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MIEUX COMPRENDRE NOTRE PLANÈTE

EGU General Assembly 2021

Photography encouraged

Combining citizen science and artificial intelligence to facilitate geology outreach and capture geodiversity:

prospects from the RockNet project

Antoine BOUZIAT

Jean-Claude LECOMTE

Renaud DIVIES

Sylvain DESROZIERS

Mathieu FERAILLE

Christophe CORNET

François COKELAER

CARNOT Ifpen Ressources Energétiques

ifp Energies nouvelles

PITCH SLIDE

Combining citizen science and artificial intelligence to facilitate geology outreach and capture geodiversity:

prospects from the RockNet project

antoine.bouziat@ifpen.fr

1. Concept

Deep Learning classification model

input : photo of rock

output : lithology + confidence score

Likelihood

Mudrock ***87 %***
Flint ***11 %***
Mica schist ***< 1 %***

Citizen science mobile app

User pictures rock

App predicts litho and gives geological info

User can validate or correct litho

AI model improves

User saves picture and litho

Participative collection grows

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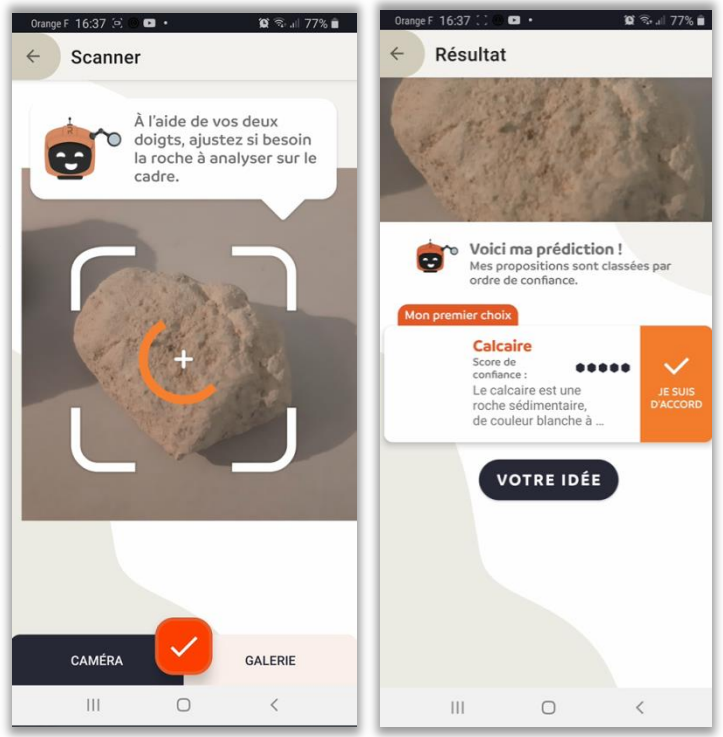


