick building is visible, showing some scaffolding and a fire escape. The overall composition is a mix of industrial and urban elements.

**AWESOME  
WORDS**

# MAJOR REQUIREMENTS



## MARS

Despite being red, Mars is a cold place, not hot. It's full of iron oxide dust



## JUPITER

It's a gas giant, the biggest planet in our Solar System and the fourth-brightest object in the sky



## SATURN

Yes, this is the ringed one. It's a gas giant, composed of hydrogen and helium



## MERCURY

Mercury is actually the smallest planet in our Solar System



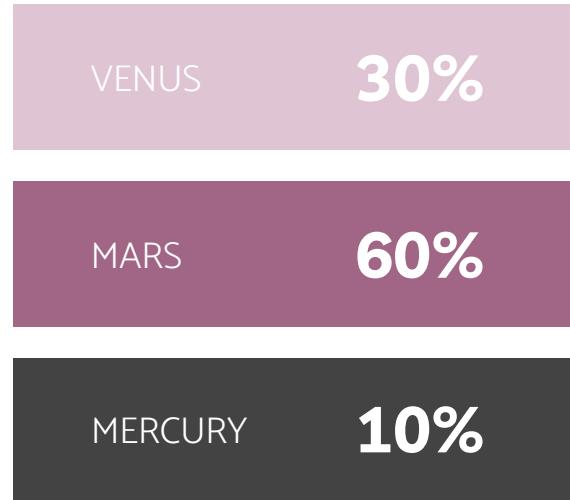
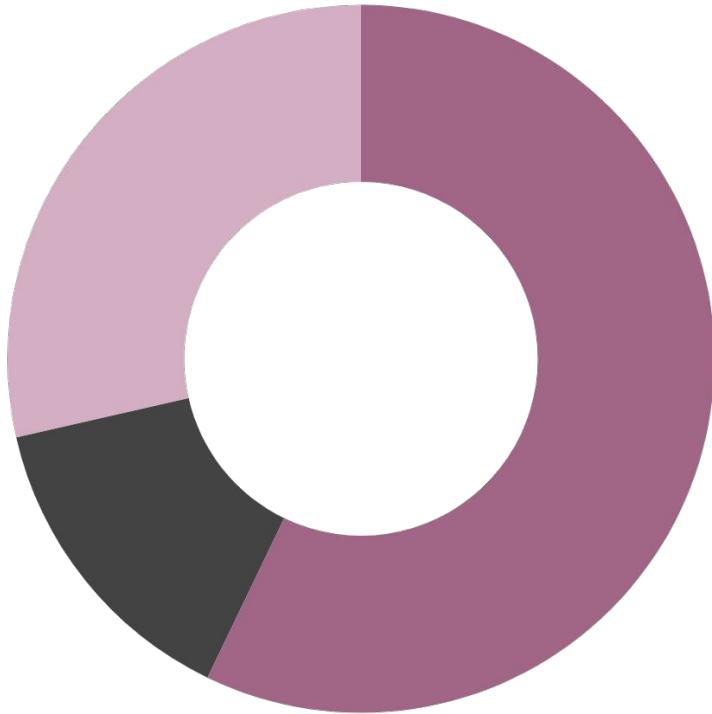
## NEPTUNE

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

## VENUS

Venus has a beautiful name and is the second planet from the Sun. It's terribly hot

# BUDGET



If you want to modify this graph, click on it, follow the link,  
change the data and replace it

# OUR NUMBERS

\$50,000,000

REVENUE LAST YEAR

2,000

NEW CLIENTS LAST YEAR

75

EMPLOYEES

# PREDICTED RESULTS

	VENUS	MARS	MERCURY	JUPITER
AREA 1	50	100	20	30
AREA 2	23	34	45	56
AREA 3	234	45	65	56

# SNEAK PEEK



Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's only a bit larger than our Moon. The planet's name has nothing to do with the liquid metal, since it was named after the Roman messenger god, Mercury

# SNEAK PEEK



Insert your  
multimedia  
content here



# PROJECT STAGES

## STAGE 1

Venus has a beautiful name and is the second planet from the Sun. It's terribly hot

## STAGE 2

Mercury is the closest planet to the Sun and the smallest one in the Solar System

