

Comparative Visualization of User Flows in Voice Portals

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Introduction

- ▶ Voice portals are widely used to guide users interactively through an application.
- ▶ Users can use self-services like SMS or banking services. More complex requests are routed to specialized consultants in call centers.
- ▶ Recent voice portals are providing a growing number of functions in one application, thus increasing their complexity.
- ▶ This work presents flow-map-based techniques for the comparative visualization of user flows at different time frames, in order to enable dialog designers to analyze and improve the user interaction with these systems.

Natural Language Systems in Voice Portals

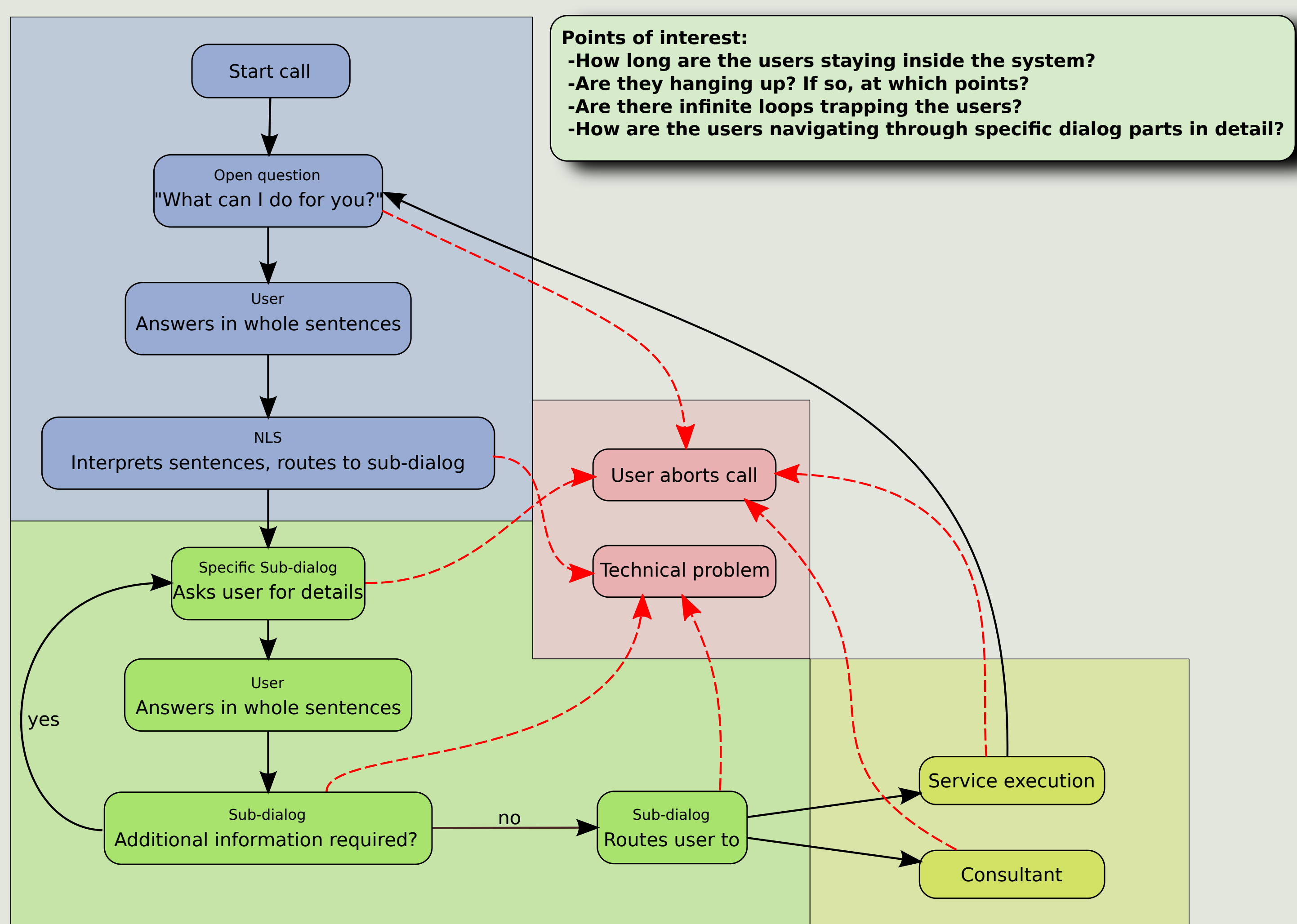


Figure 1: Example of a voice portal using a natural language system.

- ▶ Especially after applying changes to a voice portal or in case of technical problems, it is important to be able to analyze the consequences on user flows in the system.

