INFORMATION SYSTEMS 330

ASSIGNMENT 2

BUSINESS INTELLIGENCE

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Part 1

Problem: **Maximising profit from shares according to prediction trends from clients.**

Alison Trump's investment Management Company (AT) is one of the largest investment and management firms in the oceanic region. They are required to make appropriate decisions to minimise risk exposure whilst reducing risk exposure. This leads to the problem of how they will be able maximise profit from shares according to prediction trends from clients. Thus, AT will identify by utilising past trends to obtain the most profitable scenario for Alison Trump's investment Management Company (AT).

Business Intelligence Solution:

Alison Trump's investment Management Company (AT) is a large organisation and should only be focusing on relevant information that can maximise profit, disregarding any information that does not yield possible profit. They want to be able to extract relevant information to be able to reduce risk exposure while benefitting those in society regarding when to buy and sell shares. For this AT will need to adapt a system that will allow for them to generate and forecast shares over a period and analyse this information to determine scenarios when to buy and sell shares for maximum profit while minimising risk exposure on the market. By extracting certain amounts of information will allow for AT to have all the necessary information to determine these requirements from already existing information and help reduce risk exposure in the future.

Sub Problem 1: The impact that natural disasters have on share prices.

Sub Problem 2: Behaviours of large scale events that hinder the securities in the market.

Stakeholders: Alison Trump's investment Management Company (AT) stakeholders.

- Clients (Those who will be purchasing the shares of the market)
- CEO (Finalising the decisions from the predictions identified about the trend)
- Computer scientists (Developing the program to make predictions)
- Financial analyst

The BI solution identified above will be able to support/benefit each corresponding stakeholder as it will provide information that will help them make more benefitting choices regarding maximising profit according to share trends.

Clients: This BI solution is relevant to clients as it will provide them with potential information that can help them make appropriate decisions on the share market based off trends from previous years. This will benefit them into make choices with regarding their shares to maximise their gains from already existing data and trends likely to follow such incidents.

CEO: This benefits the CEO as it provides an indication for the CEO to decide on future decisions regarding the share market and help him make more appropriate decisions with future forecasts increasing predictability and better decision making in the future for the business. As the CEO decisions will have a heavy influence on whether they wish to rely on this information and determine best case scenarios when to sell shares.

Computer scientist: This benefits the computer scientists as they can create a program that focuses on a specific area instead of using ambiguous data that provides no benefits to the profit obtained from shares. Their decision is to determine what sort of information must be extracted and looked further into to create a prediction trend for AT to investigate further. This is important as it provides an indication to AT on what sort of forecasts are to be predicted from their program.

Financial Analyst: This benefits the financial analyst as it provides them with future forecasts with existing information regarding how shares are holding up in the market. This allows for the financial team to make choices regarding how the share will move throughout the market and make better decisions for AT. Which then could potentially lead the company to maximise their profit from shares and less risk of exposure. They must decide when to increase and decrease share prices when appropriate to ensure max profit is made over a given trend.

Part 2

Sub Problem 1

The impact that natural disasters have on share prices.

This is a relevant to the main problem as it influences the overall share market as natural disasters could reduce the profit due people's circumstances. It is possible people could sell their shares at a given lower rate than purchased as they require money. Overall reducing the maximum profit AT can receive from their shares due to cheaper sales.

Business Intelligence Application: Artificial Neural Network (ANN).

Dimension	Target Solution	Artificial Neural Network
Accuracy	Moderate	✓
Explainability	High	✓
Response Speed	High	✓
Scalability	Moderate	✓
Flexibility	Moderate	-
Embeddability	Moderate	-
Tolerance of complexity	High	✓
Tolerance for noise in data	Moderate to High	–
Independence from experts	High	✓

ANN Processes:

Prediction process of ANN:

1. Data is presented to a neural network and ANN guesses an output.
2. Prediction is compared with actual data or correct values, ANN compares such data if correct no further action is taken.
3. If incorrect data is present ANN determines which information requires adjustments and changes them.
4. New information is added, and the process is repeated further increasing the accuracy of predictions generated from ANN.