## STAGE 3

Despite being red, Mars is a cold place, not hot. It's full of iron oxide dust, giving the planet its reddish cast

# FUTURE PROJECTS

## MERCURY

Mercury is the closest planet to the Sun and the smallest one in the Solar System

## MARS

Despite being red, Mars is a cold place, not hot. It's full of iron oxide dust



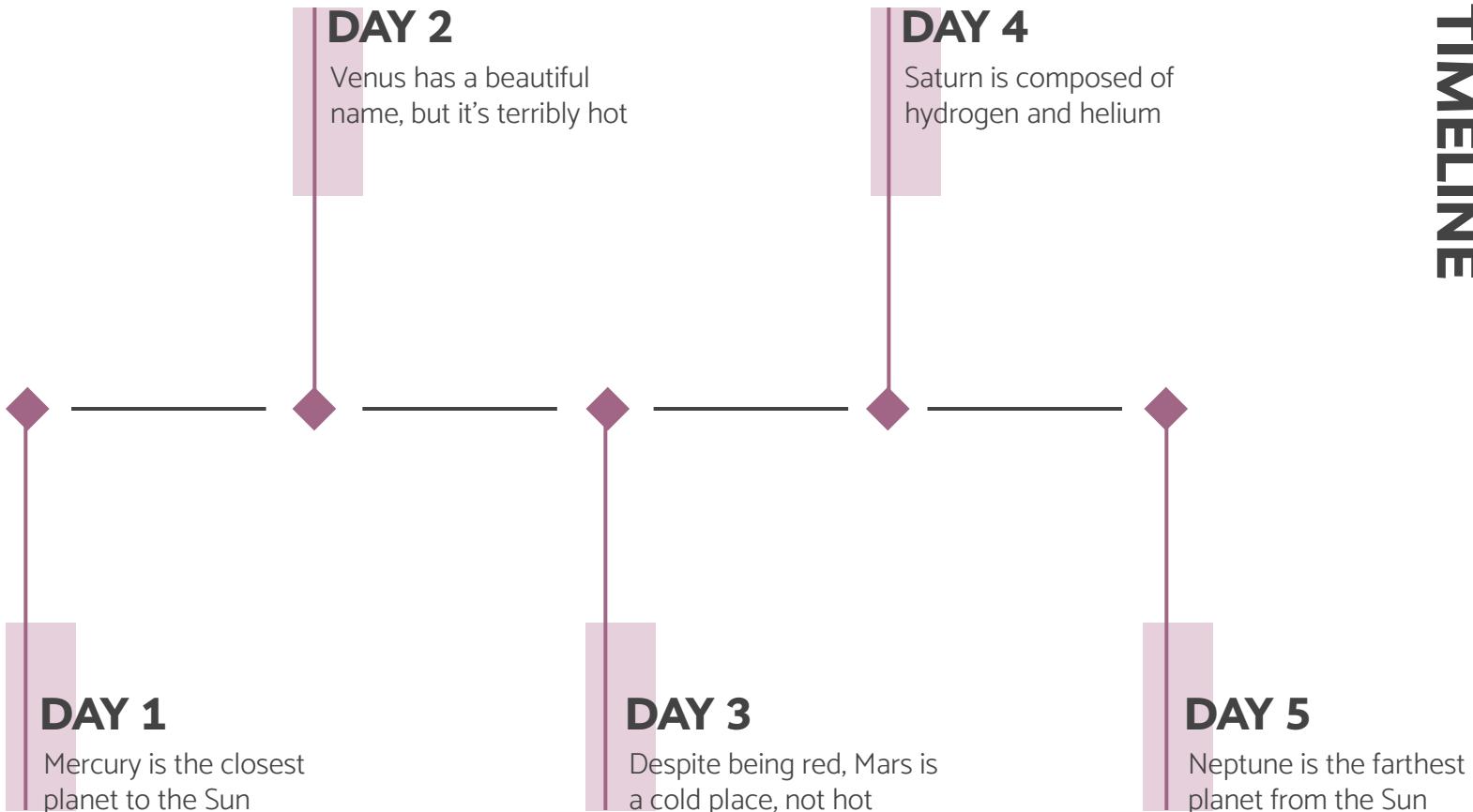
Venus has a beautiful name and is the second planet from the Sun

