

Relating Practitioner Needs to Research Activities

Martin S. Feather
Jet Propulsion Laboratory
California Institute of Technology
Martin.S.Feather@Jpl.Nasa.Gov

Tim Menzies
Lane Dept. of Computer Science
& Electrical Engineering,
West Virginia University
tim@menzies.us

Judith R. Connelly
NASA IV&V Facility
Judith.R.Connelly@nasa.gov

Abstract

Many organizations look to research to yield new and improved products and practices. Connecting practitioners who have the need for research results to the researchers producing those results is important to guiding research and utilizing its results. Likewise, connecting researchers working on related topics to one another, and connecting practitioners with related needs to one another, is important to establishing communities of shared interests. **We demonstrate an approach that helps identify fruitful such connections.**

The key idea of the approach is to use an established taxonomy of research areas as the intermediary through which to relate researchers and practitioners. Researchers express their activities in terms of this taxonomy. Practitioners likewise express their needs in terms of this same taxonomy. Furthermore, these expressions of activity/interest can be quantitatively weighted to reflect the relative strengths of activity/interest (e.g., a researcher active in several topic areas, but to different degrees) and to reflect the magnitude of the activity/interest (e.g., one research program may be twice the magnitude of another). The gathered data can be used to identify:

- fruitful connections between researchers and practitioners by matching the researchers' combined activities to the practitioners' combined needs,
- areas of overlap among researchers, i.e., opportunities for collaboration and sharing of results, and similar areas of overlap among practitioners,
- "gaps", areas of needs which are unfulfilled (or only

weakly fulfilled) by existing research, and areas of research for which there is little or no demand. This can be useful to guide a research program, and to direct researchers towards areas with high potential.

The approach makes use of an existing decision support tool to represent the information, conduct reasoning across the sum total of that information, and present the results via cogent visualizations.

In a pilot study, expressions of needs were gathered from 9 NASA practitioners in the area of software V&V, and expressions of research activities were gathered from 19 NASA funded software assurance researchers. A visualization based on this study's data is shown in the figure. The upper half plots expressions of practitioner needs against the almost 200 leaf nodes of the "software" portion of an established taxonomy of computer science. The lower half plots expressions of research. This presentation allows the immediate visual discernment of effects such as clusters of overlapping interest between practitioners and researchers, common research foci, areas of unmet need, etc. Other visualizations facilitate scrutiny of more quantitative implications of the data.

The demonstration will present this decision-tool supported approach and its tool support, and allow for the audience to on-the-fly add in their own expressions of needs/research, and compare with similar such data.

The research described in this paper was carried out at the Jet Propulsion Laboratory, California Institute of Technology under a contract with the National Aeronautics and Space Administration, at West Virginia University under a contract with the National Aeronautics and Space Administration, and at NASA's Independent Verification & Validation Facility in West Virginia.

