Visualizing Geographical Data for NASA Projects

Computer Science/IT

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Background

- Develop a more accessible way for NASA's Scientific Visualization Studio (SVS) members to obtain labels for their projects
- Make labels adaptable to the needs of different projects
- Labels give the viewer more context from visuals

Development of Code

- Utility code developed in Python 3
- Data collected from:
    - Natural Earth Data
    - SEDAC (Socioeconomic Data and Applications Center)
    - OpenStreetMap
- Uses two Python libraries:
    - PyShp to read the databases
    - Pillow to draw the data onto a picture
- Tested several times to analyze output, efficiency, neatness, and user-friendliness

End Product

- Input entered by user in interface, output is .png pictures that can be wrapped around a globe for 3D visualizations
- Utility code can outline/label cities, countries, roads, rivers, disputed boundaries, glaciated areas, and coral reefs
- Labels can be written in 20+ languages
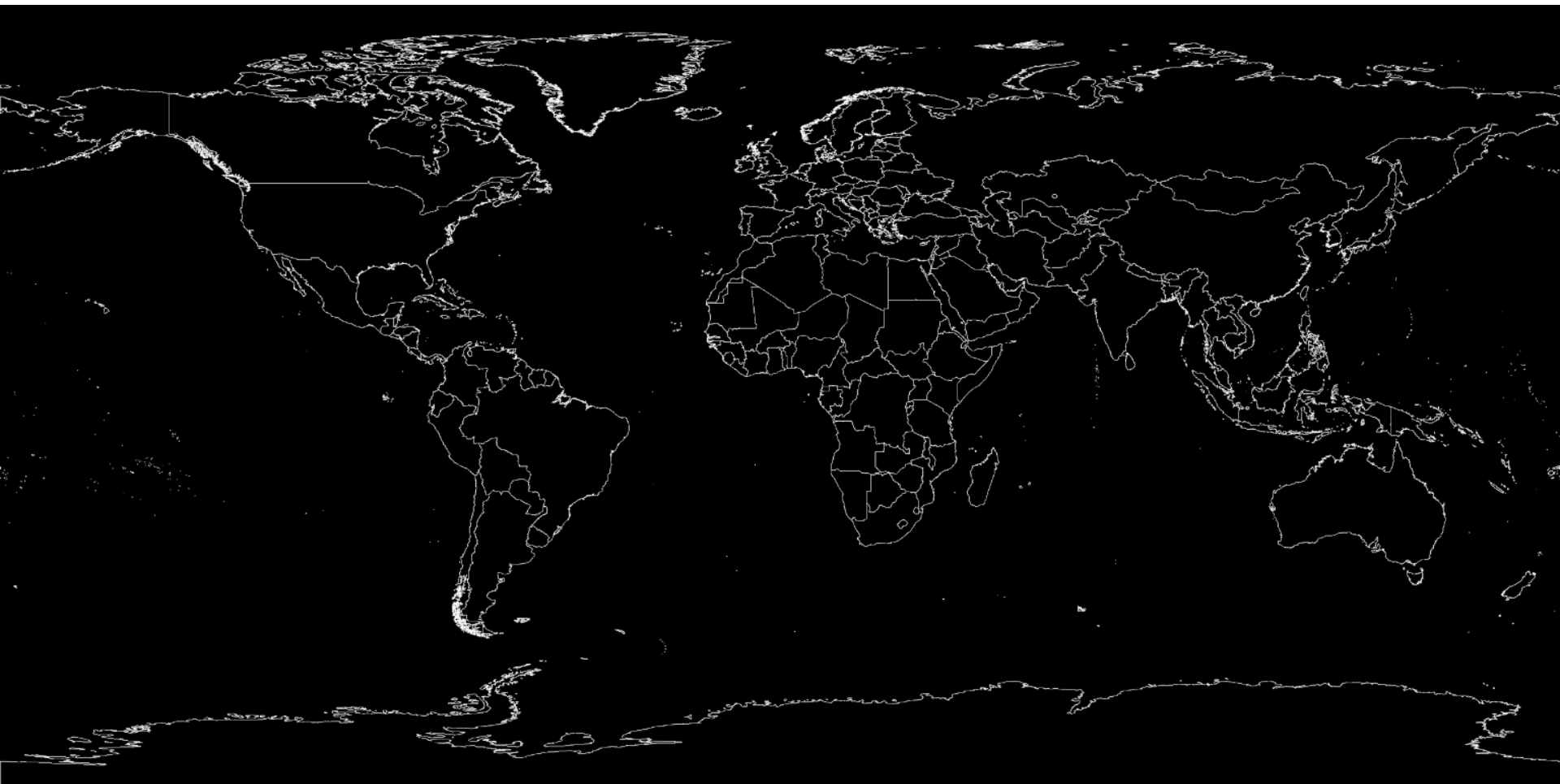
Demonstration of layer and labelling mechanisms
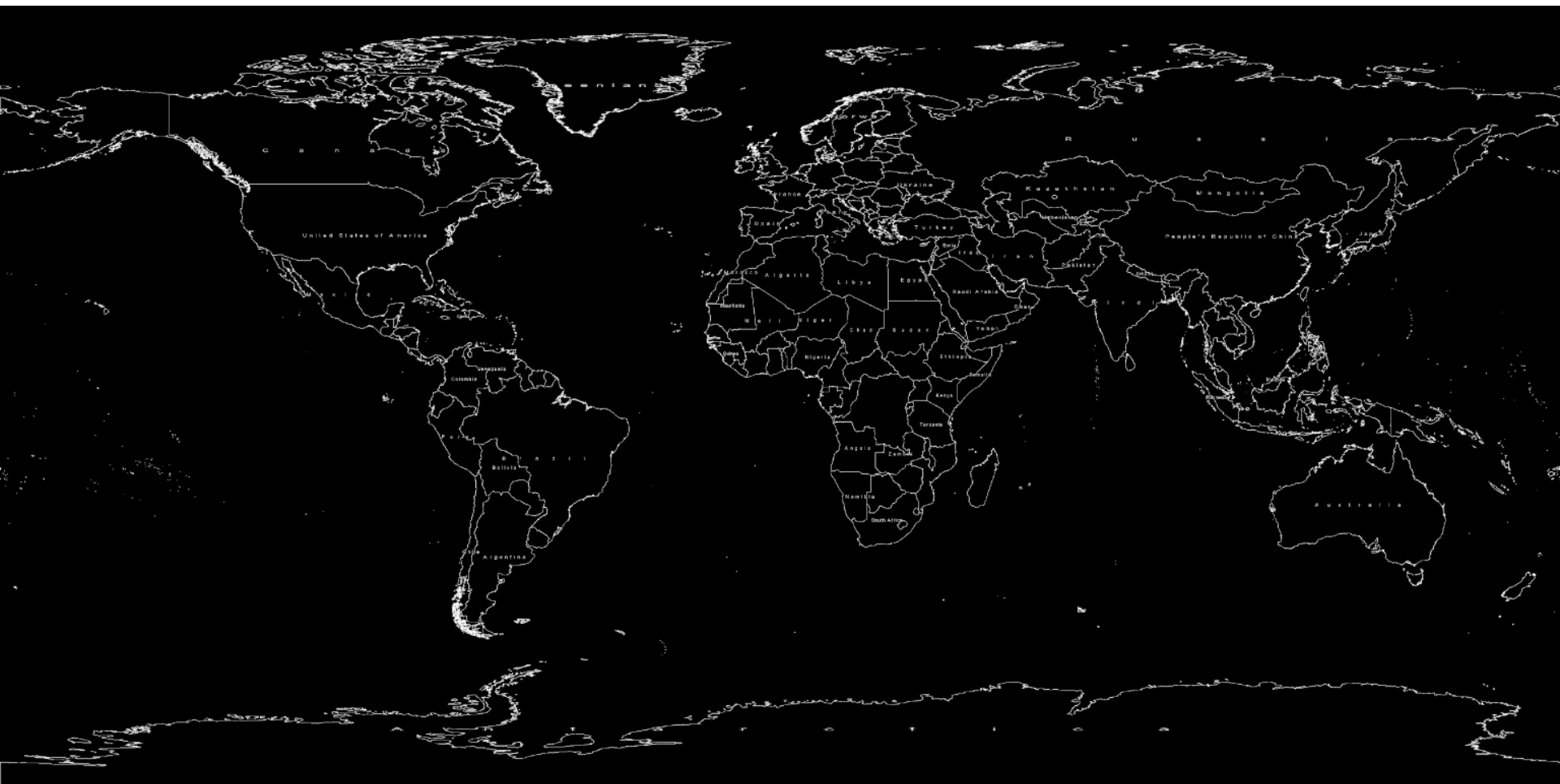
Country outlines with country labels

Country outlines with city labels (in German)

Nepal Glacial Lakes project

Conclusion and Suggestions

- Conclusion
    - Provides efficient way for SVS members to gather data and create labels
    - Helps more viewers understand the message the visualizers and NASA are trying to convey
- Suggestions
    - More effective algorithm to label geographical and cultural features that are lines or polygons
    - Ability to gather data in wider range of geographical features
    - Expand this utility outside of SVS

References/Acknowledgements