2. Prototype

12 litho classes

Training on 2 700 public images

90 % of good predictions

3. Future work

Scale up

More litho classes

Efficient data engineering

Share

Partnership with **UNESCO Geoparks**

Community building

Find funding ☺

FULL PRESENTATION

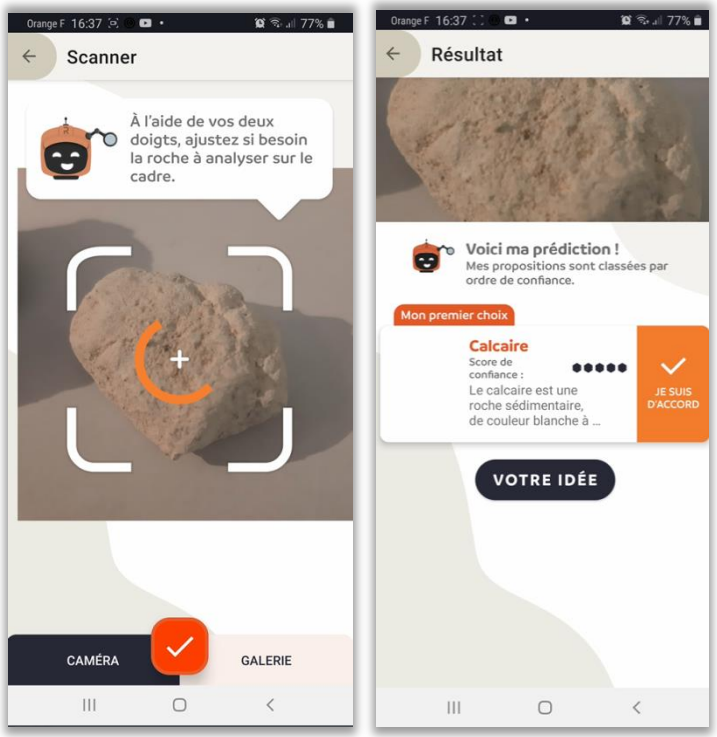
ROCKNET IN A NUTSHELL

Innovative technology

- Lithology recognition from rock samples pictures
- Deep Learning model

Mobile application

- Design by a digital communication agency
- Version 1 expected in May 2021



Citizen science project

- Users can provide feedback on predictions