## VENUS

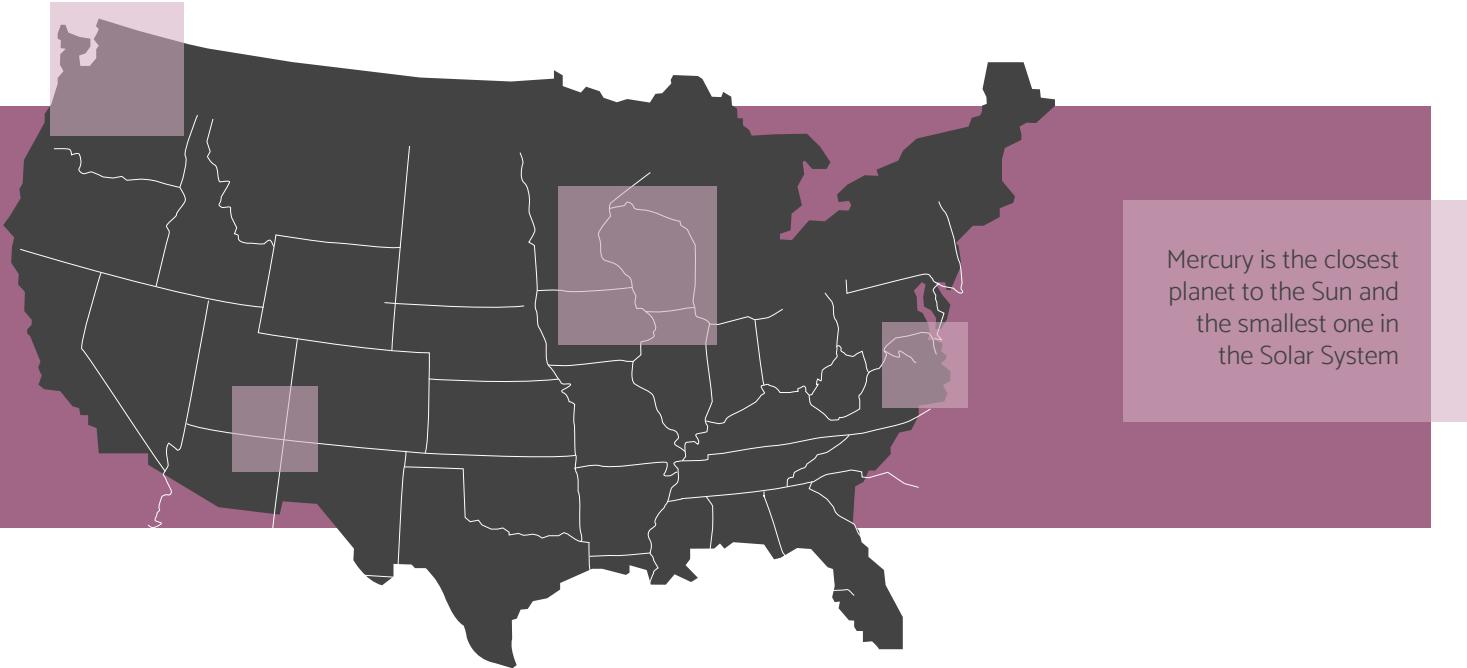
Saturn is the ringed planet. It's a gas giant, composed mostly of hydrogen and helium

