Buisness Intelligence

CMP9051M

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# Task 1: Intelligent Technologies in Affective Human Computer Interaction (Week 10, Date 28th November 2016)

### Introduction to company

Amanita Design is a Czech game developing company founded in 2003 by Jakub Dvorsky and is headquartered in Brno, Czech Republic. The company currently has 20 full time employees. They have created several award winning games that include Machinarium, the Samorost series and Bontanicula. Besides making computer games, the studio has also created music videos, websites, animated works, and illustrations, and has done production design as well. They have had clients such as the BBC and Nike.

### Services

Amantia Design creates games for several platforms, most recently focusing on Windows, IOS and Android. Being a studio that develops for cross platform opens them up too many technology’s as they have access to a wide range of devices.

Examples of their games on Google’s Play Store:

Machinarium - £3.99 - 500,00 installs - May 2012 Android release

Botanicula - £3.99 - 100,00 installs - May 2014 Android release

Samorost 3 - £3.99 - 10,00 installs - March 2016 Android release

Above is just the data for their sales on the Android play store, so this alone shows success and is not including the sales from IOS or steam. It also shows that given time the amount of downloads for these products increase and aren’t just a fad meaning they sell lots initially and then it rapidly decays which shows a solid foundation for reliable revenue.

Obviously they also gain revenue from the services they provide to BBC and Nike which is developing web based games for advertisement purposes as well as other side projects that include music videos, and other flash based programs for web use.

### Challenges to the company’s business

Amantia design has been struggling with piracy from the beginning. In an interview with Jakub Dvorksy, Jakub estimates that only 5-15% of people actually bought his game. In an effort to combat this they started selling their games along with a downloadable copy of the soundtrack to entice more people to pay for it. The soundtrack of the game being one of its USP’s. Dvorsky stated that this isn’t a confirmed number done with any statistics just from assumptions of the pure amount of free download links to the free games along with discussions on forums. Either way it is clear that this is a huge loss of potential revenue, later on intelligent software will be mentioned on how it can help combat this.

Like every company Amantia Design has competitors in the shape of huge AAA studios and even small indie developers that make overnight successes. According to statistics only 33% of people will pay for GET REF

Steam takes 30-40% profit

Play store takes 30%

App store takes 30%

### Freemium, premium and paymium mobile models.

Freemium- Freemium is a pricing strategy by which a product or service (typically a digital offering or application such as software, media, games or web services) is provided free of charge, but money (premium) is charged for proprietary features, functionality, or virtual goods.92% of revenue from the App store is generated from freemium apps, yet they just account for 11% of apps. This model requires a huge player base to make money.

Premium- Premium is a strategy of selling a product or service at a fixed priced. This is the model that Amantia follows. This is the straightest forward and safest ways to sell on the app store. Paid apps account for 36% of the apps on the app store and they generate 4% of the revenue.

Paymium- This is a paid for game that has in game purchases like the freemium model. Only roughly 2% of apps on app store are paymium, yet they generate the same amount of revenue as premium.

In 2014 9 of the top 10 games were freemium.

### How technologies can solve these problems

Amantia design currently has problems with piracy which was discussed earlier, this is because they follow the premium model for selling their games. They could switch to a freemium or a paymium model and use technologies such as facial/ emotional recognition to effectively regulate micro transactions that have been shown to annoy users. Using this approach, they could avoid using the premium model which causes problems with piracy and make profit via one of the other models.

NOT ONLY DO AMATIA CREATE GAMES BUT ADVERTS FOR BIG COMPANIES. THEY COULD USE EMITONAL DETECTION TO TEST THESE

### How these technologies work (High level)

### How do they inform and enhance the business decision processes?

Obviously as they are a games development company they want to develop good games. So using data collected from recording player’s facial expressions while playing the game will give the developers good feedback on what players enjoyed and didn’t enjoy allowing them to improve their games if need be. Which in return will allow for more sales as happier customers means they will get good reviews and more customers will purchase the game resulting in more revenue.