- Users gather a common collection of rock images
- Every new photo improves the Artificial Intelligence model

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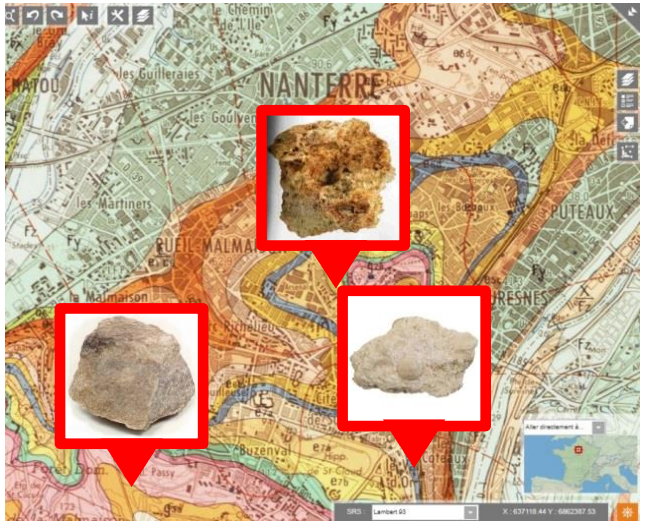
ROCKNET TARGETS

Capture geodiversity



Facilitate geology outreach

[Bouziat *et al.* 2020]

Digital transformation and geoscience education: New tools to learn, new skills to grow.

European Geologist, 50.

http://doi.org/10.5281/zenodo.4311379

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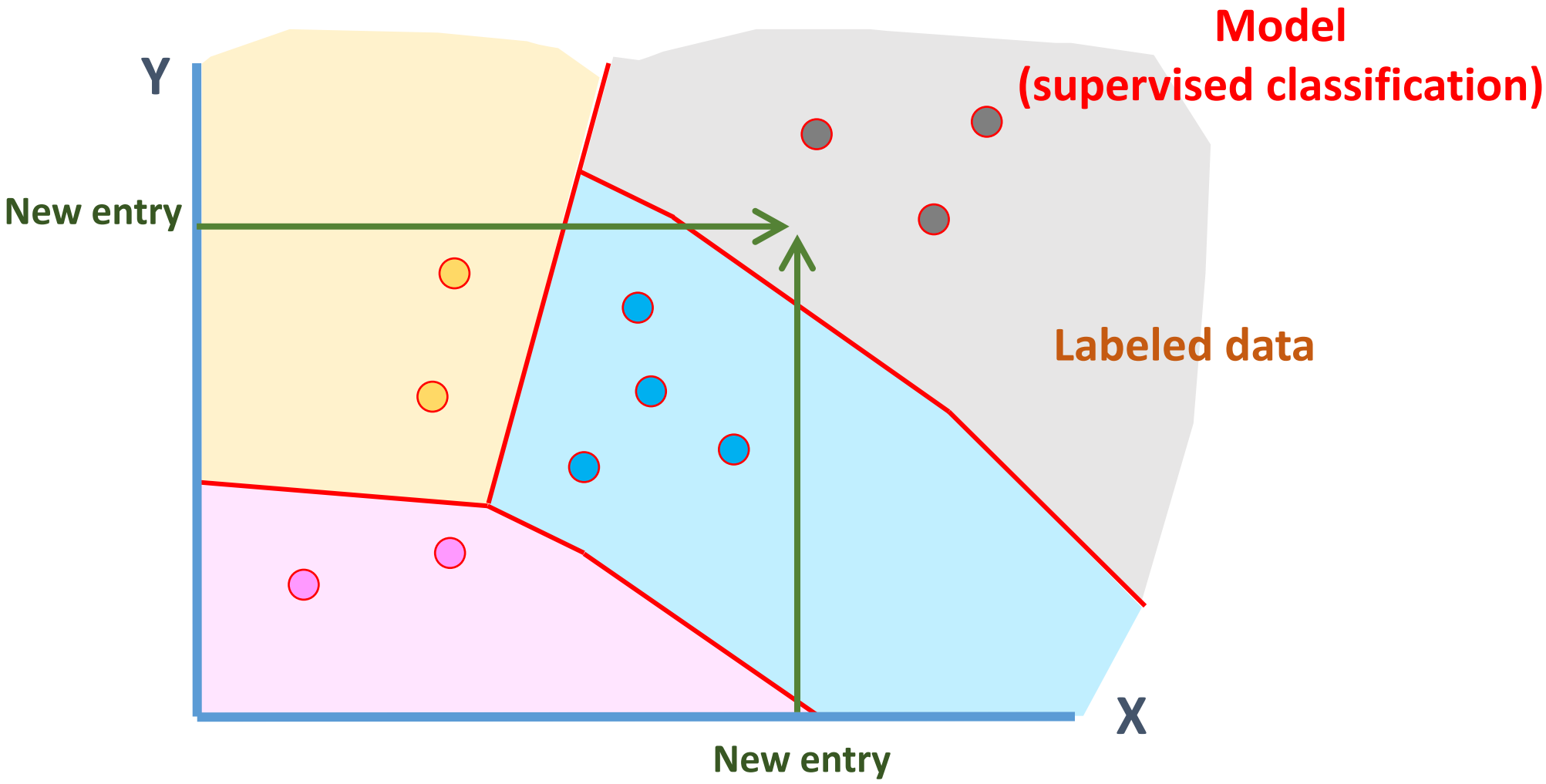
HOW DOES IT WORK?



