Lab #7

Citizen Science: Mapping Mars

Introduction

In today's lab, we are continuing our semester-long theme with another Citizen Science project, this time dealing with the planet Mars. Before we visit the Mars mapping website (project Cosmic), it would be helpful to review some of the important scientific work that has already been done by the Mars Global Surveyor and (the mission we will be working with on our project) the Mars Reconnaissance Orbiter (MRO).

To do this, you will read a recent (May 2013) Scientific American article about recent discoveries on Mars by the two orbiting spacecraft. This article is in the form of a pdf file at http://personal.tcu.edu/dingram/mars.pdf. Load this article and read through it, answering the following questions (that are arranged in the same order that the topics are covered in the article).

Part 1

1) Describe the evidence observed by the Mars Global Surveyor in 2000 and 2006 that led scientists to believe running water may exist on Mars currently.

2) Explain two related pieces of evidence collected by the HiRISE camera that indicates the gullies first seen by the Mars Global Surveyor are more likely related to Carbon Dioxide than liquid water flow.

3) According to the diagram on page 63 of the article (page 6 of the pdf), why does the Southern hemisphere of Mars experience warmer summers compared to the Northern hemisphere?

4) Explain two pieces of evidence that led the author to believe the dark lines seen by the HiRISE camera, the Recurring Slope Lineae (RSL), were caused by intermittently flowing liquid water.

5) Name and briefly explain the two things limit the ability of the Mars Reconnaissance Orbiter (MRO) to directly identify actual flowing water on the surface?

Part 2

Now load https://www.zooniverse.org/projects/wkiri/cosmic and log in. You may wish to use the same username and password you have used for previous Zooniverse labs. First, visit the "Learn More" page and read the description of the project, and answer.

1) This project is intended to help spacecraft "learn" a new skill. Describe what we are hoping to change about the way future Mars data-gathering spacecraft operate.

Next, under the “Education” tab, click on the article entitled “Mars Life Search Implications.” Read this article and answer below.

2) The authors propose several potential landing sites for a future Mars rover different from the kinds of places we have landed before. Explain what these sites are like and why we hope these landing sites would be productive.

Part 3

Ok, enough with all of the background information, let's start getting some work done! Click on "Classify" in the sidebar, then click on the "Show Tutorial" button to complete a brief walkthrough of how the classification process works. I also recommend you look at the "Show Examples" button to see what kinds of things you will be looking for.

Once you start classifying, as usual, just do your best job. It doesn't have to be perfect since this is crowdsourced data. The scientists simply want everyone to do their best job classifying, and then they will use the consensus result. You may also discover something interesting in the images that the scientists will follow up with further images and more detail in the future You never know what discoveries lay waiting in the millions of close-up images of the Martian surface.

Be sure to explore the "Field Guide" tab before you get too deep into classifying so you'll have a better idea of what to look for. You may see the same image twice but with different features because the photos were taken at different times. That's okay! The scientists are looking at how the features change over time so that they can get a measurement of global wind and weather patterns over time, just like how water flow in the RSL features was discovered.

Once you and/or your group has classified 36 images (make sure each member of your group gets an equal chance to control things), this part is complete. To learn how many classifications you have completed, look to the top right of the page and click on the little circle to the right of your username. This will take you to the Zooniverse home page for your account. There you will see how many classifications you have done for each project, including Cosmic.

Once you have completed 36 Cosmic classifications, show the screen to your TA who will initial below to indicate that you have completed the last portion of your lab.

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