Value at Risk:
Visual Approaches to Scrutinising Investment Risk

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Abstract

Prudential plc. is an international investment company providing savings, protection and retirement products, as well as asset management, to the global market place. Management of risk is one of Prudential's key 2014 strategies and is a standard required by the industry's regulators, however, there is currently a gap in Prudential's value at risk reporting function.

This project aims to fill this gap in reporting by producing an application which can carry out value at risk calculations and display these results in a range of graphs. The application will allow users to scrutinise different investments, distribution calculations and scenario ranges on data they have loaded into the application. Research of existing products and their features was performed; it was found that of the 3 products researched none were suitable solutions due to cost, time to implement or functionality. An agile software development approach was adopted to enable client engagement, early prototyping and regular testing. Essential, desirable and system requirements were discussed and agreed with Prudential before commencing the process of interface design. During interface design client feedback was used to solidify the project requirements and ensure the functionality and appearance that the client required.

The application's static design was developed utilising Model View controller design patterns, this provides several advantages to the application including: the modularity of the calculations function, in particular scenario calculations; the opportunity to extend the application; and, interaction with user input elements whilst maintaining separation between the graphical user interface and other aspects of the programming.

Testing was carried out throughout the development process identifying issues, some of which have been rectified and others that have been included recommended as future areas for development. Issues identified through the testing phases include: browser compatibility; slight issues in accessibility; and, page loading performance.

The application satisfies the bulk of Prudential's essential and desirable requirements: it handles CSV file loading; operates securely; produces scatter plot, bubble graph, joint probability loss distributions and curve fitting graphs, all of which have tooltips; can display different scenario ranges (in particular the solvency margin); graph display is backed up by the display of specific numerical data; and, formatted reports are available to be printed. The key strengths of the application are the swift updating of the view on user input, the ability to display and compare 2 different investment products on one graph, and the scenario calculation module. However, to fully meet the essential functionality support is required in order to supply the 3 dimensional surface chart with the correct plot data.