Process of ANN:

1. The input layer receives data from data sources. (Data input)
2. The internal or hidden layer than processes the obtained data. (Guess)

3. The output layer finally produces the information from the past information used. (output)

The BI application: Artificial Neural Network is the most ideally for this specific task of monitoring and learning from past events and predicting a new trend. Learning is done by comparing outputs from the system and past events to create the most desired outputs from current and past data. This is ideally better as this application focuses on past data and current data to form new predictions in this case a disaster that could affect shares on the market and further affecting AT overall profit. While another application such as Data tree focuses on correct data and paths that can occur given the scenario, since disasters un-predictable the events following are also unknown making data trees an unreliable application for making predictions. Having a greater response speed makes ANN that more reliable as it will continue to learn from new cases and generate information that is almost certain and trust worthy. ANN also utilises a method called Supervised Learning which is given correct results data and correct results and learns from these patterns to form predictions in the future from the given data. Thus, making this the most ideal application for predicting events such as a disaster that can affect the share market and provide AT with future predictions in case incidents were to occur and allow for AT to act on it.

Sub Problem 2:

Behaviours of large scale events that hinder the securities in the market.

This is another relevant problem to the main problem as larger events may hold a negative effect towards to profit on a share as people may wish to purchase shares for the new event and drop their current shares to purchase new ones. This could lead to a negative effect for AT as their shares aren't as valuable as before due to new large-scale events taking prejudice over their shares overall causing AT to be unable to maximise profit and increase exposure risk.

Business Intelligence Application: Case base Reasoning (CBR)

Dimension	**Target Solution**	**Case base Reasoning**
Accuracy	High	✓
Explainability	Moderate	✓
Response Speed	High	✓
Scalability	High	✓
Flexibility	High	-
Embeddability	Moderate - High	✓
Tolerance of complexity	High	✓
Tolerance for noise in data	Moderate	**-**
Independence from experts	High	✓

Case Base Reasoning Process:

Case base reason is broken into two aspects a "case" and "Case-base."

Case: is a collection of attributes (data) together all this information forms a scenario and a solution.

Case-base: Is a collection of cases.

Used cases retrieved by a probe looks for similar cases and uses the data in two specific ways.

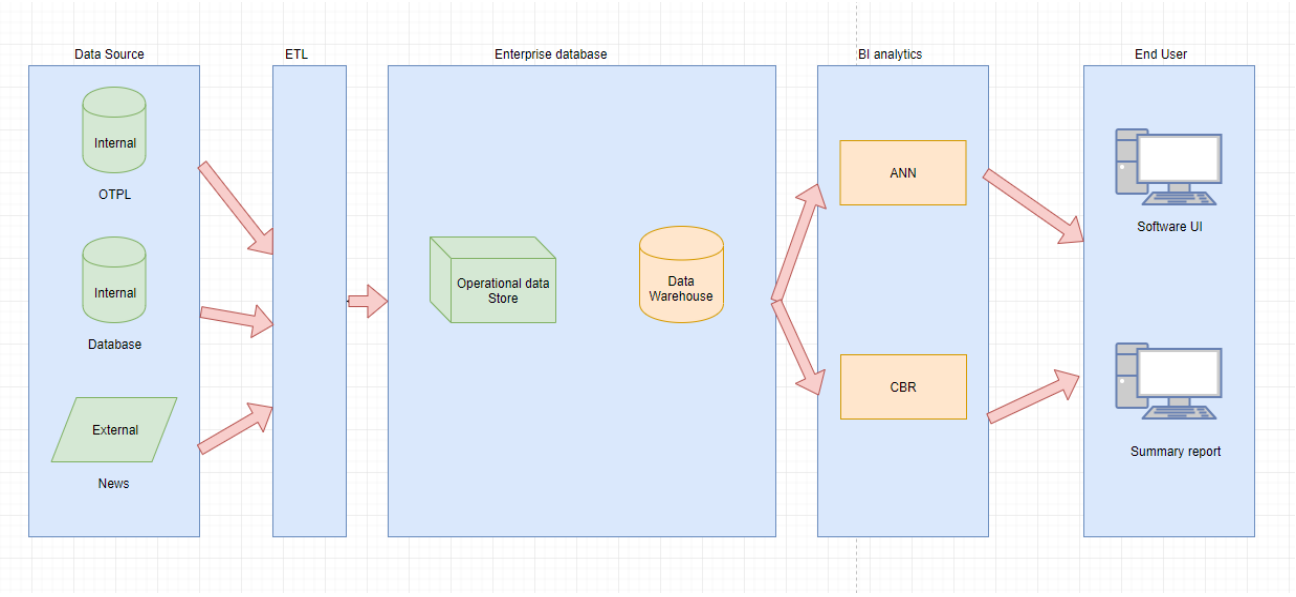
1. Initial probe looks for similar cases. Looks at past events that are similar to the current and affects it has caused on the shares
2. The initial probe is refined (makes adjustments to the solution from the most similar case found in the past) in context looks for other large scale events and the affects they've had on the share market.