## SATURN

# TIMELINE



# OUR LOCATIONS



# OUR PARTNERS



## MERCURY

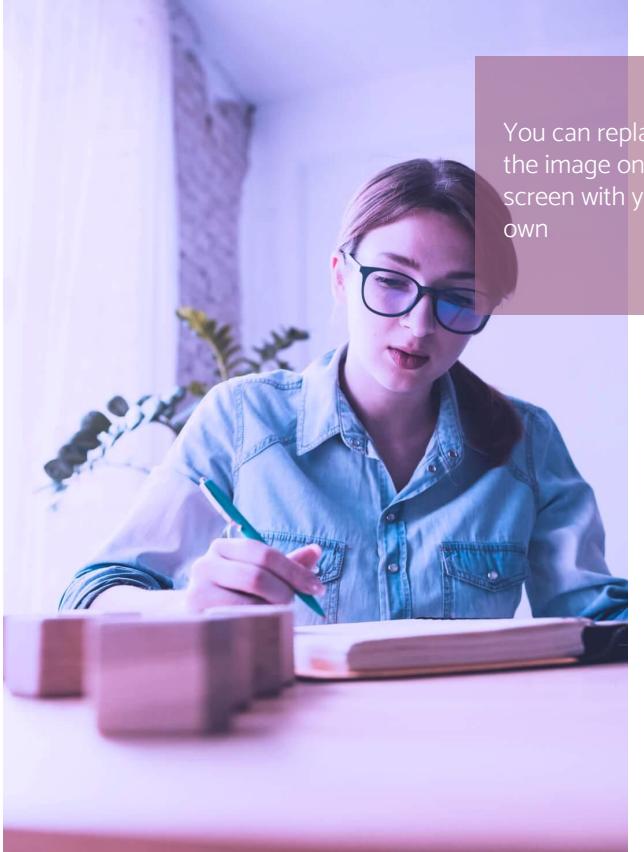
Mercury is the closest planet to the Sun and the smallest one in our Solar System—it's only a bit larger than our Moon. The planet's name has nothing to do with the liquid metal, since it was named after the Roman messenger god

## VENUS

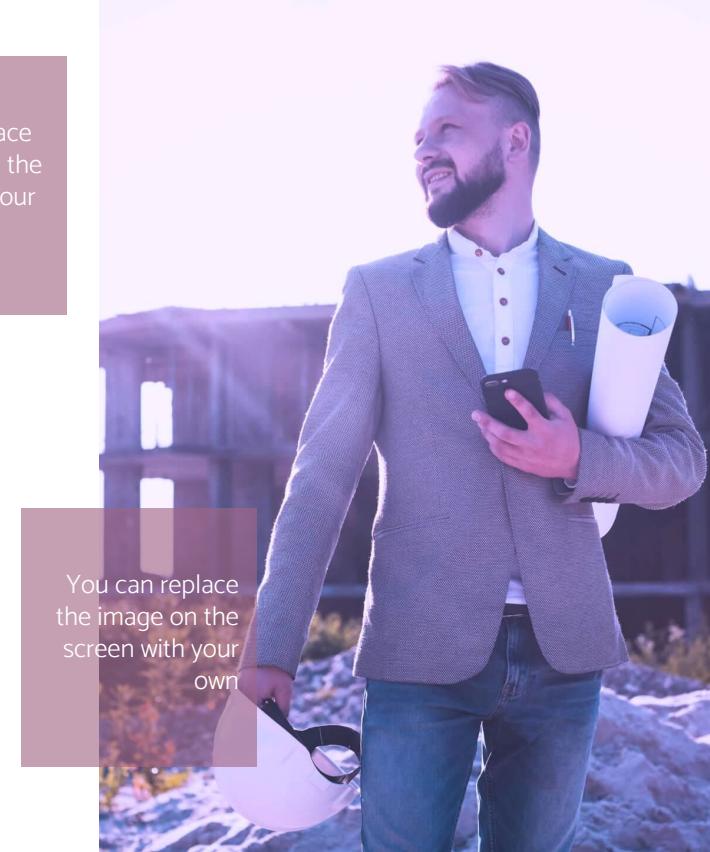


Venus has a beautiful name and is the second planet from the Sun. It's terribly hot—even hotter than Mercury—and its atmosphere is extremely poisonous. It's the second-brightest natural object in the night sky