Comparing User Flows

- ▶ The user flow in a voice portal within a specific time frame corresponds to a weighted graph, where the dialogs are represented by nodes and the user flows by weighted edges.
- ▶ In order to compare user flows within the same voice portal at different time frames, a joined graph with multiple edges is created.
- ▶ A flow-map-based layout is used to visualize the resulting graph, with multiple edges drawn as single arrows.
- ▶ The amount of users passing between two dialogs is visualized either by varying edge width or by varying color saturation.
- ▶ The figures to the right are showing the results for a small example voice portal, where three time frames are used for comparison.
- ▶ A radial tree layout algorithm provided the initial layout, while the node positions were adjusted manually.
- ▶ The prototype implementation was done in Java, using the Piccolo2D framework.

Acknowledgement

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Using Edge Width to Compare User Flows

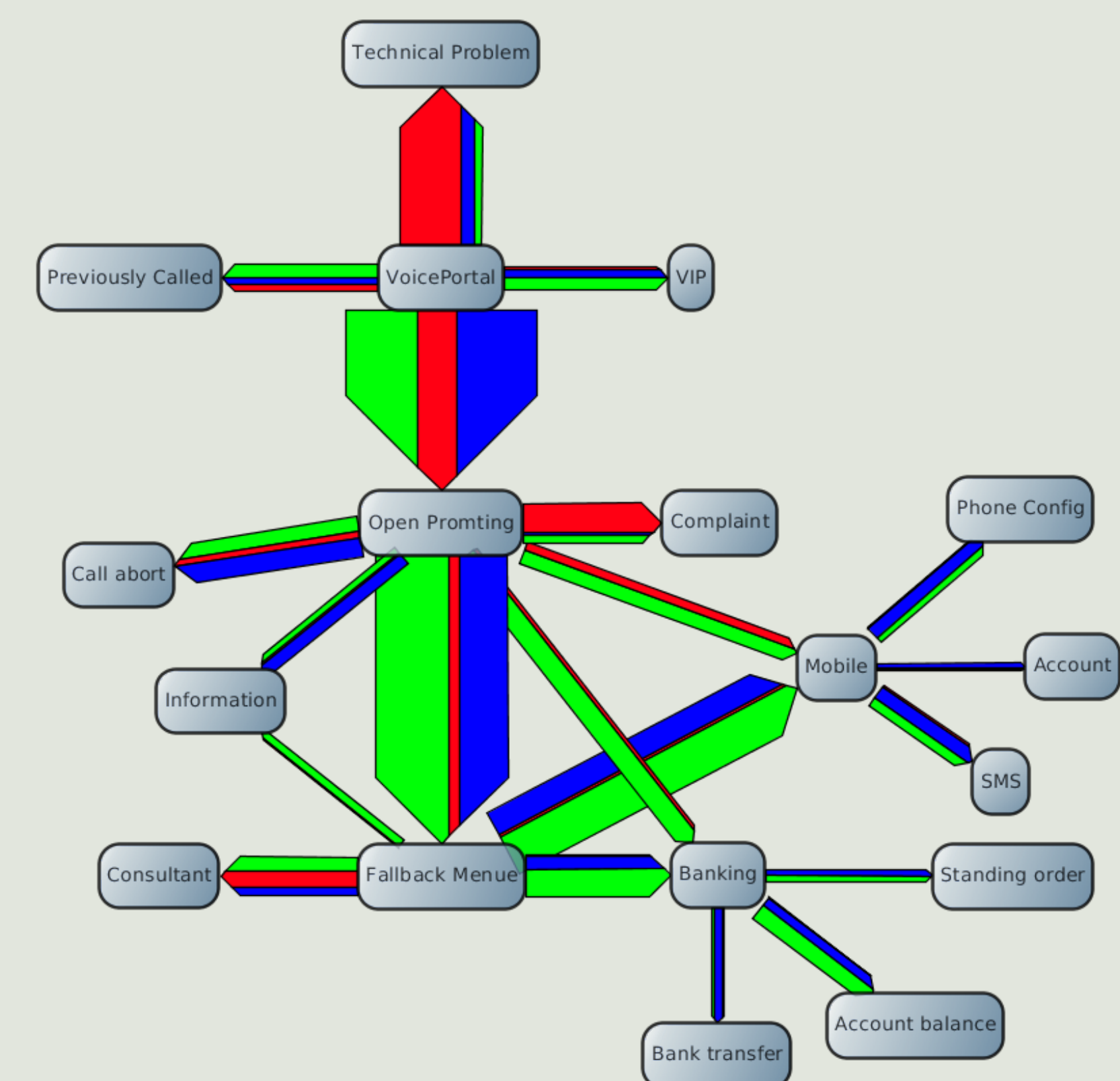


Figure 2: First approach, comparing user flows by means of edge width.