What are the challenges of the company’s business in terms of migrating manual data analysis practices by employees to automated decision making technologies?

### What are the limitations of the existing technologies?

Currently the main limitation facing this technology is

### What does the future hold for these technologies?

### What are the future challenges?

After finding a solution for the data protection, the future challenges will be mostly technology based. So for example now the majority of people have some phone with a front facing camera that could be used for facial recording however, different technologies such as a ECG, heat sensors etc. would require the technology for the majority of users to have access too. Currently smart phones don’t come with this technology so using these technologies now won’t provide much. Given 5 years or so with devices such as a smart watch becoming more common these technologies may be used in a business intelligence stand point.

How can the company incorporate the new emerging technologies for BI?

TALK ABOUT IN GAME AGENTS THAT COMPLIMENT THE USER. These can be affected by the emotions of the individual player and react as such.

### Micro transactions

Micro transactions are a business model where users can purchase virtual or digital goods via micropayments (A very small sum of money). Micro transactions are often used in free to play games and provide a form of revenue for the developers. Micro transactions are a staple to the mobile app industry but are not limited to it as they appear on other gaming/ app platforms.

An example of a micro transactions would be in a free to play action based game where the user could purchase a cosmetic item that changed their avatar in games appearance. This for example costs £0.99, now on its own this doesn’t seem like a huge source of revenue but when you have a big player base and say a 1000 players buy this seeing as it is only 99p it adds up.

Some games developers introduce their own currency so with real money you exchange it for this virtual currency. This virtual currency allows you to purchase in game goods. However, what some developers do is price goods oddly so say £1.00 gets you 100 points of virtual currency. A typical item would cost 875 of this virtual currency leaving the user with 125 points left over. This encourages them to spend more as they see it as a waste if they don’t or they see it as not needing much for the next in game item.

This could delve deeper into getting players addicted to purchase these goods via micro transactions but this short description seeks to show how these can be an effective way of making revenue especially when you have multiple games published. Later on the integration of business intelligence will be discussed and how it could increase the performance of the sales of micro transactions.

[Electronic Arts](https://en.wikipedia.org/wiki/Electronic_Arts) Corporate Vice-President [Peter Moore](https://en.wikipedia.org/wiki/Peter_Moore_(business)) speculated in June 2012 that within 5 to 10 years, all games will have transitioned to the microtransaction model.[[10]](https://en.wikipedia.org/wiki/Microtransaction#cite_note-10) [Tommy Palm](https://en.wikipedia.org/wiki/Tommy_Palm) of King ([Candy Crush Saga](https://en.wikipedia.org/wiki/Candy_Crush_Saga)) expressed in 2014 his belief that all games will eventually be free-to-play.

study found that over 92% of revenue generated on Android and iOS in 2013 came from free-to-play games.

.5% to 6% of players will purchase in game goods via micro transactions based on the quality of the game.

RECORDING PEOPLES FACES NOT ONLY TO POP THE ADVERT UP AT THE KEY TIME BUT TO GATHER DATA ON WHEN PEOPLE ARE MOST SUSEPTABLE TO ADVERTS AND USE THIS TO DESGIN FUTURE GAMES. SO USE DATA GATHERED TO SPECIFCALLY DESIGN FEATURES IN NEW GAMES THAT AIM TO GET USERS TO USE MICRO TRANSACTIONS.

NOT ONLY CAN IT BE USED FOR A METHOD OF INCREASING SALES IN GAME/ APP BUT DEVELOP APPS AND GAMES THAT BIRNG USERS IN BECAUSE ITS USING NEW TECHNOLGIES SUCH AS USING EMOTIONS TO DYNAMICALLY CHANGE THE GAME.

Howard Dresner originated the term business intelligence. In the early 1990s, he defined businenss intelligence (BI) as “a set of concepts and methodologies to improve decision making in business through use of facts and fact-based systems.” QUOTE THIS

http://amanita-design.net/about.html

talk about how it’s used in the games industry with technology such as Kinect and even web cams that pick up on player emotions and dynamically change the pacing of the game.

