**PROJECT DESCRIPTION - JOSHUA**

**WHAT DOES IT DO? (600 WORDS)**

As a group we decided that our project idea would be a health issue prediction tool. This tool would be a web-based application, with the potential of eventually being made into an application for mobile phones, such as iOS and Android. The web application would allow Australian’s to go online and predict any health issues they may have based off information they provide to the system.

When users first access the website, they will be promoted to enter personal information such as their age, sex, and any past medical issues they have had. Users will then be asked if they optionally would like to enter more information. The more information the user enters the more accurate the predictions will be. Additional information they can enter could be ethnicity, diet, weight, any family illnesses, are they smokers, alcohol consumption, etc.

After the user enters the information they have chosen to share, the system will analyse their information against existing medical conditions. For example, a user enters that they are in their 60s, have had a cough, nasal congestion, and a headache. The system will look at these symptoms and determine what the most likely medical condition for this is. After giving the user the most likely medical condition, it will advise them on the next steps to take which could include taking cold medication and resting or seeing a doctor if it gets worse.

When building this application, the system would require a large database of medical data to analyse, to allow the system to recognise patterns to allow it to make its predictions more accurate. The system would most likely use some sort of artificial intelligence tools to analyse large sums of medical data. To do this we would need to look at various legal and ethical requirements. Regarding ethics, all the initial data given to the system would need to be completely anonymous to ensure that the privacy of all patients is maintained. In addition, the data would need to be verified to ensure that the system only learns correct patterns. Once the system is running and is allowing real-world users to use the system, their information would need to be highly protected. For legal reasons, the application would most likely also need to give users a notice informing them that this system only provides predictions and is not 100% accurate, and if they are feeling unwell, they should seek professional medical advice as soon as possible. The website would also need to have dedicated sections discussing the terms and conditions and the privacy policy to outline how the user’s data is used.

Privacy and security will have to be a major part of this system as it would store and manage highly confidential information. To ensure the privacy of users the system would allow users to get health predictions without having to create an account or entering any identifying information such as name, address, Medicare number, etc. After a user gets their personal information/symptoms analysed, users could optionally choose to create an account to store their information that they have entered. By giving users the ability to store their personal information they would be saving time the next time they needed to use the system as they would not have to re-enter all of their personal information, instead they would only have to log in and enter their new symptoms.

This application would be a prediction tool which bases its information off trusted information, such as “healthdirect” which is an Australian Government website which provides general ‘trusted health information’. The system could determine the symptoms and then tally them, then the symptoms with the highest tally would be shown to the user. For example, a user says they have a blocked nose. The system could find symptoms such as a common cold, hay fever and deviated septum. Then if the user has an account with saved information the system could review that information along with current seasons (as in winter, spring, summer, autumn). If the system notes that it is ‘hay fever season’ it could change the ‘tally’ to increase the likelihood that it is hay fever. Then the system notes that the user does not have a high temperature and then tallies down the likelihood of the symptom being a fever. Once the system runs though majority of the possibilities, it will produce the user with its prediction, which in this case would be hay fever.

This project would be possible by using advanced artificial intelligence (AI) and data mining. Many companies such as Google, Amazon, and Microsoft are working on advanced AI which can be used in many ways and has almost endless possibilities. These AI’s that are being developed alongside data mining or ‘big data’ technology could be used to help the system recognise patterns and medical conditions so that it can provide users with possible conditions.

All Australians who did not opt out now have a My Health Record. This is a service provided by the Australian Digital Health Agency which stores their medical information when they visit their local GP, hospitals, or specialists. Users can also manually enter data into their My Health Record account. A user may find it time consuming entering all their medical data, especially if they have an extensive medical history into the health issue prediction tool. To try and make the sign up process easier for users the application could ask users for their permission to link to their My Health Record. By giving users the option to link their accounts they would not have to manually enter all their medical data. This again would have an impact on a user’s privacy. Due to this, we could give users the option of deleting certain parts of their data once it is transferred into their online accounts, similarly to the My Health Record system.

**WHAT IS THE LIKELY IMPACT? (300 WORDS)**

The system would have the ability of majorly reducing the stress on the public health system. By using this online system Australian’s would not have to visit their general practitioner as often, therefore saving funds and resources for other Australian’s with serious health issues. The stress on the public health system is more apparent now than ever due to the COVID-19 pandemic as many Australian’s are going to their general practitioner to diagnose symptoms they have, which could be just the common cold. Instead of going to their general practitioner, Australian’s would have the ability to answer questions to determine if they actually need to go to their general practitioner.

CSIRO researchers stated that by helping the ill monitor and manage their conditions at home instead of going to their general practitioner or hospital they could ‘save the health budget up to $3 billion a year’. Another article published by Roy Morgan states that ‘11.3% of Australians (14+) looked up health or medical information online’, suggesting that many Australian’s already prefer looking online for medical advice. Therefore, having a reliable system which would be built with the input of professional doctors’ people would be able to get reliable information, unlike many other websites where people can simply enter what they believe, without any medical information to back their claims.

This project is unlikely to take jobs from health sector or make them redundant as general practitioners would still be a very important part of the health industry. The prediction tool was designed to reduce the amount of people that went to visit their doctors for minor issues, but many people would still need to visit their GPs for serious issues, or ongoing problems that someone has. In addition, the prediction tool would still advise users to visit their GP for information, if necessary.

**HOW WILL THIS AFFECT YOU? (300 WORDS)**

This application is not something that most people would be using daily but knowing that there is an online prediction tool to help them diagnose their conditions would be very helpful. This would save us time as we would not need to go to the doctor for a small issue, instead the prediction tool could be used to recommend remedy, such as over the counter medication or changing your routine. The most useful aspect of the application is that it would be saving us time. By logging into our accounts, the system will automatically get our past medical information and then will be able to quickly give us a diagnosis. Many families, especially ones with young children are very busy and having a tool that allows them to get some medical advice quickly would save them from having to go and wait at a clinic to see a doctor.

**References for Project Ideas**

* World Health Organization 2020, Health Impact Assessment (HIA) - The determinants of health, viewed 28th April 2020, <<https://www.who.int/hia/evidence/doh/en/>>.
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* Roy Morgan, More patients using internet to self-diagnose or get a second opinion, viewed 28th April 2020, < <http://www.roymorgan.com/findings/6632-going-to-the-doctor-and-online-for-health-and-medical-research-september-2015-201601180355>>.
* National Library of Medicine, The Legal and Ethical Concerns That Arise From Using Complex Predictive Analytics in Health Care, viewed 24th May 2020, <<https://pubmed.ncbi.nlm.nih.gov/25006139/>>.