# OUR TEAM



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screen with your  
own

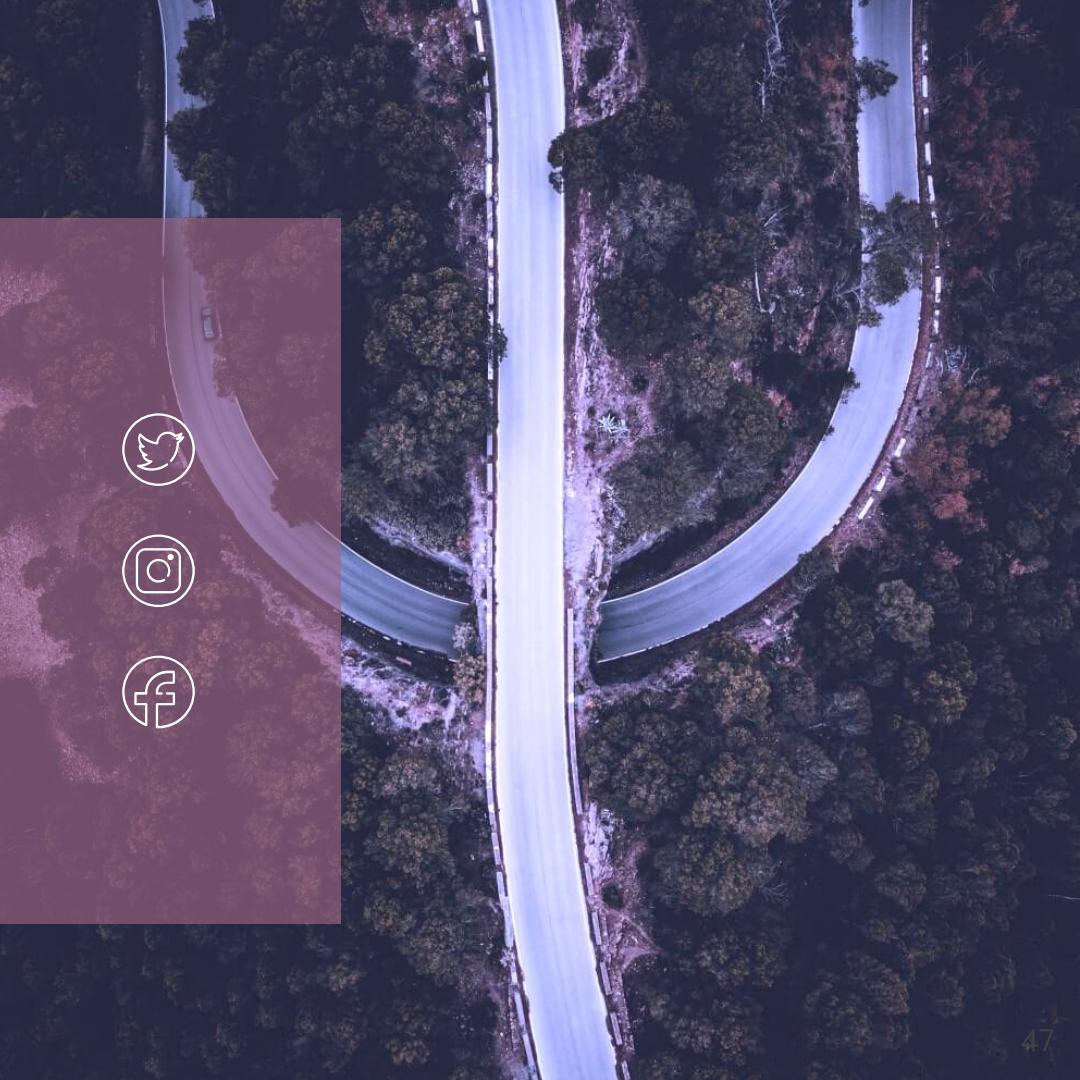


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# THANKS

Does anyone have any questions?  
Follow the project updates

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- Airplane window with sky and sea landscape
- Railway train station long shot
- One way road sign in the city
- Sunset at bay
- Old foot bridge over the river near alesund; norway
- Tropical road with desert background
- Modern woman riding bike in city
- Harbor with boats and blue sea
- City roads at night
- Brooklyn bridge and new york

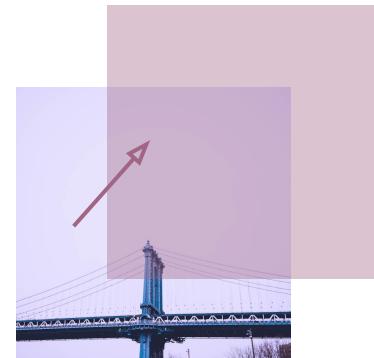
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## VECTORS

- Usa map
- Gradient logo with abstract shape

## PHOTOS

- Elevated view of road with trees growing in forest
- Foggy weather in city with channel
- American flag on brooklyn bridge in new york
- Brightly illuminated city street
- Blurred traffic lights on street at night
- Road block signs closeup
- Crosswalks in the city closeup
- Manhattan bridge in new york

