

Process of Differential Diagnosis

Daniel Shameti

1. Rationale

The motivation of the project on differential diagnosis comes from the need to help those that are not educated in medicine or educated in the different types of diseases/conditions that could cause their pain or symptoms. Educating those in how diagnosis works and differential works can help oneself find out why they are getting pain and learn to get treatment earlier. Teaching people these processes of differential diagnosis will allow them to possibly self-diagnose themselves, using certain programs. Additionally, seminars in differential diagnosis have been found to be very satisfactory for students and in learning about clinical decision making and reasoning (Bosner et al. 2015). Differential diagnosis is important because it is a crucial skill used and required by medical workers (Cook & Decary, 2019). As well, the actual process of differential diagnosis is important to understand as it is the making of a list of possible conditions for the cause of the given symptoms or pain, and is important for clinical reasoning before confirming a final diagnosis.. (Richardson et al. 2000). From this, the differential diagnosis is then able to narrow down certain conditions through questioning, examinations and lab tests of the patient (Strum, 2020).

The focus of this project will be following specifically machine differential diagnosis, where technology will help in making a diagnosis. With the use of machine differential diagnosis, it will allow for more questions to narrow down conditions. As well, machine differential diagnosis will probably use artificial intelligence and databases in the future, and even right now, these technologies are currently being made and used as a starting point for further progress in machine differential diagnosis (Strum, 2020). The major technology of

machine differential diagnosis are symptom checkers, which use artificial intelligence, and people with pain can use these symptom checkers to self-diagnose (Bennett, 2018). These people answer many questions in order for the technology to be able to assess possible conditions that the patient may have. However, these symptom checkers are not entirely able to give a 100% confirmed diagnosis due to the fact that the patient may misdiagnose themselves with wrong symptoms or missing symptoms, which could exaggerate or underestimate the actual condition the person has. In order to credit these symptom checkers to be effective enough to give confirmed diagnoses, these programs will have to be consistently correct at diagnosing conditions, and of course have to be certified from medical professionals (Bennett, 2018). Further, these patients can do their own in-depth background research to become more knowledgeable on the different possibilities and diseases, which could save time in diagnosis at the doctors. As a result, this project instead will use the creation of both, simple decision trees from symptoms, and more complex ones from databases to create consistent diagnoses based on symptoms and probability, which could be more effective and help people understand the diagnosis process.

2. Engineering Goal

The goal of this project is to aid lay people in understanding what ails them and how to determine the certain tests that are needed to identify the causes of pain, and how to gather a final diagnosis. The end result/goal of the project is for a better educated public.

3. Research Methods

a. Procedure

The first part was using different symptom checkers from different programs/websites to assess made up subjects with certain given symptoms, 4 different symptom checkers were used

along with the assessment of 3 different made up subjects with pain in different parts of the body. The point of this part of the procedure was to check how consistent the symptom checkers are to see how effective they are, even with subjects of pain in different areas. Next, the different physical examinations are identified and explained how they could lead to possible diagnoses for each subject of different pains. As well, the different types of lab tests (such as ultrasounds, CT scans) are identified and explained with how they can be effective at narrowing down the diagnoses and possibilities. With all the symptoms given, plausible diagnoses given, examinations and lab tests identified, a simple decision tree can be created with the purpose of giving a way of people with those pains to follow the decision tree to a reasonable conclusion. For the other part of the procedure, data and probabilities from certain databases will be obtained from people reporting certain symptoms and the options and treatments they chose along away, as well as the specific narrowing of possible diagnoses. With this given data, a more complex differential diagnosis decision tree can be created and studied.

b. Analysis

The analytical methods that will be used is just the basic comparison of symptom checkers and their consistency of similar diagnosis of possible conditions, however these symptom checkers usually give suggestions of possible conditions and tell the subject to go to the doctors or a hospital for an official diagnosis, which is considerably reasonable. Another analytical method would be determining how effective the examinations and laboratory tests are. Lastly, certain analytical methods (unsure of what yet) would be used to determine the probabilities of the more complex differential diagnosis decision trees, and which would figure out which conditions are more likely and what treatments are more effective. The decision of if the research goal will be finally reached is if the project and diagrams/decision trees of

differential diagnosis are effective at helping people understand how it works and why it works just from an overall standpoint.

c. Risk Assessment

With this certain project, there seems to be no risks associated. This is due to the fact all the data gathered will be from technology and the internet. The data gathered from symptom checkers are based on artificial intelligence and complex programs. As well, the data gathered from the certain databases were already taken and are already stored in the database and internet, so there would be no risk with gathering this data.

4. References

- Bennett, C. (2018, August 23). The Impact of Self-Diagnosis on the Healthcare Industry. Retrieved December 05, 2020, from <https://www.news-medical.net/health/The-Impact-of-Self-Diagnosis-on-the-Healthcare-Industry.aspx>
- Bösner, S., Pickert, J., & Stibane, T. (2015). Teaching differential diagnosis in primary care using an inverted classroom approach: student satisfaction and gain in skills and knowledge. *BMC medical education*, 15, 63. <https://doi.org/10.1186/s12909-015-0346-x>
- Cook, C. E., & Décary, S. (2020). Higher order thinking about differential diagnosis. *Brazilian journal of physical therapy*, 24(1), 1–7. <https://doi.org/10.1016/j.bjpt.2019.01.010>
- Richardson, W., Glasziou, P., Polashenski, W., & Wilson, M. (2000, November 01). A new arrival: Evidence about differential diagnosis. Retrieved December 05, 2020, from <http://dx.doi.org/10.1136/ebm.5.6.164>
- Strum, J. (2020, October 25). Differential Diagnosis. Retrieved December 05, 2020, from <https://www.therecoveryvillage.com/mental-health/related/differential-diagnosis/>