- ▶ The example above shows the first levels of an example voice portal.
- ▶ Multi-colored edges are displaying the user flows for that system.
 - ▷ Each color represents a different selectable time frame.
 - ▷ The edge width represents the amount of users that have passed between the adjacent dialogs.
- ▶ Drawbacks of this approach:
 - ▷ User flows through central dialogs of the voice portal are creating very thick edges.
 - ▷ Peripheral edges are too thin to actually give a hint of the user flows. Very small flows are nearly invisible.
 - ▷ The overall edge width could be increased to see the details at peripheral parts, with the effect, however, of making the graph look very crowded and unsettled.
 - ▷ Viewing time frames with very different user flows could create the need to adjust node positions in order to route thick edges between them, destroying the mental map of the user.

Using Color Saturation to Compare User Flows

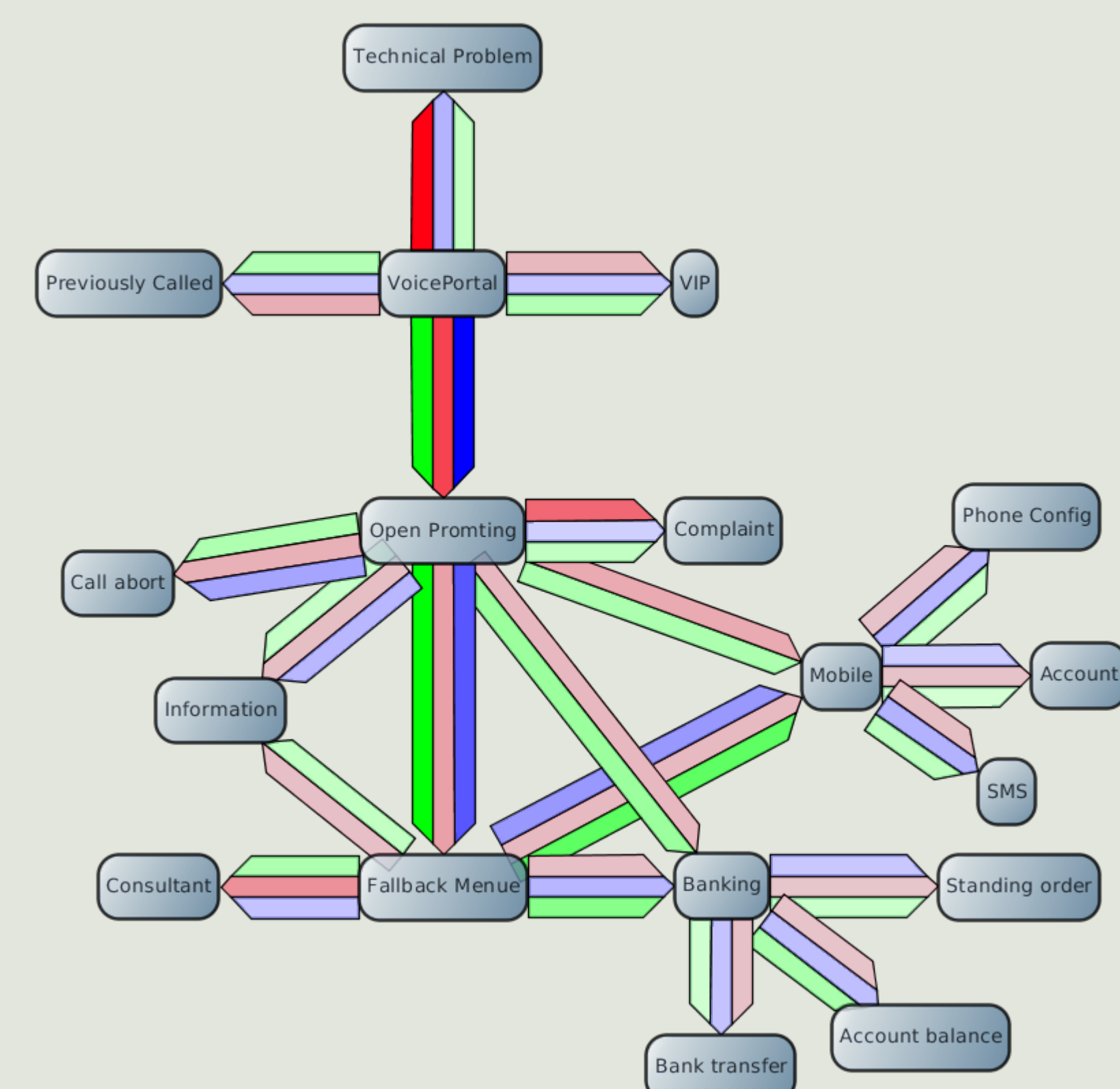


Figure 3: Second approach, comparing user flows by means of color saturation.

- ▶ Representing user flows by color saturation avoids varying edge width.
- ▶ Small user flows at peripheral parts are now visible as low-saturated edges.
- ▶ A lower saturation threshold of 0.05 (for the range [0, 1]) is used in order to keep colors distinguishable for small amounts of users. If no users have passed between two dialogs within a certain time frame, the corresponding color is not contained in the edge connecting these dialogs.
- ▶ Changing time frames does not have an impact on the edge width, thus preventing the need to adjust node positions.