Talk about competitors

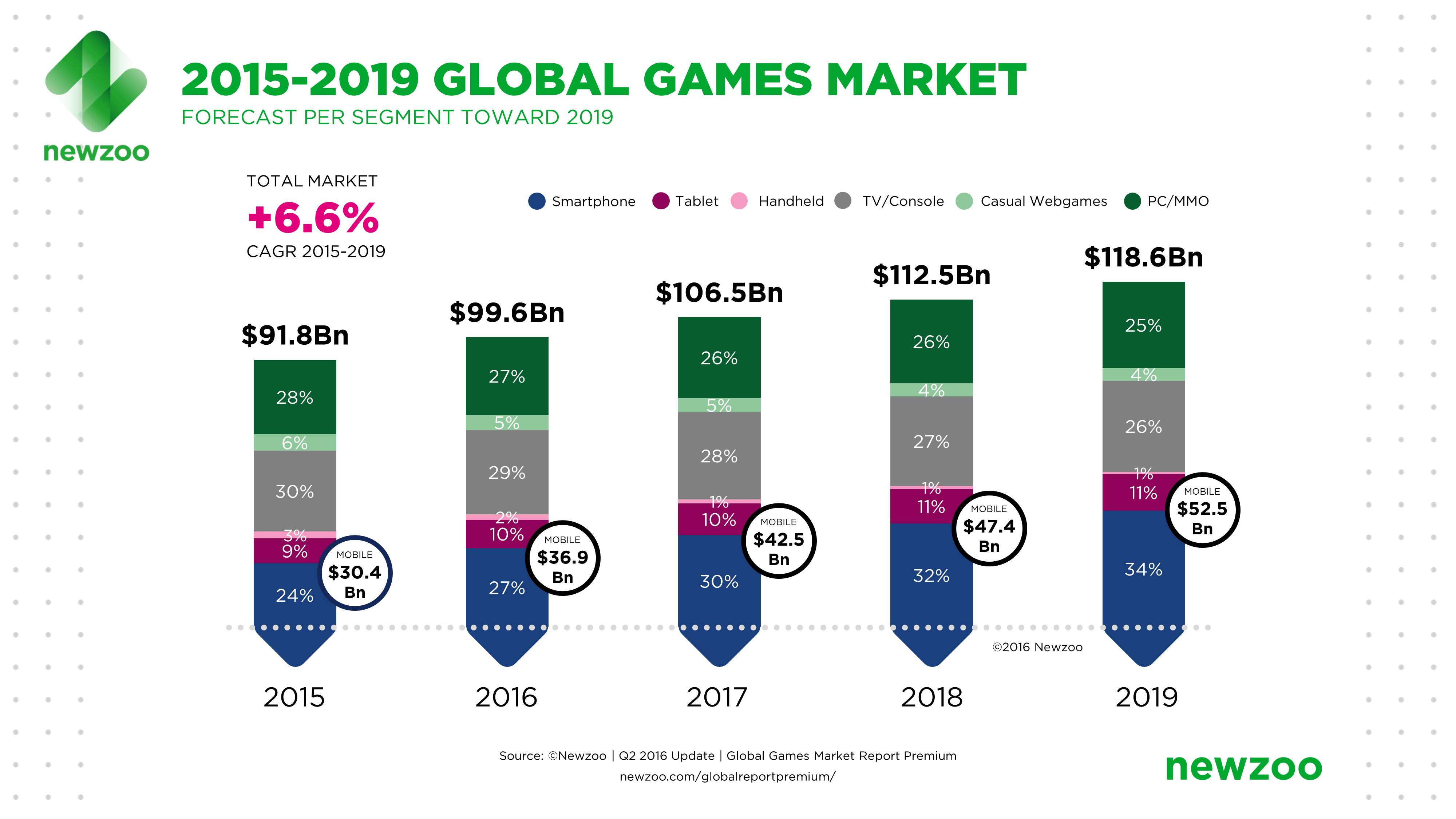
Talk about affectiva and companies like it that other emotional recognition software that can easily be implemented and used in software that creates games like unity.

