Problem Analysis

Todo: Make the summaries into one nice big thing without stupid headers  
Research some notification methods papers a bit better so I can actually do that section  
Tables!  
Stuff talking about tables!  
Shorten summaries because they’re loonnnngggg

# Summary of Network Issues and Problems

Large organisations require fast and efficient network monitoring systems, and many current systems use slow or difficult to set up methods for informing persons of issues such as services offline or environment issues[1]. Security is also a relevant factor, with the British government attempting to inform the private sector of potential security issues, but dealing with them or even methods of working out if they are happening are conspicuously missing from many reports and documents[2]. A paper on visualising Cyber Security is very much based around post-analysis, though its favour of colourful visualisations is not shared by many Cyber Security analysts in the field, who would much rather work with “archaic” command line tools[3]. This lack of interest in the visualisation of data makes it more difficult to identify trends in live data, as traversing textual logs can be both time consuming and frustrating[4].

Due to the unification of operating systems over devices, such as the Universal Windows Platform or many Linux variants and Android sharing similar codebases, cross-platform attacks are more popular than ever[5]. This means that monitoring and intrusion detection systems should be take this into account, keeping an eye on as much of the site as possible and not just servers or desktops.

# Summary of Research on Chat Bots and NLP

The idea behind Natural Language Processing is to convert text into a programmer friendly data structure that describes the meaning of the text, allowing it to be used programmatically[6].

Chat bots started out as fairly non-intelligent programs, able to only parse very basic and very specific text out of incoming data[7]. Even the more intelligence chat bots such as Eliza and ALICE are still just simple adaptations of the “regular expression” style of chat bots, often written in a style of XML called AIML[8]. While you could still have almost meaningful or semi-useful information gathering conversations with chatbots in the early days of them[8][9], things slowly started to improve with projects taking advantage of large databases of documented human interaction such as the Dialog Diversity Corpus[10]. These databases allowed for much larger keyword recognition and transformations of incoming text to output human-like responses[11]. However, while conversations seemed more natural, this was still only a basic extension of the original “regular expression” style.

As machine learning started to enter the realm of computer science problems, it started to merge with the idea of being able to process natural language, and that began the field of statistical natural language processing[12]. Machine learning allowed chat bots to take interactions like the Dialog Diversity Corpus and learn from them, being able to “guess” at new phrases or sentences rather than just having a list of stock inputs and outputs. Machine learning is also not bound by its reference material, and is able to learn from the inputs it receives(ref?).

Attempts have been made to start the idea of natural language processing and machine learning almost from scratch, but so far it seems that it almost always worth referring back to technologies that already exist and building upon them[6]. For example, a study comparing traditional AIML with the ALICE chat bot and a new chat bot program called FUTURE showed that the AIML based bot was significantly easier and faster to develop for due to already having many AI-oriented features, and ended up performing fairly well under human testing[13].

“Machine Intelligence” was defined in one of the papers as a list of fundamental requirements for a machine to be considered “intelligent”, such as having perception of a situation, working sensors and a working memory that can be used to retrieve data logically. Many chat bots can be considered partially intelligent due to being able to apply logic & reasoning, heuristics and a dynamic memory[13].

Recently, technologies like Microsoft’s Language Understanding Intelligent Service (LUIS)[14] allow for non-machine learning experts build models for things like natural language processing without complex programming or large-scale database management[15]. Machine learning can suffer from what as being a “lopsided” problem, where not all the data is available for a system to fully realise a piece of data. A human “teacher” can help rectify this and act as the middle-man, translating language easily into machine-readable code until the machine has learned enough to continue for itself[15]. After systems like these achieve the desired accuracy, they can be accessed via external API’s which will accept an input and output a much more machine-useable output, with information separated as requested by the teacher[16].

# Summary of Research on Notification Methods

Todo because I apparently did fuckall research on that

# Existing Tools

Talking about existing tools could be a problem as I haven’t researched many – My last 4 reviews should be about information systems

{{Table comparing tools}

|  |  |  |
| --- | --- | --- |
|  |  |  |
| Nagios |  |  |
| Webmin |  |  |
| RSAT |  |  |
| Icinga (Has a cool rest API) |  |  |
| OpenNMS |  |  |

{{Table comparing sub-tools, tools that the tools use to report stuff}}

|  |  |
| --- | --- |
|  |  |
| E-Mail |  |
| SMS |  |
| Phone Call (Automated) |  |
| Web page |  |
| Log files |  |
| Instant Message |  |

{{Response types? – How can you remotely deal with issues once being informed}}

|  |  |
| --- | --- |
| VPN |  |
| Remote desktop |  |
|  |  |
|  |  |
|  |  |

{{Some theoretical stuff based on my lit reviews}}

{{Specific weaknesses from tables}}

{{List/identify weaknesses I’d like to address}}

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