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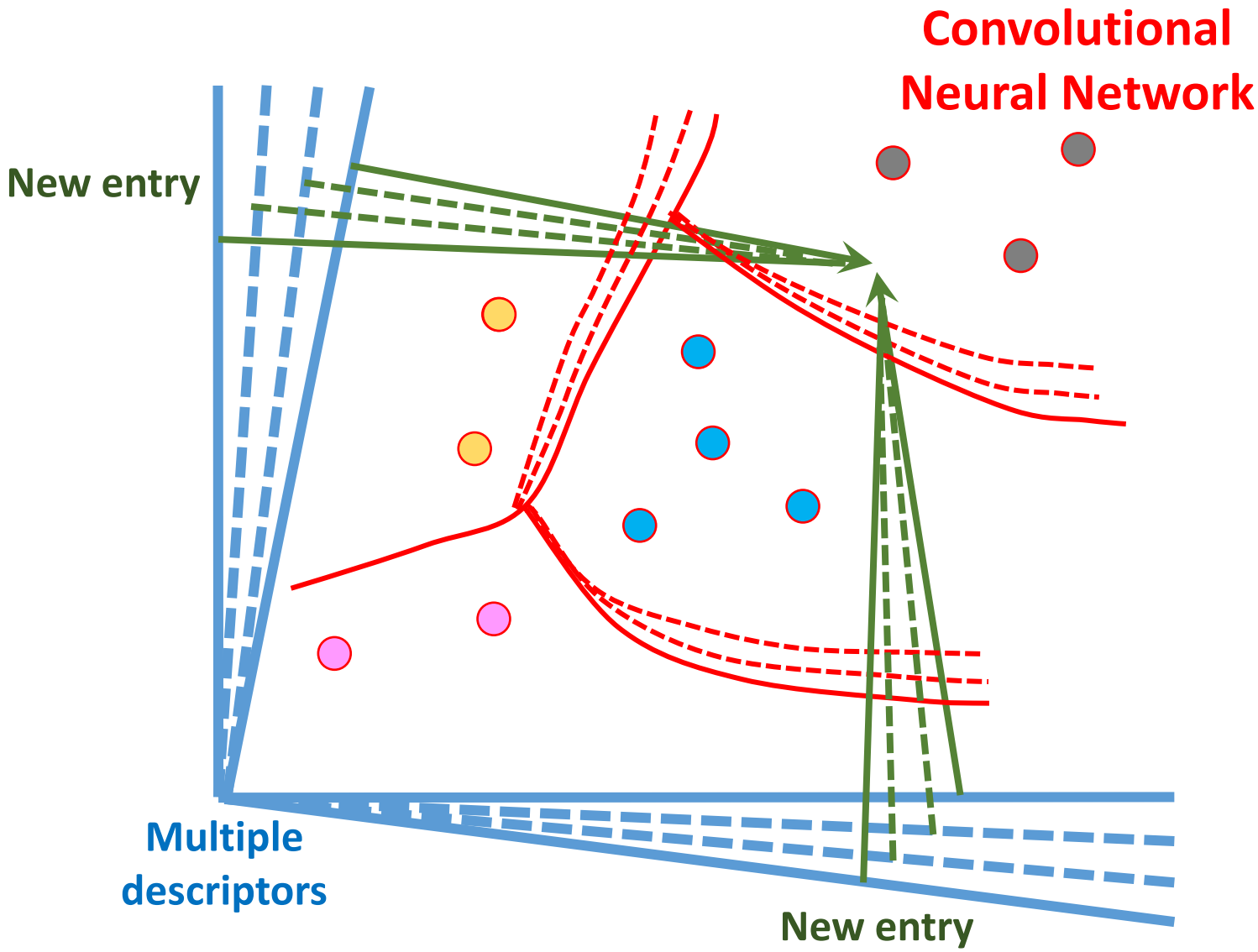
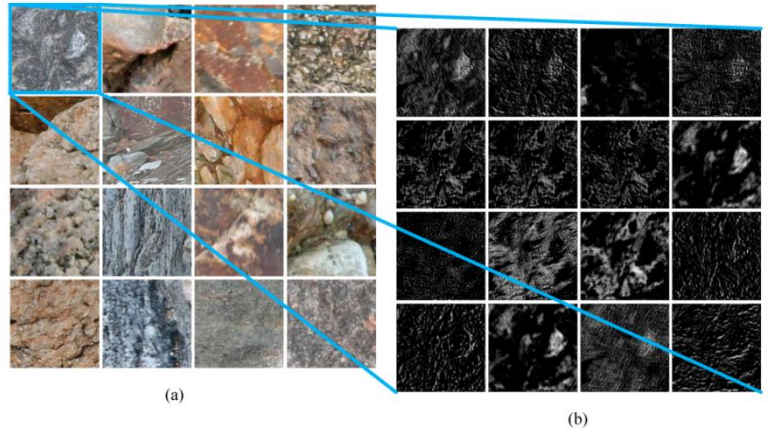
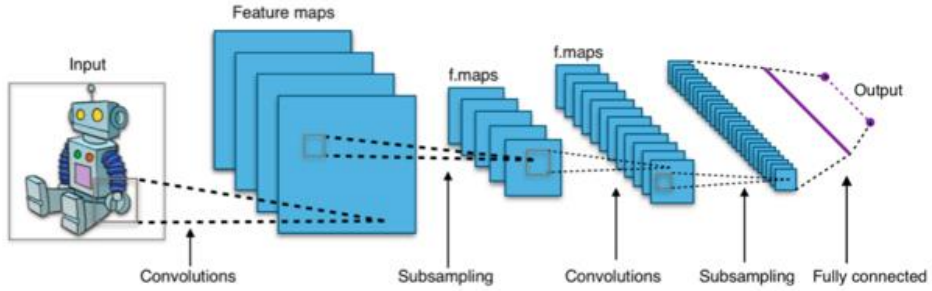
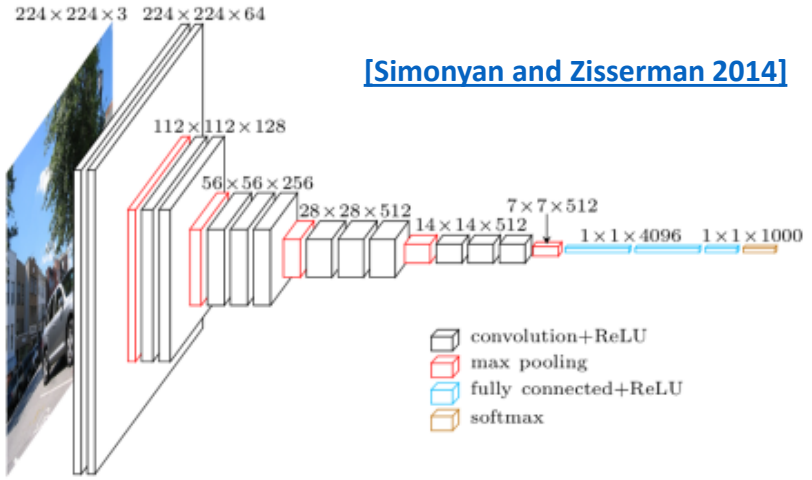
HOW DOES IT WORK?