Talk about in game purchases that could pop up based on emotions. Unlike retail customers play games where ever and whenever so will be open to a wide range of emotions. Micro transactions make up a huge amount of income for small games companies especially those that focus on a mobile platform which is the hugest gaming platform.

Evidence of the increasing player willingness to play video games across a variety of media and different platforms can be seen in the rise of casual gaming on smartphones, tablets, and social networking sites as 92% of all smartphone and tablet owners play games at least once a week, 45% play daily, and industry estimates predict that, by 2016, one-third of all global mobile gaming revenue will come from tablets alone. Apple's App Store alone has more than 90,000 game apps, a growth of 1,400% since it went online. In addition, game revenues for iOS and Android mobile devices now exceed those of both Nintendo and Sony handheld gaming systems combined.(ref)

University, Stanley J. Baran, Bryant (2014). *Introduction to Mass Communication : Media Literacy and Culture* (Eighth Edition. ed.). New York: McGraw-Hill. p. 222.

In 2016 the games industry generated $99.6 billion, Mobile generated 37% of this. ($36.9 Billion). First year that mobile has taken over other gaming platforms.



With substantial growth showing in the coming years making this a very profitable market. The use of new technologies will over better services and will allow businesses to make more profit.

Talk about how games such as flappy bird, crossy road have had run away successes for a very cheap development.

90% of revenue comes from micro transactions

They are considered annoying but using this technology could come up at the point which would least annoy the gamer GET PAPER FOR THIS

Research the percentage app store takes.

Mobile isn’t only platform with Xbox, pc and Play station all having some sort of camera especially in the coming future it will be easier to record a player’s emotions. Some games now use emotions to affect game play so it won’t be unheard of that businesses could use this to their gain by ways of advertisements etc.

Gambling games use of AI, emotional recognition could be used to make these Ai extremely effective however then there is the moral and ethical issue with this.

The ability to understand and even predict, individual customer or segments, needs preferences and habits

Anticipate new opportunities to sell

Deliver better services

Targeted marketing campaigns

Increase their sales, differentiate the brand better or unique services

Future of this

Evolving still so many possibilities around the corner meaning new competitors and different markets to explore.

Targeted adverts that not only respond to demographics (age, gender, likes) but to a person’s current emotional state. This information could be used to makes sales when people are most emotionally vulnerable, this of course is a possible ethical issue. Emotional recognition via facial detection is also shady if the user isn’t aware of their consent to be recorded visually.

Privacy legalities

TALK ABOUT THIS AS A FIELD SO SENSORS, HOMES CONTROLLED BY AI that respond to emotions/ needs, transportation NEXT STEP OF TECHNOLOGY

<http://ibug.doc.ic.ac.uk/media/uploads/documents/IJAACS-2008-PanticEtAl-CAMERA.pdf>

virtual over physical environments

Obviously as this task was talking about a medium sized games development company and how intelligent technologies focused around HCI could help improve a company many off the intelligent technologies simply don’t apply, not yet anyway. It just isn’t feasible for example implementing smart AI, not only is this breaking edge technology but not only would they have to hire programmers to implement it. For a huge AAA studio this area is more feasible.

The magic of Moore’s Law has continued for almost forty years. With the advances in computer and sensing technology, we are living in a world of virtually ubiquitous powerful computation and sensing. Computers of different dimension and nature are equipped with such devices as cameras, microphones, mechanical and magnetic sensors. In the near future, we probably will spend more time interacting with computers than with people. Unfortunately, human-computer interaction(HCI) has been lagging behind the progress of computation. Currently, the dominant computer interface is the Graphical User Interface (GUI) WHICH ISNT A SMART TECHNOLOGY PER SAY RATHER A DESIGN METHOD.

Look up software to see if a GUI is good user interface.

Battle net menu use to store data on players use software to design this mix this with over intelligent software

Speech recognition

This would require the user to talk which isn’t always wanted, this has been shown in the past and is the reason some games don’t succeed as people simply don’t want to do it. Some examples of games doing it so it picks up ambient speech rather than requiring the user to actually talk.

