# Al and collaboration in the future of geospatial

Are you ready for it?



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## GE©NADIR



# Earth observation data are everywhere



EO datasets are growing by >100 PB per year



Ongoing growth of EO satellites since the 1960's



Drones have democratized EO data capture







### Yet 99% of the world's EO data are not analyzed







### The all-you-can-eat buffet... without cutlery





#### Google Earth Engine

Q Search places and datasets...

Scripts Docs Assets	2023wk8 * Get Link - Save - Run - Reset - Apps	Inspector Console Tasks
Filter scripts	* Imports (2 entries)	Use print() to write to this console.
• Owner (1)         • users/kejoyce2/default         • 2020_RS         • 2021_RS         • 2022_RS         • 2023_RS         • 2023_RS         • 2023 ex4a supervised classification         • 2023 ex4b supervised classification with spec sigs         • 2023 ex4c supervised classification with scatter plot         • 2023 ex4d post classification	<pre>     Imports (2 entries)      var ROI: Point (145.99, -16.60)      var L8: ImageCollection LANDSAT/LC08/C02/T1_RT      // Centre the scene to the ROI     Map.centerObject(ROI, 12);     // Let's define the image collection we are working with by writing this command.     // We are creating a new variable 'image' that will come from the L8 collection we have imported     var image = ee.Image(L8     // We will then include a filter to get only images in the date range we are interested in     .filterDate("2022-01-01", "2023-10-30") </pre>	Use print() to write to this console. A L8 scene: JSON *Image LANDSAT/LC08/C02/T1_RT/LC08_095072_20220210 (17 bands) JSON type: Image id: LANDSAT/LC08/C02/T1_RT/LC08_095072_20220210 version: 1645839409771092 *bands: List (17 elements) *0: "B1", unsigned int16, EPSG:32655, 7621x7731 px *1: "B2", unsigned int16, EPSG:32655, 7621x7731 px *2: "B3", unsigned int16, EPSG:32655, 7621x7731 px
<ul> <li>2023 ex5 accuracy</li> <li>2023 ex6a image differencing</li> <li>2023 ex6b multi-date time series</li> <li>2023 ex6c post class change detection</li> <li>2023wk8</li> <li>2023wk9</li> <li>Landslides</li> <li>Image differencing</li> <li>Ioad sentinel</li> <li>Map My School</li> <li>CalcuatingAreas</li> </ul>	<pre>11 // Next we include a geographic filter to narrow the search to images at the location of our ROI point 12 .filterBounds(ROI) 13 // Next we will also sort the collection by a metadata property, in our case cloud cover is a very usef 15 .sort("CLOUD_COVER") 16 // Now let's select the first image out of this collection - i.e. the most cloud free image in the date 17 // Now let's select the first image out of this collection - i.e. the most cloud free image in the date 18 .first()); 19 // And let's print the image to the console. 19 print("A L8 scene:", image); 20 // Define visualization parameters in a JavaScript dictionary for true colour rendering. 21 // Bands 4,3, and 2 are needed for RGB (true colour composite). 25 var trueColour = { 26 bands: ["BA", "B3", "B2"].</pre>	<pre>&gt;3: "B4", unsigned int16, EPSG:32655, 7621x7731 px &gt;4: "B5", unsigned int16, EPSG:32655, 7621x7731 px &gt;5: "B6", unsigned int16, EPSG:32655, 7621x7731 px &gt;6: "B7", unsigned int16, EPSG:32655, 7621x7731 px &gt;7: "B8", unsigned int16, EPSG:32655, 7621x7731 px &gt;8: "B9", unsigned int16, EPSG:32655, 7621x7731 px &gt;9: "B10", unsigned int16, EPSG:32655, 7621x7731 px &gt;10: "B11", unsigned int16, EPSG:32655, 7621x7731 px &gt;11: "QA_PIXEL", unsigned int16, EPSG:32655, 7621x7731 px &gt;12: "QA_RADSAT", unsigned int16, EPSG:32655, 7621x7731 px &gt;13: "SAA", signed int16, EPSG:32655, 7621x7731 px &gt;14: "SZA", signed int16, EPSG:32655, 7621x7731 px &gt;15: "VAA", signed int16, EPSG:32655, 7621x7731 px &gt;16: "VZA", signed int16, EPSG:32655, 7621x7731 px &gt;16: "VZA", signed int16, EPSG:32655, 7621x7731 px</pre>
HolyCross MapMySchool-weipa MapMySchoolFlorey MapMySchoolcode RandomSample Time Series Indiv Regions	27       min: 5000,         28       max: 12000         29       };         30       // Add the image to the map, using the visualization parameters.         32       Map.addLayer(image, trueColour, "true-colour image");         33	<pre>*properties: Object (112 properties) CLOUD_COVER: 0.73 CLOUD_COVER_LAND: 0 COLLECTION_CATEGORY: T1 COLLECTION_NUMBER: 2 DATA_SOURCE_ELEVATION: GLS2000</pre>



### Complex, inaccessible tools





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# Relying on 1% of data won't solve global problems

# Ah, of course, artificial intelligence

Get the Information You Need from Imagery.