- Contemporary buildings on waterfront of river
- Brooklyn bridge over east river in new york
- Motion in the city intersection
- Architecture project and tablet mockup
- Railways closeup with blurred background
- Train on railway closeup
- Man in black t-shirt standing in front of railway train
- Portrait of a female architect writing on book at workplace
- Portrait of smiling architect man holding cellphone and hard hat with blueprint at construction site
- Elevated view of straight and curve road in forest

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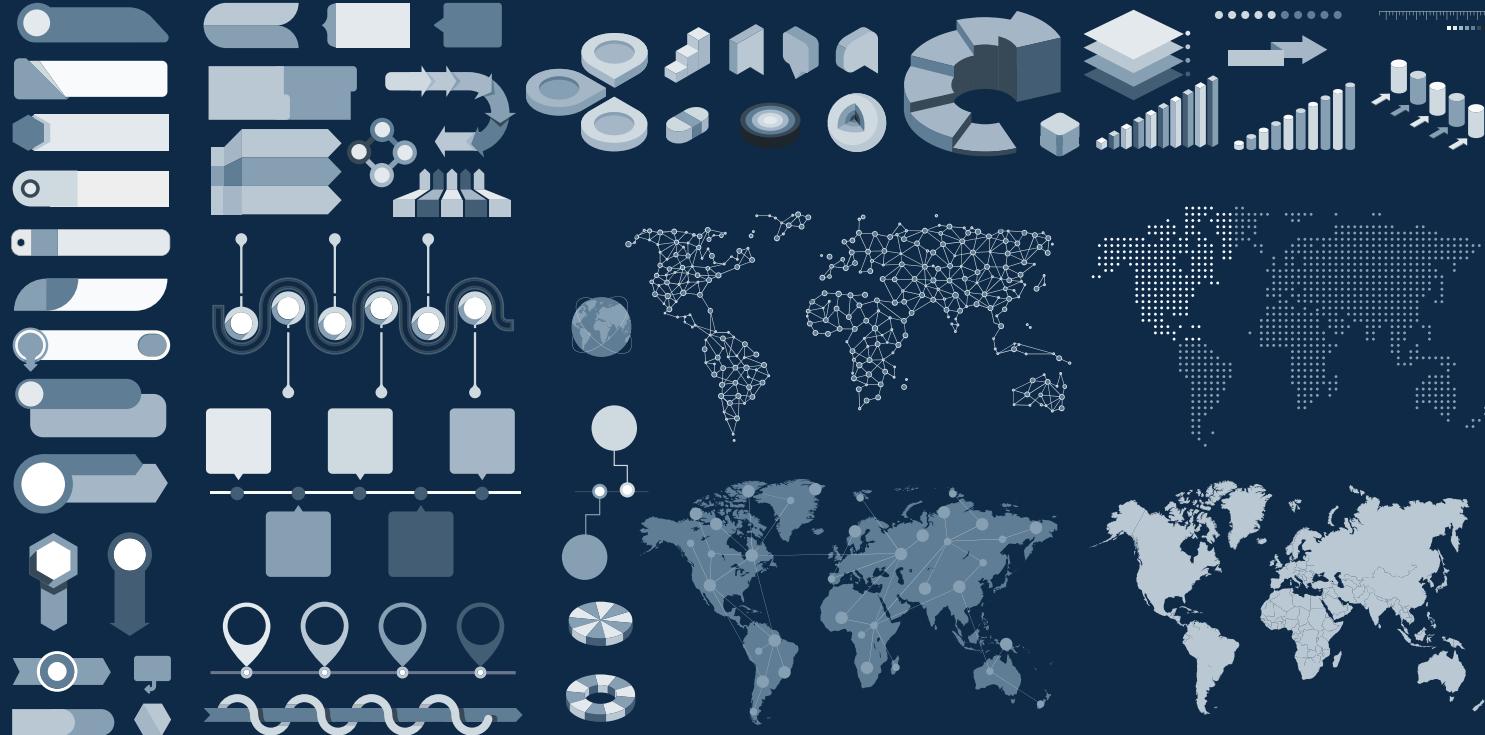
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## **Catamaran**

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

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#a16685



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## Teamwork Icons



## Help & Support Icons



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