Heart rate/ sweat recording

With new smart watches along with facial expressions users heart rate data could be recorded

# Task 2: Web Search Algorithms: A Short Introduction to Information Retrieval - 31 October 2016

http://www.slideshare.net/ankur881120/business-intelligence-solution-using-search-engine

BI solutions are designed to allow companies to easily turn volumes of data they collect and store into meaningful information – to best manage their operations. When key information is readily accessible, better informed business decisions can be made.

The web provides a vast resource for business intelligence. However, the large size of the web and its dynamic nature make the task of foraging appropriate information a difficult task. BI solutions have for many years been a hot topic among companies due to their optimization and decision making capabilities in the business process.

Text mining

With the wide spread inclusion of document, especially text, in the business systems, business executives cannot get useful details from the large collection of unstructured and semi structured written materials.

Data mining can scan a large amount of retail sales to find the money making purchasing patterns of consumers.

Text mining is a variation of data mining and is a relatively new discipline. Commonly, text mining is the discovery by computer of previously unknown knowledge in text, by automatically extracting information from different written resources. Text mining can represent flexible approaches to information management, research and analysis. Thus text mining can expand the fists of data mining to the ability to deal with textual materials.

Mining the web

WWW is a huge, widely distributed and globally information service centred for;

Information services: news, advertisements, education etc.

Hyper-link information

Access and usage of information

This all provides rich sources for data mining.

Challenges faced

Too huge for effective data warehousing and data mining.

Too complex and heterogeneous

The data is changing and growing at a rapid rate.

Not all data is available for example people’s private blogs, conversations.

Page rank

This is an algorithm used to analysis links

Helps determine the importance of a website

All websites are given a google page rank score 1-10 to determine its importance, reliability and authority on the web.

New websites with no links pointing to them start at o and increment up the scale from 1.

More inbound links are seen by crawlers and essentially count them as votes of recommendation from other sites.

Page rank has a way of counting and evaluating the quality, relevance and quantity of the votes.

Years ago google used the page rank of the website to determine the position in the search results.

It was one of the major ranking factors to get a website to the top of search engines. For this reason, everyone wanted to get links from other websites with a higher page rank to get a higher page rank themselves. This is not the case anymore.

Now pagerank no longer, in and of itself determines a web pages search rankings in google. Its now one of over 200 plus factors that google uses.

Example Some website

Link from a website of a page rank of 8, yet it’s a website of no relevance. It will not only not improve the webpages pagerank it could hurt it.

Links from off topic websites and poor quality links such as spammy sites

### Introduction to company

The Rogue Saint is an American Irish bar, located in Lincoln that opened in 2015. It is known for its exciting live bands and skilled mixologist. It specialises in whiskeys, vodkas, gin and brandy inspired drinks from pre-prohibition America of the 1860s and 1870s. It is located in the centre of Lincoln in a prime location.

### Services

Choose something like a kebab shop. Use text mining for events coming up use page rank for orders online. Find on that doesn’t make use of a website right now.

Although people still gather to socialize in bars, just as they have for hundreds of years, other factors have come into play for the industry as well. Problems with driving while intoxicated have changed the drinking patterns of people in United States. The growing concern with health and fitness toward the end of the 20th century took its toll on the bar industry. Keeping tabs on this industry requires a look at the alcoholic beverage industry as a whole--what people buy in the store doesn't differ much from what they buy in a bar. The distilled spirits industry generates around $100 billion in U.S. economic activity annually, according to the Distilled Spirits Council, a national trade association.

You have some pretty tough competition out there. But you're not just competing with the other bars in your area these days. You're competing with every entertainment option from which your customers can choose.

**Speciality bar-** these concentrate on one type of libation from wines to martinis or a theme. although some specialty bars focus on only one drink category, there must be a wide variety available within the genre. Take martinis: They have become very popular due to the variety they offer. The traditional martini still has a solid appeal if made with quality vodkas and gins, but other mixes, like sour apple martinis, have expanded the martini-drinking base, especially among women. But even with their increased popularity, martinis are still looking up at wine.