[Simonyan and Zisserman 2014]

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HOW DOES IT WORK?

Basalt 93%
Shale 2%
Sandstone 1%

Sandstone 99%
Dunite < 1%
Limestone < 1%

Conglomerate 98%
Flint 1%
Mica schist < 1%

Mudrock 87%
Flint 11%
Mica schist < 1%

Limestone 37%
Sandstone 32%
Mudrock 26%

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CURRENT PROTOTYPE

Transfer Learning method

12 litho classes

Training on 2 700 public images

90 % of good predictions

- Sandstone
- Conglomerate
- Mudrock
- Limestone
- Flint
- Evaporite
- Orthogneiss
- Micaschist
- Granite
- Basalt
- Gabbro
- Dunite

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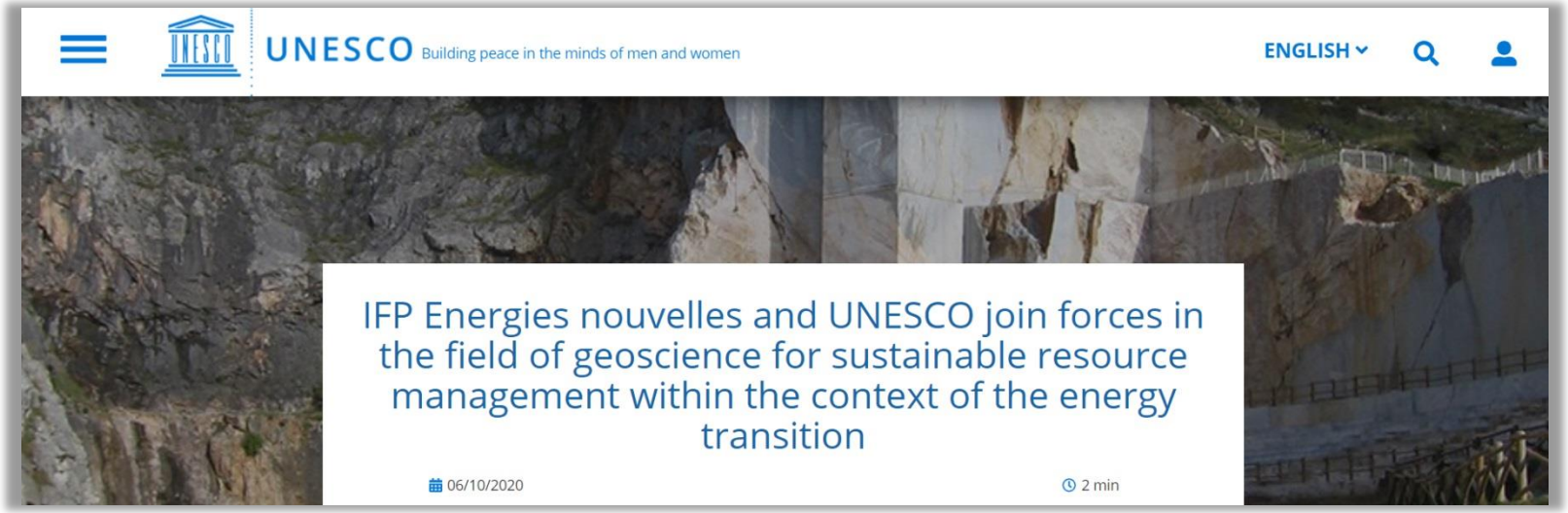
FIRST PARTNERS

UNESCO Global Geoparks

United Nations Educational, Scientific and Cultural Organization

UNESCO Global Geoparks



Nancy school of Geology

Lorraine University

Saint-Etienne school of Telecom engineering

University of Lyon

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NEXT CHALLENGES

- Set a robust data architecture
- Improve AI model
- Build a community of users
- Find funding

Partners welcome!

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Thanks for your attention!

antoine.bouziat@ifpen.fr

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@AntoineBouziat

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