The benefits of using CBR for dealing with the problem of behaviours of large scale events that hinder the securities in the market.

1. Allows for AT to solve the problem without having to start from scratch as there will already be existing information to look at.
2. This utilises past knowledge to form a prediction which is ideal in forming a prediction trend for the main problem and the sub problem.
3. CBR takes the whole situation into account and modifies it according to the differences from past situations. Allowing for AT to modify their shares accordingly to past situations.
4. CBR overall offers more improvement to performances over time allowing for AT to be able to maintain their shares prices regardless of events that could affect their shares.

Overall, we can confirm CBR would be the most logically choice for an application for dealing with large scale events that can hinder performance and share prices. Compared to rule-based systems which must follow a set of rules to produce an outcome. CBR is more efficient compared to another application that follows similar rules such as RBS instead of decomposing the problem into smaller parts CBR focuses on the whole and modifies the whole solution instead of small chunks of it. CBR overall provides better performance indicators and on the long run will provide AT with more necessary regarding how these largest scale events have affected their shares. Thus making CBR the most logically choice when wanting to compare past data and create a solution most benefiting and adapting to old events and current events to reduce risk exposure and increase profit according to large events.

System diagram:



System Architecture:

AT does not require a system that can pin point the exact date for predictions of when a price of a share increases or decreases but rather need a method that will help guide people in making better decisions with estimations of a share going up or downwards.

The development to will be required to create a database that can freely interact with financial databases where the share market data is stored. To achieve a system incorporating Artificial Neural Network (ANN) into the procedure, Microsoft visual will be used as the main software for visualising the being sent and reviewed the ANN software. The data source containing all past information will be sent to the data warehouse and then generated through the visual studios in the mining model view will allow for AT to view and predict trends from past data.

For AT to use Case Base Reasoning (CBR) will require a software which allows for the system to compare and adapt to changes in the terms of having a correct case. Utilising software's such as T SQL will allow for the computer scientist to extract certain information and compare in it visual studios to create diagrams and clusters to view the information extracted from each table in T SQL. Thus, will require someone confident in T SQL and similar languages.

Conclusion:

Overall, I believe all the specifications to achieve a system that will be able to create and predict trends for AT to review and adapt to ensure they are able to maximise on profit from past trends. Being broken into two sub problems allows for the problem to be dealt with more efficiently and produce better results in the long run for the business with its' shares. Utilising ANN and CBR are two methods reliant on past data making them the best choices when creating new trends from past data. Thus, the system being created for AT will increase the quality of their shares to maximise profit and be able to prepare for scenarios that can hinder their share market price.

Therefore, all the procedures mentioned above will help solve the main problem for AT "Maximising profit from shares according to prediction trends from clients." Allowing for more appropriate decision making and overall better quality of life for AT and its clients in the share market.