🕐 E R D A S

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Orfeo ToolBox is not a black box

QGIS

Geospatial was doing AI before AI was cool

ERDAS IMAGINE® 8.4

GRASS

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entation with Deep Learning ...



M Medium Image Segmentation: The Deep Learning ...



Anolytics Semantic Segmentation Services for ...



Viso Suite Image Segmentation with Deep L...



✤ Influencer Marketing Hub An In-Depth Look into AI Image Segmentation

Convolutional encoder-de



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 Influencer Marketing Hub An In-Depth Look into Al Image Segme ...





△ Think Autonomous Image Segmentation - Use Cases for 2D ...



CleVR cutting-edge Computer Vision Solut ...





Structural Segmentation of V





Viso Suite



/ Infoscribe.ai



DeepLabv3

Segments.ai





R<sup>®</sup> ResearchGate

YouTube



Keymakr

#### Mainstream segmentation is everywhere









## Mainstream segmentation is everywhere







#### Segmentation is nothing new for us either





# Now it's a little more accessible







#### Zero shot, modern AI – fast and intuitive







#### Zero shot, modern AI – fast and intuitive







# Making geospatial for everyone, everywhere, any time







# Making geospatial for everyone, everywhere, any time





# Science is a team sport

1

But we are playing geospatial as individuals



#### Name

Finalv2\_reallyfinalthistime\_b.cpg
 Finalv2\_reallyfinalthistime\_b.dbf
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 Finalv2\_reallyfinalthistime\_b.sbn
 Finalv2\_reallyfinalthistime\_b.sbx
 Finalv2\_reallyfinalthistime\_b.shp
 Finalv2\_reallyfinalthistime\_b.shp
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Still emailing shapefiles?

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# Real-time collab – the world has moved on

#### 2006

#### Google Docs

First major introduction of real-time collaboration for the general public

#### 2013

#### Slack

Real-time communication that redefined collaboration across teams

#### 2016

Microsoft Office 365

Real-time co-authoring added to the widely used Microsoft Office suite

#### Etherpad

Real-time document editing that inspired Google's further advancements

2008

#### Figma 🐧

2016

Brought real-time collab to graphic design

#### COVID-19

2020

Canva, Notion, Miro, Soundtrap, Unity, Blender...



# But where is geospatial in the mix?















29 points

159 points

5 points

4 points

249 points

159 points

182 points

155 points

42 points 1m quadrats

-

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High dens 2

1 polygon, 99.96 m<sup>2</sup>

High dens 2 bleaching vr

Polygon - 1 99.96 m<sup>2</sup> Med dens post bleaching vr

Low dens post bleaching vr

High dens post bleaching vr

High dens bleaching vr

Med dens bleaching vr

Low dens bleaching vr

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Med dens bleaching kj

3 polygons, 299.88 m<sup>2</sup> Polygon - 11 99.96 m<sup>2</sup>

Polygon - 12 99.96 m<sup>2</sup> Polygon - 10 99.96 m<sup>2</sup>

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Jun 04, 24

DSM

DTM

Orthomosaic

100 cm

![](_page_27_Picture_0.jpeg)

![](_page_27_Picture_1.jpeg)

![](_page_27_Picture_2.jpeg)

Drone mapping reveals mass mortality post coral bleaching on the Great Barrier Reef

![](_page_28_Picture_1.jpeg)

![](_page_29_Picture_0.jpeg)

![](_page_30_Picture_0.jpeg)

#### ChatGEO ڬ

Х

How can I help?

What % of houses have solar panels?

Great question! I can see 14 houses, 11 of which have solar panels. So that's 79%.

Would you like to see them on the map?

Yes pls!

Anything else I can help with?

![](_page_30_Picture_9.jpeg)

![](_page_30_Picture_10.jpeg)

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![](_page_31_Picture_2.jpeg)

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![](_page_31_Picture_5.jpeg)

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