Beyond the traditional glass or bottle with a nice dinner, for many, wine is the drink of choice. In fact, women order wine more often than any other alcoholic beverage. Wine bars offer guests the opportunity to taste a variety of different kinds of wine and the ability to learn more about their qualities.

Specialty bars tend to stay small and intimate in size and are located in more sophisticated neighbourhoods. The costs and revenues you can expect to find when opening a specialty bar depend mostly on the type of product you serve and your location.

WRITE HOW IT CAN HELP PLAN FUTURE EVENTS AS THEY CAN SEE WHAT COMPETITORS ARE DOING ETC.

Text mining

Although data warehouses are widely adopted, most fail to tap into the business intelligence potential of text. To date the focus has been on developing data warehouses geared to support primarily quantitative data.

Why bother with text? There are two primary reasons to incorporate text mining for BI. First, there is far too much critical information’s that remains inaccessible in documents. Data warehouses excel at telling us what happened when but not why. For example, it will be easy to discover a products sales margins decreased by 15% in a certain region without knowing the cause. That could be caused by literally anything and the answer to it is not with numerical data but text buried in documents ranging from emails, status memos, news stories to more complex documents such as marketing campaigns, contracts and government reports.

The second reason to address text directly is that traditional document and text management tools are inadequate to meet the demands of business intelligence. document management systems work well with homogeneous collections of documents but not with the heterogeneous mix that knowledge workers face every day. Even the best Internet search tools suffer from poor precision and recall.

CHANGE

Finally, documents are spread across platforms in different formats and languages with little useful meta data about the content of the documents. This same type of dispersion of data is a driving factor in the development of many data warehouses. Business intelligence users need, and have become accustomed to, an integrated view of their organization without regard to the original source or distribution of the raw data.

However, text is different. It is not structured like the numeric measures we are accustomed to dealing with. Or is it? Although text is often described as unstructured, that is far from the truth. Language is richly structured at multiple levels as linguists have aptly discovered. Structural principles are found in the formation of words (morphology), the creation of grammatical sentences (syntax) and the representation of meaning (semantics). Even higher levels of structure can be found in discourses and conversations as described by speech act theory. If we can analyse the structure of language, we can extract the information conveyed by text. Fortunately, after decades of foundational work in computational linguistics, tools are now available to delve into the complex structures of text and extract vital business information.

How text mining works

It is a process of automatic extraction of information from large unstructured text (Hart, nd). In text mining, patterns are identified from natural language text rather than databases as in GIAN JYOTI E-JOURNAL, Volume 1, Issue 2 (Jan – Mar 2012) ISSN 2250-348X www.gjimt.com/GianJyotiE-Journal.htm data mining. (REF)

Text Mining is an important aspect of Business Intelligence that helps users and enterprises in analyzing stored text in a better way so as to make better decisions, improve customer satisfaction and gain competitive advantage. (REF)

It is better than data mining as it provides deeper insight into the expanding business domain and extracts more fruitful data for business intelligence. (REF)

Future of text mining

If BI was an iceberg, text mining would represent a bulk of the hidden ice below the surface and usually forgotten. Fortuanlty things are changing, commercial quality text mining tools are available and database vendors are recognizing the need to manage text alongside numerical data. The internet provides a wealth of raw material to complement internal documents. Whether a user needs to understand why an anmolas pattern is showing up in the data warehouse, monitor market conditions or conduct competitive intelligence research, text is central to meeting those business intelligence needs.

# Task 3: recommender systems

# References

Here is a list of references used for each individual task.

## Task 1: Intelligent Technologies in Affective Human Computer Interaction (Week 10, Date 28th November 2016)

**Research Papers;**

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**Laws;**

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**Video Games;**

## Task 2

**Research Papers;**

http://www.gjimt.com/N16.pdf

**Online Articles;**

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## Task 3

**Research Papers;**

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