

Identifying Fruitful Connections Between and Among Researchers and Practitioners

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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 present 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 strength 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 advantages of this approach are that expressions of activity/interest can be gathered independently of one another. The use of an established taxonomy of research areas and sub-areas, appropriate to the research domain in question, helps assure the correspondence between these separate expressions of information. Once the data has been gathered, it can be used in a variety of ways, including for identification of:

- fruitful connections between researchers and practitioners by matching the researchers' combined suite of activities to the practitioners' combined suite of needs,
- areas of overlap among researchers, i.e., opportunities for collaboration and sharing of results,
- analogous identification 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 demand. This can be useful information to guide an organization's research program, and to direct researchers towards areas of high potential payoff.

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. Two pilot studies have been performed to investigate the approach. In one, expressions of needs were gathered from 9 NASA practitioners in the area of software verification and validation, and expressions of research activities were gathered from 19 NASA funded software assurance researchers. In another, expressions of research activities were gathered from 19 attendees of a workshop. Both studies gave promising indications of the capability of the approach to yield the insights into the identifications and connections listed above.

An example visualization generated by the decision support tool is shown in the figure below. The upper half plots expressions of needs gathered from 9 NASA practitioners against the almost 200 leaf nodes of the "software" portion of an established taxonomy of computer science. The lower half plots expressions of research, gathered from 19 NASA funded researchers. This presentation allows the immediate visual discernment of effects such as several major clusters of overlapping interest between practitioners and researchers, common research foci, areas of unmet need, etc.

The paper will present the more details of the approach, the decision support tool, and the findings that emerged from both of these pilot studies.

